AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOLOGY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2019-20

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

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[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

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Programme Specific Outcomes:

PSO 1: Will be able to design, develop and implement efficient software for a given real life problem.

PSO 2: Will be able to apply knowledge of AI, Machine Learning and Data Mining in analyzing big data forextracting useful information from it and for performing predictive analysis.

PSO 3: Will be able to design, manage and secure wired/ wireless computer networks for transfer and sharing ofinformation.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I SEM																
	BP101T	3	1	2	-	1	3	2	1	3	2	2				

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Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACOLOGY
Course Handout
Course : HUMAN ANATOMY AND PHYSIOLOGY – I THEORY
Course Code : BP101T, Crédits : 04, Session :2019-20 (Odd Sem.), Class : B.Pharm. 1st Year
Faculty Name: Dr. A. N. Nagappa, Dr. Naveen Sharma

A. Introduction: This course is designed to impart fundamental knowledge on the structure and functions of the various systems of the human body. It also helps in understanding both homeostatic mechanisms. The subject provides the basic knowledge required to understand the various disciplines of pharmacy

B. Course Outcomes: At the end of the course, students will be able to:

BP101T.CO1. Explain the gross morphology, structure and functions of various organs of the human body. Define and explain the anatomy and physiology, various levels of organizations basic homeostatic mechanism.

BP101T.CO2. Describe the various process of cell communication and homeostatic mechanisms and their imbalances. Explain the morphology, physiology of skeletal system along with the physiology of muscle contraction in co-ordination with the joints, their articulation and skin.

BP101T.CO3. Identify the various tissues and organs of different systems of human body and give the protection to human body as integument, support as skeleton system. Explain and describe the composition, function of various body fluids like blood and lymph, their significance and related disorders.

BP101T.CO4. Perform the various experiments related to special senses and nervous system. Classify the peripheral nervous system, nerves and morphology of special senses.

BP101T.CO5. Appreciate coordinated working pattern of some vital organs of specific system. Explain the anatomy and physiology and parameters related to CVS and related disorders.

C. Programme Outcomes:

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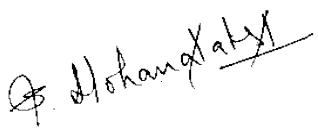

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D. Programme Specific Outcomes:

PSO 1: Will be able to understand anatomy and physiology of human body system and how the human body maintain internal environment so that different organs perform work properly.

PSO 2: Will be able to give the information about how the cell communicate and maintain their functions and various disorders of different human organs so that we can give the appropriate therapy.

PSO 3: Will be able to understand organization at the different level of human body.

Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

Unit I

- Introduction to human body Definition and scope of anatomy and physiology, levels of structural organization and body systems, basic life processes, homeostasis, basic anatomical terminology.
- Cellular level of organization Structure and functions of cell, transport across cell membrane, cell division, cell junctions. General principles of cell communication, intracellular signaling pathway activation by extracellular signal molecule, Forms of intracellular signaling: a) Contact-dependent b) Paracrine c) Synaptic d) Endocrine
- Tissue level of organization Classification of tissues, structure, location and functions of epithelial, muscular and nervous and connective tissues.

Unit II

- Integumentary system Structure and functions of skin
- Skeletal system Divisions of skeletal system, types of bone, salient features and functions of bones of axial and appendicular skeletal system Organization of skeletal muscle, physiology of muscle contraction, neuromuscular junction
- Joints Structural and functional classification, types of joints movements and its articulation

Unit III

- Body fluids and blood
- Body fluids, composition and functions of blood, hemopoeisis, formation of hemoglobin, anemia, mechanisms of coagulation, blood grouping, Rh factors, transfusion, its significance and disorders of blood, Reticulo endothelial system.
- Lymphatic system Lymphatic organs and tissues, lymphatic vessels, lymph circulation and functions of lymphatic system

Unit IV

- Peripheral nervous system: Classification of peripheral nervous system: Structure and functions of sympathetic and parasympathetic nervous system. Origin and functions of spinal and cranial nerves.
- Special senses Structure and functions of eye, ear, nose and tongue and their disorders.
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Unit V

- Cardiovascular system Heart – anatomy of heart, blood circulation, blood vessels, structure and functions of artery, vein and capillaries, elements of conduction system of heart and heart beat, its regulation by autonomic nervous system, cardiac output, cardiac cycle. Regulation of blood pressure, pulse, electrocardiogram and disorders of heart.

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypee brothers medical publishers, New Delhi.
2. Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York
3. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co,Riverview,MI USA
4. Text book of Medical Physiology- Arthur C,Guyton andJohn.E. Hall. Miamisburg, OH, U.S.A.
5. Principles of Anatomy and Physiology by Tortora Grabowski. Palmetto, GA, U.S.A.

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Definition and scope of anatomy and physiology, levels of structural organization and body system.	Lecture	Unit-1 CO1	Mid Term-1, Quiz & End Sem Exam
2	Definition and scope of anatomy and physiology, levels of structural organization and body system.	Lecture	CO1	Mid Term-1, Quiz & End Sem Exam
3	Definition and scope of anatomy and physiology, levels of structural organization and body system.	Lecture	CO1	Mid Term-1, Quiz & End Sem Exam
4	Revision of Definition and scope of anatomy and physiology, levels of structural organization and body system.	Tutorial	CO1	Mid Term-1, Quiz & End Sem Exam
5	basic life processes, homeostasis, basic anatomical terminology.	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam

6	basic life processes, homeostasis, basic anatomical terminology.	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
7	basic life processes, homeostasis, basic anatomical terminology.	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
8	Quiz	Tutorial		Mid Term-1, Quiz & End Sem Exam
9	Structure and functions of cell, transport across cell membrane, cell division, cell junctions.	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
10	Structure and functions of cell, transport across cell membrane, cell division, cell junctions.	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
11	Structure and functions of cell, transport across cell membrane, cell division, cell junctions.	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
12	Revision----Structure and functions of cell, transport across cell membrane, cell division, cell junctions.	Tutorial		Mid Term-1, Quiz & End Sem Exam
13	General principles of cell communication, intracellular signaling pathway activation by extracellular signal molecule, Forms of intracellular signaling: a) Contact-dependent b) Paracrine c) Synaptic d) Endocrine	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
14	General principles of cell communication, intracellular signaling pathway activation by extracellular signal molecule,	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
15	Forms of intracellular signaling: a) Contact-dependent b)	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem

	Paracrine c) Synaptic d) Endocrine			Exam
16	Unit test	Tutorial		Mid Term-1, Quiz & End Sem Exam
17	Classification of tissues, structure, location and functions of epithelial	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
18	Classification of tissues, structure, location and functions of epithelial	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
19	Classification of tissues, structure, location and functions of muscular and nervous.	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
20	Classification of tissues, structure, location and functions of connective tissues.	Tutorial	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
21	Structure and functions of skin	Lecture	Unit-2 CO3	Mid Term-1, Quiz & End Sem Exam
22	Divisions of skeletal system, types of bone	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
23	Divisions of skeletal system, types of bone	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
24	Quiz	Tutorial		Mid Term-1, Quiz & End Sem Exam
25	salient features and functions of bones of axial and appendicular skeletal system	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
26	Salient features and functions of bones of axial	Lecture	CO1 CO3	Mid Term-1, Quiz &

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	and appendicular skeletal system			End Sem Exam
27	Organization of skeletal muscle, physiology of muscle contraction	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
28	Revision of Bones	Tutorial		Mid Term-1, Quiz & End Sem Exam
29	Neuromuscular junction	Lecture	CO1	Mid Term-1, Quiz & End Sem Exam
30	Structural and functional classification, types of joints movements and its articulation	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
31	Structural and functional classification, types of joints movements and its articulation	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
32	Body fluids, composition and functions of blood	Tutorial	Unit-3 CO4	Mid Term-2, Quiz & End Sem Exam
33	Hemopoeisis, formation of hemoglobin, anemia,	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
34	Mechanisms of coagulation	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
35	Blood grouping, Rh factors	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
36	Seminar	Tutorial		Mid Term-2, Quiz & End Sem Exam
37	Transfusion, its significance and disorders of blood	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam

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38	Reticulo endothelial system	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
39	Lymphatic organs and tissues, lymphatic vessels, lymph circulation and functions of lymphatic system	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
40	Unit test	Tutorial		Mid Term-2, Quiz & End Sem Exam
41	Classification of peripheral nervous	Lecture	Unit-4	Mid Term-2, Quiz & End Sem Exam
42	Structure and functions of sympathetic and parasympathetic nervous system	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
43	Origin and functions of spinal and cranial nerves	Lecture	CO1	Mid Term-2, Quiz & End Sem Exam
44	Seminar	Tutorial		Mid Term-2, Quiz & End Sem Exam
45	Structure and functions of eye its their disorders.	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
46	Structure and functions of ear its disorders.	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
47	Structure and functions of tongue and its disorders.	Lecture	CO1	Quiz & End Sem Exam
48	Quiz	Tutorial		Quiz & End Sem Exam
49	Heart – anatomy	Lecture	Unit-5	Quiz & End Sem Exam
50	Heart blood circulation	Lecture	CO1 CO5	Quiz & End Sem Exam
51	Blood vessels, structure and	Lecture	CO1	Quiz & End

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	functions of artery, vein and capillaries		CO5	Sem Exam
52	Blood vessels, structure and functions of artery, vein and capillaries	Tutorial	CO1 CO5	Quiz & End Sem Exam
53	elements of conduction system of heart and heart beat	Lecture	CO1 CO5	Quiz & End Sem Exam
54	Elements of conduction system of heart and heart beat	Lecture	CO1 CO5	Quiz & End Sem Exam
55	Regulation by autonomic nervous system, cardiac output	Lecture	CO1 CO5	Quiz & End Sem Exam
56	Unit test	Tutorial		Quiz & End Sem Exam
57	Cardiac cycle	Lecture	CO1 CO5	Quiz & End Sem Exam
58	Regulation of blood pressure, pulse, electrocardiogram and disorders of heart.	Lecture	CO1 CO5	Quiz & End Sem Exam
59	Regulation of blood pressure, pulse, electrocardiogram and disorders of heart.	Lecture	CO1 CO5	Quiz & End Sem Exam
60	Unit test	Tutorial		Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP101T.1	Explain the gross morphology, structure and functions of various organs of the human body.	3	-	-	-	2	2	1	-	-	-	-		3	2	1

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BP101T.2.	Describe the various process of cell communication and homeostatic mechanisms and their imbalances.	3	-	-	1	-	2	-	-	-	-	3		2	3	1
BP101T.3.	Identify the various tissues and organs of different systems of human body and give the protection to human body as integument, support as skeleton system.	3	2	-	3	-	2	-	-	-	-	3		1	2	3
BP101T.4.	Perform the various experiments related to special senses and nervous system.	2	2	3	3	-	1	-	-	-	-	3		2	3	2
BP101T.5.	Appreciate coordinated working pattern of some vital organs of specific system.	3	-	2	-	2	-	-	-	-	-	3		2	3	3

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacology I MID-SEMESTER (SEM –Ist) 2019-20						
Class: B.Pharm, I Semester						
Subject Name: BP101T Human Anatomy and Physiology-I Theory		Time: 1 Hrs			Max. Marks: 30	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,2,4,10	Q.8,9,6	Q.5,3	Q.7		

Student will be able to

CO1. Explain the gross morphology, structure and functions of various organs of the human body.

CO2. Describe the various process of cell communication and homeostatic mechanisms and their imbalances.

CO3. Identify the various tissues and organs of different systems of human body and give the protection to human body as integument, support as skeleton system.

CO Map	Question No.	Question	Marks
CO1	Q.1	What is structural and functional unit of all living beings	2
CO1	Q.2	Define homeostasis.	2
CO1	Q.3	Make use of cell junctions for the cell.	2
CO2	Q.4	Why is cell communication important for cell.	2
CO2	Q.5	Identify correct location of carpal bones.	2
CO3	Q.6	Explain mechanism of the skeletal muscles contraction.	10
CO2	Q.7	Distinguish different layers of skin.	10
CO1 CO2	Q.8	Compare plant cell and animal cell.	5
CO1 CO3	Q.9	Classify upper and lower limb bones	5
CO1 CO2	Q.10	What are the basic life processes	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 1:

63.5 % Percentage of students secured more than 60% marks, so this course attained Level:1.

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DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

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PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11				
I SEM	BP102T	3	3	3	2	-	1	2	2	1	-	1		-	-	-

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Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICAL CHEMISTRY
Course Handout
Course : PHARMACEUTICAL ANALYSIS (Theory)
Course Code : BP102T , Crédits : 04, Session :2019-20(Odd Sem.), Class : B.Pharm. 1st Year
Faculty Name : Dr. Pawan Kumar Gupta

A. Introduction: This course deals with the fundamentals of analytical chemistry and principles of electrochemical analysis of drugs. It aims to understand the principles of volumetric and electro chemical analysis and carryout various volumetric and electrochemical titrations.

B. Course Outcomes: At the end of the course, students will be:

BP102T.1. Able to **discuss** principles of volumetric analysis

BP102T.2. Able to **explain** the basics of different titration methodologies

BP102T.3. Able to **compare** various electrochemical methods of analysis

BP102T.4. Able to **ensure** quality of product by titrations

BP102T.5. Able to **develop** methods for the estimation and determination of drugs and pharmaceuticals

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D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2 quiz, assignment, open book test, field work, group discussion and seminar)		
	Seminar/ Assignment/Quiz/ Open book test	S/As/Q/OBT	3%
Interaction	Student-Teacher interaction	ST	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester	End Semester Examination	EE	75%

Examination			
Total			**100%**

E. Syllabus

UNIT I

a) Pharmaceutical analysis- Definition and scope

i. Different techniques of analysis
ii. Methods of expressing concentration
iii. Primary and secondary standards.
iv. Preparation and standardization of various molar and normal solutions-Oxalic acid, sodium hydroxide, hydrochloric acid, sodium thiosulphate, sulphuric acid, potassium permanganate and ceric ammonium sulphate

b) **Errors:** Sources of errors, types of errors, methods of minimizing errors, accuracy, precision and significant figures

c) Pharmacopoeia, Sources of impurities in medicinal agents,limit tests.

UNIT-II

- **Acid base titration**: Theories of acid base indicators, classification of acid base titrations and theory involved in titrations of strong, weak, and very weak acids and bases, neutralization curves
- **Non aqueous titration**: Solvents, acidimetry and alkalimetry titration and estimation of Sodium benzoate and Ephedrine HCl

UNIT-III

- **Precipitation titrations**: Mohr's method, Volhard's, Modified Volhard's, Fajans method, estimation of sodium chloride
- **Complexometric titration**: Classification, metal ion indicators, masking and demasking reagents, estimation of Magnesium sulphate, and calcium gluconate.
- **Gravimetry**: Principle and steps involved in gravimetric analysis. Purity of the precipitate: co-precipitation and post precipitation, Estimation of barium sulphate.

UNIT -IV

Redox titrations

(a) Concepts of oxidation and reduction
(b) Types of redox titrations (Principles and applications)

Cerimetry, Iodimetry, Iodometry, Bromatometry, Dichrometry, Titration with potassium iodate

UNIT-V

Electrochemical methods of analysis

- Conductometry- Introduction, Conductivity cell, Conductometric titrations, applications.
- Potentiometry - Electrochemical cell, construction and working of reference (Standard hydrogen, silver chloride electrode and calomel electrode) and indicator electrodes (metal electrodes and glass electrode), methods to determine end point of potentiometric titration and applications.
- Polarography - Principle, Ilkovic equation, construction and working of dropping mercury electrode and rotating platinum electrode, applications

F. Examination Scheme:

Components	A	ST	CT	S/As/Q/OBT	EE
Weightage (%)	4	3	15	3	75

CT: Class Test, As: Assignment, ST: Student teacher interaction, S/A/Q/OBT: Seminar/ Assignment/Quiz/ Open book test, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

- AA Napoleon, Pharmaceutical Titrimetric Analysis,
- Skoog-Instrumental Analysis and Skoog fundamentals of analytical chemistry.
- AH Beckett & Stenlake Vol. I & II practical pharmaceutical chemistry, Continuum International Publishing Group, Althone.
- Connors, A Textbook of Pharmaceutical Analysis.
- Chatwal & anand, Instrumental methods of Analysis.

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Pharmaceutical analysis- Definition and scope	Lecture	BP102T.1	Mid Term-1, Quiz & End Sem Exam
2	Methods of expressing concentration	Lecture	BP102T.4	Mid Term-1, Quiz & End Sem Exam
3	Primary and secondary standards.	Lecture	BP102T.4	Mid Term-1, Quiz & End Sem Exam
4	Tutorial class Methods of expressing concentration	Lecture	BP102T.4	Mid Term-1, Assignment ,Quiz & End Sem Exam
5	Preparation and standardization of various molar and normal solutions	Lecture	BP102T.4	Mid Term-1, Quiz & End Sem Exam
6	Sources of errors and Types of errors	Lecture	BP102T.4	Mid Term-1, Quiz & End Sem Exam
7	Methods of minimizing errors	Lecture	BP102T.4	Mid Term-1, Quiz & End Sem Exam
8	Tutorial class Sources of errors	Lecture	BP102T.4	Mid Term-1, Quiz, Class

				test & End Sem Exam
9	Accuracy, precision and significant figures	Lecture	BP102T.4	Mid Term-1, Quiz & End Sem Exam
10	Pharmacopoeia	Lecture	BP102T.5	Mid Term-1, Quiz & End Sem Exam
11	Sources of impurities in medicinal agents	Lecture	BP102T.4	Mid Term-1, Quiz & End Sem Exam
12	*Tutorial class:* Pharmacopoeia	Lecture	BP102T.5	Mid Term-1, Assignment ,Quiz & End Sem Exam
13	Limit tests	Lecture	BP102T.4	Mid Term-1, Quiz & End Sem Exam
14	Theories of acid base indicators	Lecture	BP102T.1 & BP102T.2	Mid Term-1, Quiz & End Sem Exam
15	Classification of acid base titrations	Lecture	BP102T.2	Mid Term-1, Quiz & End Sem Exam
16	*Tutorial class* *Acid and base*	Lecture	BP102T.1	Mid Term-1, Class test, Quiz & End Sem Exam
17	Theory involved in titrations of strong, weak, and very weak acids and bases,	Lecture	BP102T.1	Mid Term-1, Quiz & End Sem Exam
18	Neutralization curves	Lecture	BP102T.2	Mid Term-1, Quiz & End Sem Exam
19	Non aqueous titration: Solvents	Lecture	BP102T.2	Mid Term-1, Quiz & End Sem Exam
20	*Tutorial class* Neutralization curves	Lecture	BP102T.2	Mid Term-1, Assignment ,Quiz & End Sem Exam
21	Acidimetry and alkalimetry titration	Lecture	BP102T.2	Mid Term-1, Quiz & End Sem Exam
22	Estimation of Sodium benzoate	Lecture	BP102T.5	Mid Term-1, Quiz & End

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				Sem Exam
23	Estimation of Ephedrine HCl	Lecture	BP102T.5	Mid Term-1, Quiz & End Sem Exam
24	*Tutorial class* Acidimetry	Lecture	BP102T.2	Mid Term-1, Quiz & End Sem Exam
25	Mohr's and Volhards method	Lecture	BP102T.1	Mid Term-1, Quiz & End Sem Exam
26	Fajans method	Lecture	BP102T.5	Mid Term-1, Quiz & End Sem Exam
27	Estimation of sodium chloride.	Lecture	BP102T.5	Mid Term-1, Quiz & End Sem Exam
28	*Tutorial class* Volhards method	Lecture	BP102T.5	Mid Term-2, Seminar,Quiz & End Sem Exam
29	Complexometric titration: Classification	Lecture	BP102T.2	Mid Term-2, Quiz & End Sem Exam
30	Metal ion indicators, masking and demasking reagents,	Lecture	BP102T.2	Mid Term-2, Quiz & End Sem Exam
31	Estimation of Magnesium sulphate, and calcium gluconate.	Lecture	BP102T.5	Mid Term-2, Quiz & End Sem Exam
32	*Tutorial class* Estimation of Magnesium sulphate	Lecture	BP102T.5	Mid Term-2, Quiz & End Sem Exam
33	**Gravimetry**: Principle and steps involved in gravimetric analysis.	Lecture	BP102T.1	Mid Term-2, Quiz & End Sem Exam
34	Purity of the precipitate: co-precipitation and post precipitation	Lecture	BP102T.1	Mid Term-2, Quiz & End Sem Exam
35	Estimation of barium sulphate	Lecture	BP102T.5	Mid Term-2, Quiz & End Sem Exam
36	*Tutorial class* Gravimetric analysis.	Lecture	BP102T.1	Mid Term-2, Assignment

				,Quiz & End Sem Exam
37	Basic Principles, methods and application of diazotisation titration.	Lecture	BP102T.1	Mid Term-2, Quiz & End Sem Exam
38	Concepts of oxidation	Lecture	BP102T.2	Mid Term-2, Quiz & End Sem Exam
39	Concepts of reduction	Lecture	BP102T.2	Mid Term-2, Quiz & End Sem Exam
40	*Tutorial class* Oxidation and reduction	Lecture	BP102T.2	Mid Term-2, Quiz & End Sem Exam
41	Types of redox titrations (Principles and applications)	Lecture	BP102T.2	Mid Term-2, Quiz & End Sem Exam
42	Cerimetry	Lecture	BP102T.1& BP102T.5	Mid Term-2, Quiz & End Sem Exam
43	Iodimetry	Lecture	BP102T.1& BP102T.5	Mid Term-2, Quiz & End Sem Exam
44	*Tutorial class* *Redox reactions*	Lecture	BP102T.1& BP102T.5	Mid Term-2, Seminar, Quiz & End Sem Exam
45	Iodometry	Lecture	BP102T.1& BP102T.5	Mid Term-2, Quiz & End Sem Exam
46	Bromatometry	Lecture	BP102T.1& BP102T.5	Mid Term-2, Quiz & End Sem Exam
47	Dichrometry	Lecture	BP102T.1& BP102T.5	Mid Term-2, Quiz & End Sem Exam
48	*Tutorial class* Iodometry	Lecture	BP102T.1& BP102T.5	Mid Term-2, Seminar, Quiz & End Sem Exam
49	Titration with potassium iodate	Lecture	BP102T.1& BP102T.5	Mid Term-2, Quiz & End Sem Exam
50	Conductivity cell	Lecture	BP102T.3	Mid Term-2, Quiz & End Sem Exam

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51	Conductometric Titrations and applications.	Lecture	BP102T.3	Mid Term-2, Quiz & End Sem Exam
52	*Tutorial class*: Conductometric methods	Lecture	BP102T.3	Mid Term-2, Assignment ,Quiz & End Sem Exam
53	Electrochemical cell	Lecture	BP102T.3	Mid Term-2, Quiz & End Sem Exam
54	Construction and working of reference (Standard hydrogen, silver chloride electrode and calomel electrode)	Lecture	BP102T.3	Mid Term-2, Quiz & End Sem Exam
55	Indicator electrodes (metal electrodes and glass electrode)	Lecture	BP102T.3	Mid Term-2, Quiz & End Sem Exam
56	*Tutorial class* Standard hydrogen, silver chloride electrode	Lecture	BP102T.3	Mid Term-2, Quiz & End Sem Exam
57	Methods to determine end point of potentiometric titration and applications	Lecture	BP102T.3 and BP102T.5	Mid Term-2, Quiz & End Sem Exam
58	Ilkovic equation	Lecture	BP102T.3	Mid Term-2, Quiz & End Sem Exam
59	Construction and working of dropping mercury electrode and rotating platinum electrode and applications	Lecture	BP102T.3	Mid Term-2, Quiz & End Sem Exam
60	*Tutorial class* End point of potentiometric titration	Lecture	BP102T.3 and BP102T.5	Mid Term-2, Seminar,Quiz & End Sem Exam

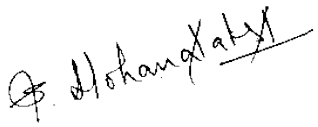
I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11

BP102T.1.	Able to discuss principles of volumetric analysis	3	3	1	2	1				1		2
BP102T.2.	Able to explain the basics of different titration methodologies	3	3	1	3	2				2		2
BP102T.3.	Able to compare various electrochemical methods of analysis	3	3	2	3	2				3		2
BP102T.4.	Able to ensure quality of product by titrations	3	3	2	2	2			2	2		2
BP102T.5.	Able to develop methods for the estimation and determination of drugs and pharmaceuticals	3	3	2	3	3			2	2		3

Sample Question Paper

Amity Institute of pharmacy Department of Pharmaceutical Chemistry II MID-SEMESTER (SEM –I) 2019-20						
Class: B.Pharmacy I Semester						
Subject Name: BP102T PHARMACEUTICAL ANALYSIS		Time: 1 Hr		Max. Marks: 30		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3,4	Q.2,5,9,10	Q.6	Q.8		Q.7
Student will be **CO**1. Able to **discuss** principles of volumetric analysis **CO**.2. Able to **explain** the basics of different titration methodologies						



CO.3. Able to **compare** various electrochemical methods of analysis

CO.4. Able to **ensure** quality of product by titrations

CO.5. Able to **develop** methods for the estimation and determination of drugs and Pharmaceuticals

CO Map	Question No.	Question	Marks
CO2	Q.1	Define diazotization titration.	2
CO1	Q.2	Write a note on principle of complexometric titration	2
	Q.3	Define oxidation-reduction titration	2
CO1	Q.4	Calculate oxidation state Mn in $KMnO_4$	2
CO2	Q.5	Explain the principle of Dichrometry.	2
CO4	Q.6	Distinguish between iodimetry and iodometry	10
	Q.7	Discuss various steps involved in diazitisation titration.	10
CO2	Q 8	Describe the principle involved in permanganate titration	5
CO5	Q.9	Write a note on volhard method.	5
CO3	Q 10	Explain gravimetric titrations with suitable examples.	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 0:

55.8 % Percentage of students secured more than 60% marks, so this course not attained any Level.

AMITY UNIVERSITY
MADHYA PRADESH
Established vide Government of Madhya Pradesh Act No. 27 of 2010

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICS

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2019-20

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I SEM																
	BP103T	3	-	2	-	1	3	2	1	1	-	2				

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AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICS
Course Handout
Course : PHARMACEUTICS – I THEORY
Course Code : BP103T, Crédits : 04, Session :2019-20 (Odd Sem.), Class : B.Pharm. 1st Year
Faculty Name: Dr. Ajay Sharma

A. Introduction: The course is designed to impart fundamental knowledge on the preparatory
pharmacy with arts and science of preparing the different conventional dosage forms.

B. Course Outcomes: At the end of the course, students will be able to:

BP103T.1. Relate pharmacy education, and pharmacy history with pharmacy career options.

BP103T.2. Classify the different types of dosage forms based on uses, physical form, and pharmaceutical incompatibilities.

BP103T.3. Experiment in the development of various conventional dosage forms such as solid, liquid, and semisolid dosage forms.

BP103T.4. Able to analyze the prescription, stability issues in emulsion and suspension.

BP103T.5. Solve the dose calculation, pharmaceutical calculations.

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	Description	Code	Weightage %
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

UNIT – I

Historical background and development of profession of pharmacy: History of profession of Pharmacy in India in relation to pharmacy education, industry and organization, Pharmacy as a career, Pharmacopoeias: Introduction to IP, BP, USP and Extra Pharmacopoeia. **Dosage forms:** Introduction to dosage forms, classification and definitions, **Prescription:** Definition, Parts of prescription, handling of Prescription and Errors in prescription. **Posology:** Definition, Factors affecting posology. Pediatric dose calculations based on age, body weight and body surface area.

UNIT – II

Pharmaceutical calculations: Weights and measures – Imperial & Metric system, Calculations involving percentage solutions, alligation, proof spirit and isotonic solutions based on freezing point and molecular weight. **Powders:** Definition, classification, advantages and disadvantages, Simple & compound powders – official preparations, dusting powders, effervescent, efflorescent and hygroscopic powders, eutectic mixtures. Geometric dilutions. **Liquid dosage forms:** Advantages and disadvantages of liquid dosage

forms. Excipients used in formulation of liquid dosage forms. Solubility enhancement techniques.

UNIT – III

Monophasic liquids: Definitions and preparations of Gargles, Mouthwashes, Throat Paint, Eardrops, Nasal drops, Enemas, Syrups, Elixirs, Liniments and Lotions.**Biphasic liquids: Suspensions:** Definition, advantages and disadvantages, classifications, Preparation of suspensions; Flocculated and Deflocculated suspension & stability problems and methods to overcome. **Emulsions:** Definition, classification, emulsifying agent, test for the identification of type of Emulsion, Methods of preparation & stability problems and methods to overcome.

UNIT – IV

Suppositories: Definition, types, advantages and disadvantages, types of bases, methods of preparations. Displacement value & its calculations, evaluation of suppositories. **Pharmaceutical incompatibilities**: Definition, classification, physical, chemical and therapeutic incompatibilities with examples.

UNIV – V

Semisolid dosage forms: Definitions, classification, mechanisms and factors influencing dermal penetration of drugs. Preparation of ointments, pastes, creams and gels. Excipients used in semi solid dosage forms. Evaluation of semi solid dosages forms

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

- H.C. Ansel et al., Pharmaceutical Dosage Form and Drug Delivery System, Lippincott Williams and Walkins, New Delhi.
- Carter S.J., Cooper and Gunn's-Dispensing for Pharmaceutical Students, CBS publishers, New Delhi.
- M.E. Aulton, Pharmaceutics, The Science& Dosage Form Design, Churchill Livingstone, Edinburgh.
- Indian pharmacopoeia.
- British pharmacopoeia.

H. Lecture Plan

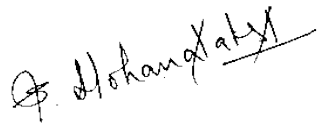
Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	History of profession of Pharmacy in India in relation to pharmacy education	Lecture	1	Mid Term-1, Quiz & End Sem Exam
2	History of profession of Pharmacy in India in relation to pharmacy industry and organization	Lecture	1	Mid Term-1, Quiz & End Sem Exam
3	Pharmacy as a career	Lecture		Mid Term-1, Quiz & End Sem Exam
4	Revision of history of pharmacy	Tutorial	1	Mid Term-1, Quiz & End Sem Exam
5	Introduction to dosage forms	Lecture	2	Mid Term-1, Quiz & End Sem Exam
6	classification and definitions	Lecture	2	Mid Term-1, Quiz & End Sem Exam
7	classification and definitions	Lecture	2	Mid Term-1, Quiz & End Sem Exam
8	Quiz	Tutorial		Mid Term-1, Quiz & End Sem Exam
9	Definition, Parts of prescription,	Lecture	4	Mid Term-1, Quiz & End Sem Exam
10	Handling of Prescription and Errors in prescription.	Lecture	4	Mid Term-1, Quiz & End Sem

				Exam
11	Definition, Factors affecting posology.	Lecture	5	Mid Term-1, Quiz & End Sem Exam
12	Discussion about posology	Tutorial		Mid Term-1, Quiz & End Sem Exam
13	Pediatric dose calculations based on age, body weight and body surface area.	Lecture	5	Mid Term-1, Quiz & End Sem Exam
14	Weights and measures – Imperial & Metric system,	Lecture	5	Mid Term-1, Quiz & End Sem Exam
15	Calculations involving percentage solutions, alligation, proof spirit	Lecture	5	Mid Term-1, Quiz & End Sem Exam
16	Unit test	Tutorial		Mid Term-1, Quiz & End Sem Exam
17	Calculations involving isotonic solutions based on freezing point and molecular weight.	Lecture	5	Mid Term-1, Quiz & End Sem Exam
18	**Powders:** Definition, classification, advantages and disadvantages, Simple & compound powders	Lecture	2,3	Mid Term-1, Quiz & End Sem Exam
19	Official preparations, dusting powders, effervescent, efflorescent and hygroscopic powders,	Lecture	2,3	Mid Term-1, Quiz & End Sem Exam
20	Group discussion on different topics	Tutorial		Mid Term-1, Quiz & End Sem Exam
21	Eutectic mixtures. Geometric dilutions. Liquid dosage forms	Lecture	2,3	Mid Term-1, Quiz & End Sem Exam

22	Advantages and disadvantages of liquid dosage forms.	Lecture	2,3	Mid Term-1, Quiz & End Sem Exam
23	Excipients used in formulation of liquid dosage forms.	Lecture	2,3	Mid Term-1, Quiz & End Sem Exam
24	Quiz	Tutorial		Mid Term-1, Quiz & End Sem Exam
25	Solubility enhancement techniques.	Lecture	2,3	Mid Term-1, Quiz & End Sem Exam
26	Definitions and preparations of Gargles	Lecture	Unit-3	Mid Term-1, Quiz & End Sem Exam
27	Mouthwashes, Throat Paint	Lecture	2,3	Mid Term-1, Quiz & End Sem Exam
28	Revision of solubility enhancement technique	Tutorial		Mid Term-1, Quiz & End Sem Exam
29	Eardrops, Nasal drops, Enemas	Lecture	2,3	Mid Term-1, Quiz & End Sem Exam
30	Syrups, Elixirs,	Lecture	2,3	Mid Term-1, Quiz & End Sem Exam
31	Liniments and Lotions	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
32	Group discussion on liquid dosage form	Tutorial		Mid Term-2, Quiz & End Sem Exam
33	Definition, advantages and disadvantages,	Lecture	2,3	Mid Term-2, Quiz &

	classifications, Preparation of suspensions			End Sem Exam
34	Flocculated and Deflocculated suspension	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
35	Stability problems and methods to overcome	Lecture	4	Mid Term-2, Quiz & End Sem Exam
36	Seminar	Tutorial		Mid Term-2, Quiz & End Sem Exam
37	Definition, classification, emulsifying agent	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
38	Test for identification, type of Emulsion,	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
39	Methods of preparation	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
40	Unit test	Tutorial		Mid Term-2, Quiz & End Sem Exam
41	Stability problems and methods to overcome	Lecture	4	Mid Term-2, Quiz & End Sem Exam
42	Semisolid dosage forms: Definitions, classification	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
43	Mechanisms and factors influencing dermal penetration of drugs	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
44	Seminar	Tutorial		Mid Term-2, Quiz & End Sem

				Exam
45	Preparation of ointments	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
46	Preparation of paste	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
47	Preparation of cream & gel	Lecture	2,3	Quiz & End Sem Exam
48	Quiz	Tutorial		Quiz & End Sem Exam
49	Excipients used in semi solid dosage forms	Lecture	2,3	Quiz & End Sem Exam
50	Evaluation of semi solid dosages forms	Lecture	2,3	Quiz & End Sem Exam
51	Semisolid dosage forms: Definitions, classification	Lecture	2,3	Quiz & End Sem Exam
52	Group discussion on semisolid dosage form	Tutorial		Quiz & End Sem Exam
53	Mechanisms and factors influencing dermal penetration of drugs	Lecture	2,3	Quiz & End Sem Exam
54	Preparation of ointments	Lecture	2,3	Quiz & End Sem Exam
55	Preparation of paste	Lecture	2,3	Quiz & End Sem Exam
56	Unit test	Tutorial		Quiz & End Sem Exam
57	Preparation of cream & gel	Lecture	2,3	Quiz & End Sem Exam
58	Excipients used in semi solid dosage forms	Lecture	2,3	Quiz & End Sem Exam



59	Evaluation of semi solid dosages forms	Lecture	2,3	Quiz & End Sem Exam
60	Unit test	Tutorial		Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP103T.1	**BP103T.1**. Relate pharmacy education, and pharmacy history with pharmacy career options.	3	-	-	-	2	2	1	-	1	-	-				
BP103T.2.	**BP103T.2**. Classify the different types of dosage forms based on uses, physical form, and pharmaceutical incompatibilities.	3	-	-	1	-	2	-	-	-	-	3				
BP103T.3.	**BP103T.3**. Experiment in the development of various conventional dosage forms such as solid, liquid, and semisolid dosage forms.	3	2	-	3	-	2	-	-	-	-	3				

BP103T.4.	**BP103T.4**. Able to analyze the prescription, stability issues in emulsion and suspension.	2	2	3	3	-	1	-	-	-	-	3				
BP103T.5.	**BP103T.5**. Solve the dose calculation, pharmaceutical calculations.	1	-	3	-	-	-	-	-	-	-	3				

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutics I MID-SEMESTER (SEM –Ist) 2019-20						
Class: B.Pharm, I Semester						
Subject Name: BP103T Pharmaceutics-I Theory		Time: 1 Hrs			Max. Marks: 30	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3,4,5	Q.6,8,9	Q.2	Q.7, 10		

The student will be able to

CO1. Relate pharmacy education, and pharmacy history with pharmacy career options.

CO2. Classify the different types of dosage forms based on uses, physical form, and pharmaceutical incompatibilities.

CO3. Experiment in the development of various conventional dosage forms such as solid, liquid, and semisolid dosage forms.

CO4. Able to analyze the prescription, stability issues in emulsion and suspension.

CO5. Solve the dose calculation, pharmaceutical calculations.

CO Map	Question No.	Question	Marks
CO4	Q.1	Enlist the stability issues in emulsion.	2
CO5	Q.2	Apply Young's rule to calculate the pediatric dose for a 9-year-old child. The adult dose for the same drug is 300mg. What dose should the child be given?	2
CO1	Q.3	Who is the first postgraduate in pharmacy (India)?	2
CO2	Q.4	Define compound powder.	2

CO2	Q.5	Write the name of two gaseous dosage forms.	2
CO1	Q.6	Summarize the different career options available in the field of pharmacy	10
CO4	Q.7	Assume the drug is having a problem of poor solubility, how will you solve this issue?	10
CO3	Q.8	Compare bulk and divided powder powder.	5
CO2	Q.9	Illustrate the classification of different dosage forms on the basis of physical form.	5
CO4	Q.10	How to examine the prescription for errors?	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 1:

65.4 % Percentage of students secured more than 60% marks, so this course attained Level - 1.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharmacy), Academic Year – 2019-20

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11				
I SEM	BP104T	3	3	3	3	2		1	2	2	-	2		-	-	-

Dr. Mohanty

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICAL CHEMISTRY
Course Handout
Course : PHARMACEUTICAL INORGANIC CHEMISTRY (Theory)
Course Code : BP104T , Crédits : 04, Session :2019-20 (Odd Sem.), Class : B.Pharm. 1st Year
Faculty Name : Dr. Pawan Kumar Porwal

A. Introduction: This course deals with the fundamentals of inorganic chemistry and monograph of inorganic drugs and pharmaceuticals. It aims to understand the preparation assay, properties and medicinal uses of inorganic compounds.

B. Course Outcomes: At the end of the course, students will be:

BP104T.1. Able to discuss the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals.

BP104T.2. Able to Study the monographs of inorganic drugs and pharmaceuticals.

BP104T.3. Able to understand the medicinal and pharmaceutical importance of inorganic compounds.

BP104T.4. Able to learn about preparations, properties, chemical reactions and assay of inorganic compounds

BP104T.5. Able to discuss radio activity, measurement of radioactivity, properties and pharmaceutical applications of radiopharmaceuticals.

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the

decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis**.**

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2 quiz, assignment, open book test, field work, group discussion and seminar)		
	Seminar/ Assignment/Quiz/ Open book test	S/As/Q/OBT	3%
Interaction	Student-Teacher interaction	ST	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination.	A	4%

	The allowance of 20% includes all types of leaves including medical leaves.		
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

UNIT I

- **Impurities in pharmaceutical substances:** History of Pharmacopoeia, Sources and types of impurities, principle involved in the limit test for Chloride, Sulphate, Iron, Arsenic, Lead and Heavy metals, modified limit test for Chloride and Sulphate
- **General methods of preparation**, assay for the compounds superscripted with **asterisk (*),** properties and medicinal uses of inorganic compounds belonging to the following classes

UNIT II

- **Acids, Bases and Buffers:** Buffer equations and buffer capacity in general, buffers in pharmaceutical systems, preparation, stability, buffered isotonic solutions, measurements of tonicity, calculations and methods of adjusting isotonicity.
- **Major extra and intracellular electrolytes**: Functions of major physiological ions, Electrolytes used in the replacement therapy: Sodium chloride*, Potassium chloride, Calcium gluconate* and Oral Rehydration Salt (ORS), Physiological acid base balance.
- **Dental products**: Dentifrices, role of fluoride in the treatment of dental caries, Desensitizing agents, Calcium carbonate, Sodium fluoride, and Zinc eugenol cement.

UNIT III

- **Gastrointestinal agents**

  Acidifiers: Ammonium chloride* and Dil. HCl

  Antacid: Ideal properties of antacids, combinations of antacids, Sodium Bicarbonate*, Aluminum hydroxide gel, Magnesium hydroxide mixture

  Cathartics: Magnesium sulphate, Sodium orthophosphate, Kaolin and Bentonite

  Antimicrobials: Mechanism, classification, Potassium permanganate, Boric acid, Hydrogen peroxide*, Chlorinated lime*, Iodine and its preparations

UNIT IV

- **Miscellaneous compounds**

  Expectorants: Potassium iodide, Ammonium chloride*.

  Emetics: Copper sulphate*, Sodium potassium tartarate

  Haematinics: Ferrous sulphate*, Ferrous gluconate

  Poison and Antidote: Sodium thiosulphate*, Activated charcoal, Sodium nitrite333

  Astringents: Zinc Sulphate, Potash Alum

UNIT V

- **Radiopharmaceuticals**: Radio activity, Measurement of radioactivity, Properties of α, β, γ radiations, Half-life, radio isotopes and study of radio isotopes - Sodium iodide I^{131}, Storage conditions, precautions & pharmaceutical application of radioactive substances.

F. Examination Scheme:

Components	A	ST	CT	S/As/Q/OBT	EE
Weightage (%)	4	3	15	3	75

CT: Class Test, As: Assignment, ST: Student teacher interaction, S/A/Q/OBT: Seminar/ Assignment/Quiz/ Open book test, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

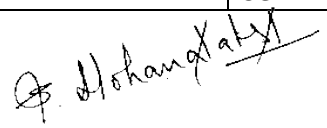
1. E A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, Stahlone Press of University of London, 4th edition
2. A.I. Vogel, Text Book of Quantitative Inorganic analysis
3. P. Gundu Rao, Inorganic Pharmaceutical Chemistry, 3rd Edition
4. M.L Schroff, Inorganic Pharmaceutical Chemistry
5. Bentley and Driver's Textbook of Pharmaceutical Chemistry
6. Anand & Chatwal, Inorganic Pharmaceutical Chemistry
7. Indian Pharmacopoeia

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	History of Pharmacopoeia	Lecture	BP104T.1 & BP104T.2	Mid Term-1, Quiz & End Sem Exam
2	Sources and types of impurities	Lecture	BP104T.1	Mid Term-1, Quiz & End Sem Exam
3	Principle involved in the limit test for Chloride,	Lecture	BP104T.1	Mid Term-1, Quiz & End Sem Exam
4	Tutorial class History of Pharmacopoeia	Lecture	BP104T.1	Mid Term-1, Assignment ,Quiz & End Sem Exam
5	Principle involved in the limit test for Sulphate	Lecture	BP104T.1	Mid Term-1, Quiz & End Sem Exam

6	Principle involved in the limit test for Iron	Lecture	BP104T.1	Mid Term-1, Quiz & End Sem Exam
7	Principle involved in the limit test for Arsenic	Lecture	BP104T.1	Mid Term-1, Quiz & End Sem Exam
8	Tutorial class limit test for Arsenic	Lecture	BP104T.1	Mid Term-1, Quiz, Class test & End Sem Exam
9	Principle involved in the limit test for Lead	Lecture	BP104T.1	Mid Term-1, Quiz & End Sem Exam
10	Heavy metals	Lecture	BP104T.1	Mid Term-1, Quiz & End Sem Exam
11	Modified limit test for Chloride and Sulphate	Lecture	BP104T.1	Mid Term-1, Quiz & End Sem Exam
12	*Tutorial class:* Modified limit test for Chloride	Lecture	BP104T.1	Mid Term-1, Assignment ,Quiz & End Sem Exam
13	Buffer equations and buffer capacity in general	Lecture	BP104T.2& BP104T.4	Mid Term-1, Quiz & End Sem Exam
14	Buffers in pharmaceutical systems, preparation, stability,	Lecture	BP104T.2& BP104T.4	Mid Term-1, Quiz & End Sem Exam
15	Buffered isotonic solutions, measurements of tonicity, calculations	Lecture	BP104T.2& BP104T.4	Mid Term-1, Quiz & End Sem Exam
16	*Tutorial class* Buffered isotonic solutions	Lecture	BP104T.4	Mid Term-1, Class test, Quiz & End Sem Exam
17	Methods of adjusting isotonicity.	Lecture	BP104T.2& BP104T.4	Mid Term-1, Quiz & End Sem Exam
18	Functions of major physiological ions	Lecture	BP104T.2& BP104T.4	Mid Term-1, Quiz & End Sem Exam
19	Electrolytes used in the replacement therapy: Sodium	Lecture	BP104T.2& BP104T.3	Mid Term-1, Quiz & End

	chloride*, Potassium chloride, Calcium gluconate			Sem Exam
20	*Tutorial class* Electrolytes used in the replacement therapy	Lecture	BP104T.2& BP104T.3	Mid Term-1, Assignment ,Quiz & End Sem Exam
21	Oral Rehydration Salt (ORS), Physiological acid base balance.	Lecture	BP104T.2& BP104T.3	Mid Term-1, Quiz & End Sem Exam
22	Dentifrices, role of fluoride in the treatment of dental caries	Lecture	BP104T.2& BP104T.3	Mid Term-1, Quiz & End Sem Exam
23	Desensitizing agents	Lecture	BP104T.2& BP104T.3	Mid Term-1, Quiz & End Sem Exam
24	*Tutorial class* Desensitizing agents	Lecture	BP104T.2& BP104T.3	Mid Term-1, Quiz & End Sem Exam
25	Calcium carbonate, Sodium fluoride, and Zinc eugenol cement.	Lecture	BP104T.2& BP104T.3	Mid Term-1, Quiz & End Sem Exam
26	**Acidifiers:** Ammonium chloride	Lecture	BP104T.2& BP104T.3	Mid Term-1, Quiz & End Sem Exam
27	Dil. HCl	Lecture	BP104T.2& BP104T.3	Mid Term-1, Quiz & End Sem Exam
28	*Tutorial class* Acidifiers	Lecture	BP104T.2& BP104T.3	Mid Term-1, Seminar,Quiz & End Sem Exam
29	**Antacid:** Ideal properties of antacids, combinations of antacids	Lecture	BP104T.2& BP104T.3	Mid Term-1, Quiz & End Sem Exam
30	Sodium Bicarbonate*, Aluminum hydroxide gel	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
31	Magnesium hydroxide mixture	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
32	*Tutorial class* Magnesium hydroxide mixture	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam



33	**Cathartics:** Magnesium sulphate	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
34	Sodium orthophosphate,	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
35	Kaolin and Bentonite	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
36	*Tutorial class* Bentonite	Lecture	BP104T.2& BP104T.3	Mid Term-2, Assignment ,Quiz & End Sem Exam
37	**Antimicrobials**: Mechanism, classification, Potassium permanganate	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
38	Boric acid, Hydrogen peroxide*	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
39	Chlorinated lime*, Iodine and its preparations	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
40	*Tutorial class* Iodine	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
41	**Expectorants:** Potassium iodide	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
42	Ammonium chloride	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
43	**Emetics**: Copper sulphate*, Sodium potassium tartarate	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
44	*Tutorial class* Copper sulphate	Lecture	BP104T.2& BP104T.3	Mid Term-2, Seminar, Quiz & End Sem Exam
45	**Haematinics:** Ferrous sulphate*, Ferrous gluconate	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
46	**Poison and Antidote:** Sodium thiosulphate*	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End

				Sem Exam
47	Activated charcoal, Sodium nitrite	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
48	*Tutorial class* Activated charcoal	Lecture	BP104T.2& BP104T.3	Mid Term-2, Seminar, Quiz & End Sem Exam
49	**Astringents**: Zinc Sulphate, Potash Alum	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
50	**Radiopharmaceuticals**: Radio activity	Lecture	BP104T.5	Mid Term-2, Quiz & End Sem Exam
51	Measurement of radioactivity.	Lecture	BP104T.5	Mid Term-2, Quiz & End Sem Exam
52	*Tutorial class*: Measurement of radioactivity.	Lecture	BP104T.5	Mid Term-2, Assignment ,Quiz & End Sem Exam
53	Properties of α, β, γ radiations, Half-life	Lecture	BP104T.5	Mid Term-2, Quiz & End Sem Exam
54	Radio isotopes	Lecture	BP104T.5	Mid Term-2, Quiz & End Sem Exam
55	study of radio isotopes - Sodium iodide I^{131}	Lecture	BP104T.5	Mid Term-2, Quiz & End Sem Exam
56	*Tutorial class* Sodium iodide I^{131}	Lecture	BP104T.5	Mid Term-2, Quiz & End Sem Exam
57	Storage conditions	Lecture	BP104T.5	Mid Term-2, Quiz & End Sem Exam
58	Precautions of radioactive substances.	Lecture	BP104T.5	Mid Term-2, Quiz & End Sem Exam
59	Pharmaceutical application of radioactive substances.	Lecture	BP104T.5& BP104T.3	Mid Term-2, Quiz & End Sem Exam
60	*Tutorial class* Precautions of radioactive substances.	Lecture	BP104T.5	Mid Term-2, Seminar,Quiz & End Sem

				Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP104T.1.	Able to discuss the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals	3	3	2	2	2				2		2
BP104T.2.	Able to Study the monographs of inorganic drugs and pharmaceuticals.	3	3	2	3	3				2		3
BP104T.3.	Able to understand the medicinal and pharmaceutical importance of inorganic compounds	3	3	2	3	2				3		2

BP104T.4.	Able to learn about preparations, properties, chemical reactions and assay of inorganic compounds	3	3	2	2	2			2	2		2
BP104T.5.	Able to discuss radio activity, measurement of radioactivity, properties and pharmaceutical applications of radiopharmaceuticals.	3	3	2	3	3			2	2		3

Sample Question Paper

Amity Institute of pharmacy Department of Pharmaceutical Chemistry I MID-SEMESTER (SEM –I) 2019-20						
Class: B.Pharmacy I Semester						
Subject Name: BP104T PHARMACEUTICAL INORGANIC CHEMISTRY		Time: 1 Hr			Max. Marks: 30	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating

Question Mapping	Q3,5,7,9	Q1,2,6,8,10				Q4

Student will be

CO.1. Able to discuss the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals.

CO.2. Able to Study the monographs of inorganic drugs and pharmaceuticals.

CO.3. Able to understand the medicinal and pharmaceutical importance of inorganic compounds.

CO.4. Able to learn about preparations, properties, chemical reactions and assay of inorganic compounds

CO.5. Able to discuss radio activity, measurement of radioactivity, properties and pharmaceutical applications of radiopharmaceuticals.

CO Map	Question No.	Question	Marks
CO1	Q.1	What is Indian Pharmacopoeia	2
CO1	Q.2	Explain the principle involved in the modified limit test for chloride	2
CO2	Q.3	Define electrolytes	2
CO4	Q.4	Write preparation of sodium bicarbonate	2
CO2	Q.5	What are the ideal properties antacid	2
CO1	Q.6	Explain the principle and procedure involved in the limit test for chloride	10
CO2	Q.7	What are antacid and write a note on Aluminum hydroxide gel	10
CO2	Q 8	Discuss the role of fluoride.	5
CO1 &CO2	Q.9	Write a note on prevention of impurities	5
CO2	Q 10	Explain the Oral Rehydration Salt (ORS)	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 0:

59.6 % Percentage of students secured more than 60% marks, so this course did not attained any Level.

AMITY UNIVERSITY
MADHYA PRADESH
Established vide Government of Madhya Pradesh Act No. 27 of 2010

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICS

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2019-20

Programme Outcomes:

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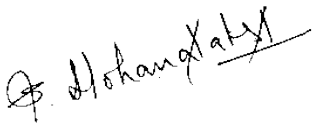
Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3: Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I SEM																
	BP105T	3	1	2	1	1	3	2	3	1	1	3				



AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICS
Course Handout
Course : Communication skills – Theory
Course Code: BP105T, Credits: 02, Session:2019-20 (Odd Sem.), Class: B.Pharm - 1st Year
Faculty Name: Dr. Bishakha Mandal

A. Introduction: This course will prepare the young pharmacy student to interact effectively with doctors, nurses, dentists, physiotherapists and other health workers. At the end of this course the student will get the soft skills set to work cohesively with the team as a team player and will add value to the pharmaceutical business.

B.

C. Course Outcomes: At the end of the course, students will be able to:

BP105T: 1. Understand the behavioral needs for a Pharmacist to function effectively in the areas of pharmaceutical operation

BP105T: 2. Communicate effectively (Verbal and Non Verbal)

BP105T: 3. Effectively manage the team as a team player

BP105T: 4. Develop interview skills.

BP105T:5. Develop Leadership qualities and essentials.

D. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of

technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

E. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	1.5%
	Student – Teacher interaction	S-T I	1.5%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

F. Syllabus

UNIT – I 07 Hours

 Communication Skills: Introduction, Definition, The Importance of Communication, The Communication Process – Source, Message, Encoding, Channel, Decoding, Receiver, Feedback, Context

 Barriers to communication: Physiological Barriers, Physical Barriers, Cultural Barriers, Language Barriers, Gender Barriers, Interpersonal Barriers, Psychological Barriers, Emotional barriers

 Perspectives in Communication: Introduction, Visual Perception, Language, Other factors affecting our perspective - Past Experiences, Prejudices, Feelings, Environment

UNIT – II 07 Hours

 Elements of Communication: Introduction, Face to Face Communication - Tone of Voice, Body Language (Non-verbal communication), Verbal Communication, Physical

Communication

 Communication Styles: Introduction, The Communication Styles Matrix with example for each -Direct Communication Style, Spirited Communication Style, Systematic Communication Style, Considerate Communication Style

43

UNIT – III 07 Hours

 Basic Listening Skills: Introduction, Self-Awareness, Active Listening, Becoming an Active Listener, Listening in Difficult Situations

 Effective Written Communication: Introduction, When and When Not to Use Written Communication - Complexity of the Topic, Amount of Discussion' Required, Shades of Meaning, Formal Communication

 Writing Effectively: Subject Lines, Put the Main Point First, Know Your Audience, Organization of the Message

UNIT – IV 05 Hours

 Interview Skills: Purpose of an interview, Do's and Dont's of an interview

 Giving Presentations: Dealing with Fears, Planning your Presentation, Structuring Your Presentation, Delivering Your Presentation, Techniques of Delivery

UNIT – V 04 Hours

 Group Discussion: Introduction, Communication skills in group discussion, Do's and Dont's of group discussion.

A. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	2	10	1.5	1.5	35

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

B. Suggested Text/Reference Books:

1. Basic communication skills for Technology, Andreja. J. Ruther Ford, 2nd Edition, Pearson Education, 2011
2. Communication skills, Sanjay Kumar, Pushpalata, 1stEdition, Oxford Press, 2011
3. Organizational Behaviour, Stephen .P. Robbins, 1stEdition, Pearson, 2013
4. Brilliant- Communication skills, Gill Hasson, 1stEdition, Pearson Life, 2011
5. The Ace of Soft Skills: Attitude, Communication and Etiquette for success, Gopala Swamy Ramesh, 5thEdition, Pearson, 2013
6. Developing your influencing skills, Deborah Dalley, Lois Burton, Margaret, Green hall, 1st Edition Universe of Learning LTD, 2010
7. Communication skills for professionals, Konar nira, 2ndEdition, New arrivals – PHI, 2011
8. Personality development and soft skills, Barun K Mitra, 1stEdition, Oxford Press, 2011
9. Soft skill for everyone, Butter Field, 1st Edition, Cengage Learning india pvt.ltd, 2011
10. Soft skills and professional communication, Francis Peters SJ, 1stEdition, Mc Graw Hill Education, 2011

11. Effective communication, John Adair, 4thEdition, Pan Mac Millan,2009
12. Bringing out the best in people, Aubrey Daniels, 2ndEdition, Mc Graw Hill, 1999

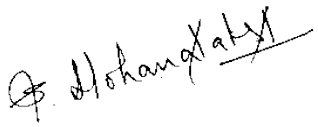
C. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	**Communication Skills:** Introduction, Definition, The Importance of Communication, The Communication Process – Source, Message,	Lecture	1	Mid Term-1, Quiz & End Sem Exam
2	Encoding, Channel, Decoding, Receiver, Feedback, Context	Lecture	1	Mid Term-1, Quiz & End Sem Exam
3	**Barriers to communication:** Physiological Barriers, Physical Barriers, Cultural Barriers, Language Barriers	Lecture	1	Mid Term-1, Quiz & End Sem Exam
4	Gender Barriers, Interpersonal Barriers, Psychological Barriers, Emotional barriers	Lecture	1	Mid Term-1, Quiz & End Sem Exam
5	**Perspectives in Communication:** Introduction, Visual Perception, Language,	Lecture	1	Mid Term-1, Quiz & End Sem Exam
6	Other factors affecting our perspective - Past Experiences, Prejudices, Feelings, Environment	Lecture	1	Mid Term-1, Quiz & End Sem Exam
7	**Elements of Communication:** Introduction, Face to Face Communication - Tone of Voice,	Lecture	2	Mid Term-1, Quiz & End Sem Exam
8	Body Language (Non-verbal communication), Verbal Communication, Physical Communication	Lecture	2	Mid Term-1, Quiz & End Sem Exam
9	**Communication Styles:** Introduction, The Communication Styles Matrix with example for each	Lecture	2	Mid Term-1, Quiz & End Sem Exam

10	Direct Communication Style, Spirited Communication Style	Lecture	2	Mid Term-1, Quiz & End Sem Exam
11	Systematic Communication Style, Considerate Communication Style	Lecture	2	Mid Term-1, Quiz & End Sem Exam
12	**Basic Listening Skills:** Introduction, Self-Awareness, Active Listening	Lecture	2	Mid Term-1, Quiz & End Sem Exam
13	an Active Listener, Listening in Difficult Situations	Lecture	2	Mid Term-1, Quiz & End Sem Exam
14	**Effective Written Communication:** Introduction, When and When Not to Use Written	Lecture	3	Mid Term-2, Quiz & End Sem Exam
15	Communication - Complexity of the Topic,	Lecture	3	Mid Term-2, Quiz & End Sem Exam
16	Amount of Discussion' Required, Shades of Meaning, Formal Communication	Lecture	3	Mid Term-2, Quiz & End Sem Exam
17	**Writing Effectively:** Subject Lines, Put the Main Point First	Lecture	3	Mid Term-2, Quiz & End Sem Exam
18	Know Your Audience, Organization of the Message	Lecture	3	Mid Term-2, Quiz & End Sem Exam
19	Know Your Audience, Organization of the Message	Lecture	3	Mid Term-2, Quiz & End Sem Exam
20	**Interview Skills:** Purpose of an interview, Do's and Dont's of an interview	Lecture	3	Mid Term-2, Quiz & End Sem Exam

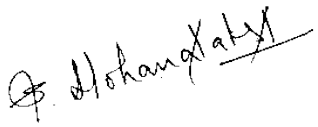
21	**Interview Skills:** Purpose of an interview, Do's and Dont's of an interview	Lecture	3	Mid Term-2, Quiz & End Sem Exam
22	**Giving Presentations:** Dealing with Fears, Planning your Presentation	Lecture	4	Mid Term-2, Quiz & End Sem Exam
23	**Giving Presentations:** Dealing with Fears, Planning your Presentation	Lecture	4	Mid Term-2, Quiz & End Sem Exam
24	Structuring Your Presentation, Delivering Your Presentation,	Lecture	4	Mid Term-2, Quiz & End Sem Exam
25	Techniques of Delivery	Lecture	4	Mid Term-2, Quiz & End Sem Exam
26	**Group Discussion:** Introduction, Communication skills in group discussion	Lecture	5	Mid Term-2, Quiz & End Sem Exam
27	**Group Discussion:** Introduction, Communication skills in group discussion	Lecture	5	Mid Term-2, Quiz & End Sem Exam
28	Do's an Dont's of group discussion	Lecture	5	Mid Term-2, Quiz & End Sem Exam
29	Do's and Dont's of group discussion	Lecture	5	Mid Term-2, Quiz & End Sem Exam
30	Do's and Dont's of group discussion	Lecture	5	Mid Term-2, Quiz & End Sem Exam

D. Course Articulation Matrix (Mapping of COs with POs)



CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP105T: 1	**BP105T**: 1. Understand the behavioral needs for a Pharmacist to function effectively in the areas of pharmaceutical operation	0	1	2	1	3	3	-	3	2	-	1				
BP105T: 2	**BP105T:** 2. Communicate effectively (Verbal and Non Verbal)	0	1	2	1	3	3	-	3	2	-	1				
BP105T: 3	**BP105T**: 3. Effectively manage the team as a team player	0	1	2	1	3	3	-	3	2	-	1				
BP105T: 4	**BP105T**: 4. Develop interview skills.	-	-	2	1	3	3	-	3	2	-	1				
BP105T: 5	**BP105T**:5. Develop Leadership qualities and essentials.	2	1	1	1	3	2	1	1	1	1	3				

Sample Question Paper



Amity Institute of Pharmacy Department of Pharmaceutics I MID-SEMESTER (SEM –Ist) 2019-20						
Class: B. Pharm, I Semester						
Subject Name: Communications Skills BP105T-Theory		Time: 1 Hrs			Max. Marks: 30	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1, Q.5, Q.3	Q.2, Q.4				

The student will be able to

BP105T: 1. Understand the behavioral needs for a Pharmacist to function effectively in the areas of pharmaceutical operation

BP105T: 2. Communicate effectively (Verbal and Non Verbal)

BP105T: 3. Effectively manage the team as a team player

CO Map	Question No.	Question	Marks
CO5	Q.1	Importance of communication skills.	5
CO3	Q.2	Write the barriers to communication.	5
CO3	Q.3	Compare verbal and non-verbal communication.	5
CO4	Q.4	What do you understand by communication styles?	5
CO5	Q.5	Write a detailed note on communication style.	10

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 0:

44.2 % Percentage of students secured more than 60% marks, so this course did not attained any Level.

AMITY UNIVERSITY
MADHYA PRADESH
Established vide Government of Madhya Pradesh Act No. 27 of 2010

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOLOGY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2019-20

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3: Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I SEM																
	BP106RBT	3	1	2	3	1	3	2	1	1	3	2				

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DEPARTMENT OF PHARMACOLOGY
Course Handout
Course : REMEDIAL BIOLOGY THEORY
Course Code: BP106RBT, Credits: 02, Session:2019-20 (Odd Sem.), Class: B.Pharm - 1st Year
Faculty Name: Dr. Naveen Sharma

A. **Introduction:** This subject deals with learning and understanding the components of living world, structure and functionalmsystem of plant and animal kingdom.

B. **Course Outcomes:** At the end of the course, students will be able to:
BP106RBT: 1. know the classification and salient features of five kingdoms of life
BP106RBT: 2. understand the basic components of anatomy & physiology of plant
BP106RBT: 3. know the basic components of anatomy & physiology animal with special reference to human
BP106RBT: 4. Know about the Essential mineral, macro and micronutrients.
BP106RBT:5. Understand the basics of plant respiration and requirements and procedures of plant growth.

C. **Programme Outcomes:**

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	1.5%
	Student – Teacher interaction	S-T I	1.5%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

E. Syllabus

UNIT I

Living world:

- Definition and characters of living organisms
- Diversity in the living world
- Binomial nomenclature
- Five kingdoms of life and basis of classification. Salient features of Monera, Potista, Fungi, Animalia and Plantae, Virus,

Morphology of Flowering plants

- Morphology of different parts of flowering plants – Root, stem, inflorescence, flower, leaf, fruit, seed.
- General Anatomy of Root, stem, leaf of monocotyledons & Dicotylidones.

UNIT II

Body fluids and circulation

- Composition of blood, blood groups, coagulation of blood
- Composition and functions of lymph
- Human circulatory system
- Structure of human heart and blood vessels
- Cardiac cycle, cardiac output and ECG

Digestion and Absorption

- Human alimentary canal and digestive glands
- Role of digestive enzymes
- Digestion, absorption and assimilation of digested food

Breathing and respiration

- Human respiratory system
- Mechanism of breathing and its regulation
- Exchange of gases, transport of gases and regulation of respiration
- Respiratory volumes

UNIT III

Excretory products and their elimination

- Modes of excretion
- Human excretory system- structure and function
- Urine formation
- Rennin angiotensin system

Neural control and coordination

- Definition and classification of nervous system
- Structure of a neuron
- Generation and conduction of nerve impulse
- Structure of brain and spinal cord
- Functions of cerebrum, cerebellum, hypothalamus and medulla oblongata

Chemical coordination and regulation

- Endocrine glands and their secretions
- Functions of hormones secreted by endocrine glands

Human reproduction

- Parts of female reproductive system
- Parts of male reproductive system
- Spermatogenesis and Oogenesis
- Menstrual cycle

UNIT IV

Plants and mineral nutrition:

- Essential mineral, macro and micronutrients

 Nitrogen metabolism, Nitrogen cycle, biological nitrogen fixation

Photosynthesis

 Autotrophic nutrition, photosynthesis, Photosynthetic pigments, Factors affecting photosynthesis.

UNIT V

Plant respiration: Respiration, glycolysis, fermentation (anaerobic).

Plant growth and development

 Phases and rate of plant growth, Condition of growth, Introduction to plant growth regulators

Cell - The unit of life

 Structure and functions of cell and cell organelles. Cell division

Tissues

 Definition, types of tissues, location and functions.

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	2	10	1.5	1.5	35

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

a. Text book of Biology by S. B. Gokhale
b. A Text book of Biology by Dr. Thulajappa and Dr. Seetaram.
c. A Text book of Biology by B.V. Sreenivasa Naidu
d. A Text book of Biology by Naidu and Murthy
e. Botany for Degree students By A.C.Dutta.
f. Outlines of Zoology byM. Ekambaranatha ayyer and T. N. Ananthakrishnan.
g. A manual for pharmaceutical biology practical by S.B. Gokhale and C. K. Kokate

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Definition and characters of living organisms	Lecture	1	Mid Term-1, Quiz & End Sem Exam
2	Diversity in the living world Binomial nomenclature	Lecture	1	Mid Term-1, Quiz & End Sem Exam
3	Five kingdoms of life and basis of classification.	Lecture	1	Mid Term-1, Quiz & End Sem Exam
4	Salient features of Monera, Potista, Fungi, Animalia and Plantae, Virus	Lecture	1	Mid Term-1, Quiz & End Sem Exam
5	Morphology of different parts of flowering plants – Root, stem, inflorescence, flower, leaf, fruit, seed.	Lecture	1	Mid Term-1, Quiz & End Sem Exam
6	General Anatomy of Root, stem, leaf of monocotyledons & Dicotylidones	Lecture	1	Mid Term-1, Quiz & End Sem Exam

7	Composition of blood, blood groups, coagulation of blood	Lecture	2	Mid Term-1, Quiz & End Sem Exam
8	Composition and functions of lymph, Human circulatory system	Lecture	2	Mid Term-1, Quiz & End Sem Exam
9	Structure of human heart and blood vessels, Cardiac cycle, cardiac output and ECG	Lecture	2	Mid Term-1, Quiz & End Sem Exam
10	Human alimentary canal and digestive glands	Lecture	2	Mid Term-1, Quiz & End Sem Exam
11	Role of digestive enzymes Digestion, absorption and assimilation of digested food	Lecture	2	Mid Term-1, Quiz & End Sem Exam
12	Human respiratory system, Mechanism of breathing and its regulation	Lecture	2	Mid Term-1, Quiz & End Sem Exam
13	Exchange of gases, transport of gases and regulation of respiration, Respiratory volumes	Lecture	2	Mid Term-1, Quiz & End Sem Exam
14	Modes of excretion, Human excretory system- structure and function,	Lecture	3	Mid Term-2, Quiz & End Sem Exam
15	Urine formation, Rennin angiotensin system	Lecture	3	Mid Term-2, Quiz & End Sem Exam
16	Definition and classification of nervous system, Structure of a neuron, Generation and conduction of nerve impulse	Lecture	3	Mid Term-2, Quiz & End Sem Exam
17	Structure of brain and spinal cord, Functions of cerebrum, cerebellum, hypothalamus and medulla oblongata	Lecture	3	Mid Term-2, Quiz & End Sem Exam
18	Endocrine glands and their secretions	Lecture	3	Mid Term-2, Quiz & End Sem Exam
19	Functions of hormones secreted by endocrine glands	Lecture	3	Mid Term-2, Quiz & End Sem Exam
20	Parts of female reproductive system, Parts of male reproductive system	Lecture	3	Mid Term-2, Quiz & End Sem Exam
21	Spermatogenesis and Oogenesis, Menstrual cycle	Lecture	3	Mid Term-2, Quiz & End Sem Exam
22	Essential mineral, macro and micronutrients	Lecture	4	Mid Term-2, Quiz & End Sem Exam
23	Nitrogen metabolism, Nitrogen cycle, biological nitrogen fixation.	Lecture	4	Mid Term-2, Quiz & End Sem Exam
24	Autotrophic nutrition, photosynthesis,	Lecture	4	Mid Term-2, Quiz & End Sem Exam
25	Photosynthetic pigments, Factors affecting	Lecture	4	Mid Term-2, Quiz & End Sem Exam

Dr. Mohanty

	photosynthesis			
26	Plant respiration: Respiration, glycolysis, fermentation (anaerobic).	Lecture	5	Mid Term-2, Quiz & End Sem Exam
27	Plant growth and development, Phases and rate of plant growth,	Lecture	5	Mid Term-2, Quiz & End Sem Exam
28	Condition of growth, Introduction to plant growth regulators	Lecture	5	Mid Term-2, Quiz & End Sem Exam
29	Structure and functions of cell and cell organelles. Cell division	Lecture	5	Mid Term-2, Quiz & End Sem Exam
30	Tissue Definition, types of tissues, location and functions.	Lecture	5	Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP106RBT: 1	**BP106RBT**: 1. know the classification and salient features of five kingdoms of life	3	1	1	1	1	2	1	-	1	-	2				
BP106RBT: 2	**BP106RBT:** 2. understand the basic components of anatomy & physiology of plants.	2	1	2	1	-	2	1	-	1	-	3				
BP106RBT: 3	**BP106RBT:** 3. know the basic components of anatomy & physiology animal with special reference to human.	2	1	2	2	2	2	2	1	2	1	2				
BP106RBT: 4	**BP106RBT**: 4. Know about the Essential mineral, macro and micronutrients.	3	1	1	1	-	2	1	1	1	1	3				
BP106RBT: 5	**BP106RBT**:5. Understand the basics of plant respiration and requirements and procedures of plant growth.	2	1	1	1	2	2	1	1	1	1	3				

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacology I MID-SEMESTER (SEM –Ist) 2019-20						
Class: B. Pharm, I Semester						
Subject Name: Remedial Biology BP106RBT-Theory		Time: 1 Hrs			Max. Marks: 30	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1, Q.5, Q.3	Q.2, Q.4				

The student will be able to

CO.3. Discuss about role of endocrine glands and their secretions.

CO.4. Write about Essential mineral, macro and micronutrients for plants growth.

CO Map	Question No.	Question	Marks
CO5	Q.1	What is role of plant growth Regulators.	5
CO3	Q.2	Write the functions of nervous system.	5
CO3	Q.3	Write the functions of hormones secreted by endocrine glands.	5
CO4	Q.4	Discuss Factors affecting photosynthesis.	5
CO5	Q.5	Write a detailed note on structure and functions of cell and cell organelles.	10

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

100.0 % Percentage of students secured more than 60% marks, so this course attained Level -3.

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AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOLOGY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2019-20

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Programme Specific Outcomes:

PSO 1: Will be able to design, develop and implement efficient software for a given real life problem.

PSO 2: Will be able to apply knowledge of AI, Machine Learning and Data Mining in analyzing big data forextracting useful information from it and for performing predictive analysis.

PSO 3: Will be able to design, manage and secure wired/ wireless computer networks for transfer and sharing ofinformation.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I SEM																
	BP107P	3	1	2	-	1	3	2	1	3	2	2				

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DEPARTMENT OF PHARMACOLOGY
Course Handout
Course: HUMAN ANATOMY AND PHYSIOLOGY – I PRACTICAL
Course Code : BP107P, Crédits: 02, Session :2019-20 (Odd Sem.), Class : B.Pharm. 1st Year
Faculty Name: Dr. Naveen Sharma

A. **Introduction:** This course is designed to impart fundamental knowledge on the structure and functions of the various systems of the human body. It also helps in understanding both homeostatic mechanisms. The subject provides the basic knowledge required to understand the various disciplines of pharmacy.

B. **Course Outcomes:** At the end of the course, students will be able to:

BP107P.1 Effectively use the microscope for microscopic study of various tissues.

BP107P.2. Identify axial and appendicular bones of human skeleton.

BP107P.3. Explain the gross morphology, structure and functions of various organs of human body.

BP107P.4 Identify different tissues and organs of different systems of human body.

BP107P.5. Perform the haematological test like CT-BT, blood cell count, haemoglobin estimation, bleeding/clotting time, ESR etc.

BP107P.6 Record the blood pressure, heart rate, pulse rate and respiratory volume.

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

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[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of

technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

C. Programme Specific Outcomes:

PSO 1: Practical physiology is complimentary to the theoretical discussions in physiology.

PSO 2: Practical allow the verification of physiological processes discussed in theory classes through experiments on living tissue, intact animals or normal human beings.

PSO 3: This is helpful for developing an insight on the subject.

Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

D. Syllabus

1. Study of compound microscope.
2. Microscopic study of epithelial and connective tissue
3. Microscopic study of muscular and nervous tissue
4. Identification of axial bones
5. Identification of appendicular bones
6. Introduction to hemocytometry.
7. Enumeration of white blood cell (WBC) count
8. Enumeration of total red blood corpuscles (RBC) count
9. Determination of bleeding time
10. Determination of clotting time
11. Estimation of hemoglobin content
12. Determination of blood group.
13. Determination of erythrocyte sedimentation rate (ESR).

14. Determination of heart rate and pulse rate.
15. Recording of blood pressure. Recommended Books (Latest Edition

E. Examination Scheme:

Components	A	CT	LR	V	EE
Weightage (%)	2	10	1	2	35

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

F. Suggested Text/Reference Books:

1. Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypee brothers medical publishers, New Delhi.
2. Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York
3. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co,Riverview,MI USA
4. Text book of Medical Physiology- Arthur C,Guyton andJohn.E. Hall. Miamisburg, OH, U.S.A.
5. Principles of Anatomy and Physiology by Tortora Grabowski. Palmetto, GA, U.S.A.

G. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Study of compound microscope.	Practical	Unit-1 CO1	Mid Term-1 and 2, Quiz & End Sem Exam
2	Microscopic study of epithelial and connective tissue	Practical	CO4	Mid Term-1 and 2, Quiz & End Sem Exam
3	Microscopic study of muscular and nervous tissue	Practical	CO4	Mid Term-1 and 2, Quiz & End Sem Exam
4	*Identification of axial bones*	Practical	CO3	Mid Term-1 and 2, Quiz & End Sem Exam
5	Identification of appendicular boneanatomical terminology.	Practical	CO3	Mid Term-1 and 2, Quiz & End Sem Exam
6	Introduction to hemocytometry	Practical	CO2	Mid Term-1 and 2, Quiz

				& End Sem Exam
7	Enumeration of white blood cell (WBC) count	Practical	CO5	Mid Term-1 and 2, Quiz & End Sem Exam
8	Quiz	Practical		Mid Term-1 and 2, Quiz & End Sem Exam
9	Enumeration of total red blood corpuscles (RBC)	Practical	CO5	Mid Term-1 and 2, Quiz & End Sem Exam
10	Determination of bleeding time	Practical	CO5	Mid Term-1 and 2, Quiz & End Sem Exam
11	Determination of clotting time	Practical	CO5	Mid Term-1 and 2, Quiz & End Sem Exam
12	Revision--	Practical		Mid Term-1 and 2, Quiz & End Sem Exam
13	Estimation of hemoglobin content	Practical	CO5	Mid Term-1 and 2, Quiz & End Sem Exam
14	Determination of blood group	Practical	CO5	Mid Term-1 and 2, Quiz & End Sem Exam
15	Determination of erythrocyte sedimentation rate (ESR).	Practical	CO5	Mid Term-1 and 2, Quiz & End Sem Exam
16	Unit test	Practical		Mid Term-1 and 2, Quiz & End Sem Exam
17	Determination of heart rate and pulse rate.	Practical	CO6	Mid Term-1 and 2, Quiz & End Sem Exam

18	Recording of blood pressure.	Practical	CO6	Mid Term-1 and 2, Quiz & End Sem Exam

H. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP107P.1	Effectively use the microscope for microscopic study of various tissues.	3	-	-	-	1	2	2	-	-	-	-				
BP107P.2.	Identify axial and appendicular bones of human skeleton.	3	-	-	1	-	1	-	-	-	-	2				
BP107P.3.	Explain the gross morphology, structure and functions of various organs of human body.	3	2	-	3	-	2	-	-	-	-	3				
BP107P.4.	Identify different tissues and organs of different systems of human body.	2	2	1	3	-	1	-	-	-	-	2				
BP107P.5.	Perform the haematological test like CT-BT, blood cell count,	3	-	1	-	2	-	-	-	-	-	2				

Dr. Mohanty

	haemoglobin estimation, bleeding/clotting time, ESR etc.															
BP10P.6	Record the blood pressure, heart rate, pulse rate and respiratory volume.	3			1							1				

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacology I MID-SEMESTER (SEM –Ist) 2019-20						
Class: B.Pharm, I Semester						
Subject Name: BP107P Human Anatomy and Physiology-I		Time: 4 Hrs			Max. Marks: 40	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,2,4,10	Q.8,9,6	Q.5,3	Q.7		

Student will be able to

CO1. Effectively use the microscope for microscopic study of various tissues.

CO2. Identify axial and appendicular bones of human skeleton.

CO3. Explain the gross morphology, structure and functions of various organs of human body.

CO4. Identify different tissues and organs of different systems of human body.

CO Map	Question No.	Question	Marks
CO1	Q.1a	*What is* different part of microscope	2
CO2	Q.1b	Define facial bones.	2

CO2	Q.1c	Make use of medibular bone.	2
CO4	Q.1d	Why is epithelium tissue work as protective tissue.	2
CO2 CO3	Q.1e	Identify correct location of carpal bones.	2
	Q.2	Experiment: Microscopic study of muscular and nervous tissue	25
	Q.3	Viva	5

Attainment Level 3:

100.0 % Percentage of students secured more than 60% marks, so this course attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2019-20

Programme Outcomes:

[PO.1]. Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

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Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I SEM	BP108P	3	1	2	1	1	2		2		2	2				

Dr. Mohan Yadav

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DEPARTMENT OF PHARMACEUTICAL CHEMISTRY
Course Handout
Course : PHARMACEUTICAL ANALYSIS – I PRACTICAL
Course Code : BP108P, Crédits : 02, Session :2019-20 (Odd Sem.), Class : B.Pharm. 1st Year
Faculty Name: Dr. Pawan Kumar Gupta

A. Introduction: The course is designed to impart skill development in the arts and science of preparing the different conventional dosage forms.

B. Course Outcomes: At the end of the course, students will be able to:

BP108P.1. Understand the principles of volumetric and electro chemical analysis

BP108P.2. Operate equipment used in electro chemical analysis

BP108P.3. Carryout various volumetric titrations

BP108P.4. Carryout various electrochemical titrations

BP108P.5. Develop analytical skills

Programme Outcomes:

[PO.1]. Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

C. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal	Mid Term 1	CT	10%
	Mid Term 2		

Evaluation	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

D. Syllabus

I Limit Test of the following

(1) Chloride
(2) Sulphate
(3) Iron
(4) Arsenic

II Preparation and standardization of

(1) Sodium hydroxide
(2) Sulphuric acid
(3) Sodium thiosulfate
(4) Potassium permanganate
(5) Ceric ammonium sulphate

III Assay of the following compounds along with Standardization of Titrant

(1) Ammonium chloride by acid base titration
(2) Ferrous sulphate by Cerimetry
(3) Copper sulphate by Iodometry
(4) Calcium gluconate by complexometry
(5) Hydrogen peroxide by Permanganometry
(6) Sodium benzoate by non-aqueous titration
(7) Sodium Chloride by precipitation titration

IV Determination of Normality by electro-analytical methods

(1) Conductometric titration of strong acid against strong base
(2) Conductometric titration of strong acid and weak acid against strong base
(3) Potentiometric titration of strong acid against strong base

E. Examination Scheme:

Components	**A**	**CT**	**LR**	**V**	**EE**
Weightage (%)	2	10	1	2	35

CT: Class Test, LR: Lab Record, V: Viva, EE: End Semester Examination; A: Attendance

F. Suggested Text/Reference Books:

- A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, StahlonePress of University of London
- A.I. Vogel, Text Book of Quantitative Inorganic analysis
- P. Gundu Rao, Inorganic Pharmaceutical Chemistry
- Bentley and Driver's Textbook of Pharmaceutical Chemistry
- John H. Kennedy, Analytical chemistry principles
- Indian Pharmacopoeia.
    - .

G. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	To study various Glassware used in Pharmaceutical Analysis.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
2	To Calibrate various Glassware used in Pharmaceutical Analysis	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
3	To prepare 0.1 N NaOH Solution and standardize it using 0.1 N Oxalic Acid as standard.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
4	To prepare and standardize 0.1 N Sulphuric Acid using Anhydrous Sodium Carbonate as Standard.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
5	To prepare 0.1 N Sodium Thiosulphate Solution and standardize it by using 0.1 N Potassium Iodide Solution Solution as Standard.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
6	To prepare 0.1 Potassium Permanganate (KMnO4) using 0.1 N Solution of Oxalic Acid (COOH)2 as standard.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam

7	To prepare and standardize 0.1 M Ceric Ammonium Sulphate	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
8	To perform assay of the given sample of Sodium Chloride	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
9	To perform assay of the given sample of Ammonium Chloride.	Practical	CO1, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
10	To perform assay of the given sample of copper sulphate	Practical	CO1, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
11	To perform assay of the given sample of Ferrous Sulphate using standard Potassium Permanganate Solution.	Practical	CO1, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
12	To perform assay of the given sample of H_2O_2.	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
13	To perform assay of the given sample of Sodium Bezoate.	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
14	To perform assay of the given sample of Calcium Gluconate.	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
15	To carry out conductometric titration of strong acid (0.1 N HCl) against strong base (0.1 N NaOH).	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam

H. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	
BP108P.1	Understand the principles of volumetric and electro chemical analysis	3		2	1	2	1	-	2	1	2	1	

BP108P.2.	Operate equipment used in electro chemical analysis	2	-	-	1	-	1	-	-	-	-	3	
BP108P.3.	Carryout various volumetric titrations	3	2	2	1	-	2	-	2	-	-	3	
BP108P 4.	Carryout various electrochemical titrations	2	2	2	1	-	2	-	2	-	-	3	
BP108P.5.	Develop analytical skills	1	2	3	-	-	2	-	2	-	-	3	

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutical Chemistry I MID-SEMESTER (SEM –Ist) 2022-23						
Class: B.Pharm, I Semester						
Subject Name: BP108P Pharmaceutical Analysis-I Practical		Time: 4 Hrs		Max. Marks: 40		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,4	Q.2,3	Q.4	Q.2,5,6		
Student will be able to **CO.1**. Understand the principles of volumetric and electro chemical analysis **CO.2**. Operate equipment used in electro chemical analysis **CO.3**. Carryout various volumetric titrations **CO.4**. Carryout various electrochemical titrations **CO.5**. Develop analytical skills						

CO Map	Question No.	Question	Marks
CO1,2,4	Q.1a	Synopsis- Define Titration.	2
CO1,2,4	Q.1b	Synopsis- Define Acid and Base Titration.	2
CO1,2,4	Q.1c	Synopsis- Illustrate the formula for Assay of NaCl.	2
CO1,2,4	Q.1d	Synopsis- List the any three methods of Volumetric Analysis.	2
CO1,2,4	Q.1e	Synopsis- What are Secondary standard Give Example?	2
CO1,2, 4,5	Q.2	Experiment To prepare 0.1 N KmnO4 Solution and standardize it using 0.1 N Oxalic Acid as standard.	25
CO1,2,3,4,5	Q.3	Viva	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

100.0 % Percentage of students secured more than 60% marks, so this course attained Level -3.

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AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
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PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2019-20

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

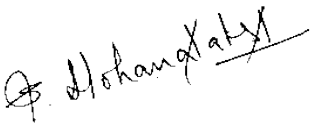
[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I SEM	BP109P	3	1	2	1	1	2		2		3	2				



AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
Course Handout
Course : PHARMACEUTICS – I PRACTICAL
Course Code : BP109P, Crédits : 02, Session :2019-20 (Odd Sem.), Class : B.Pharm. 1st Year
Faculty Name: Dr. Ajay Sharma

A. Introduction: The course is designed to impart skill development in the arts and science of preparing the different conventional dosage forms.

B. Course Outcomes: At the end of the course, students will be able to:

BP109P.1. To recall the principles used in the preparation of solid, liquid, and semi-solid dosage forms.

BP109P.2. Operate equipment used in the manufacturing of different dosage forms

BP109P.3. Formulate various conventional dosage forms such as solid dosage forms.

BP109P.4. Design various liquid dosage forms and semi-solid dosage forms.

BP109P.5. Estimate the ingredients calculation for preparation of dosage form

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

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[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

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[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal	Mid Term 1	CT	10%
	Mid Term 2		

Evaluation	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

E. Syllabus

1 . Syrups a) Syrup IP'66**,** b) Compound syrup of Ferrous Phosphate BPC'68
2. Elixirs a) Piperazine citrate elixir, b) Paracetamol pediatric elixir
3.Linctus a) Terpin Hydrate Linctus IP'66
4. Solutions a) Iodine Throat Paint (Mandles Paint)**,** b) Strong solution of ammonium acetate**,**
c) Cresol with soap solution**,** d) Lugol's solution
5. Suspensions a) Calamine lotion**,** b) Magnesium Hydroxide mixture**,** c) Aluminimum Hydroxide gel
6. Emulsions a) Turpentine Liniment, b) Liquid paraffin emulsion
7. Powders and Granules a) ORS powder (WHO)**,** b) Effervescent granules**,** c)Dusting powder**,** d)Divded powders
8. Suppositories a) Glycero gelatin suppository**,** b) Coca butter suppository**,** c) Zinc Oxide suppository
8. Semisolids a) Sulphur ointment**,** b) Non staining-iodine ointment with methyl salicylate**,** c) Carbopal gel
9. Gargles and Mouthwashes a) Iodine gargle**,** b) Chlorhexidine mouthwash

F. Examination Scheme:

Components	**A**	**CT**	**LR**	**V**	**EE**
Weightage (%)	2	10	1	2	35

CT: Class Test, LR: Lab Record, V: Viva, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

- H.C. Ansel et al., Pharmaceutical Dosage Form and Drug Delivery System, Lippincott Williams and Walkins, New Delhi.
- Carter S.J., Cooper and Gunn's-Dispensing for Pharmaceutical Students, CBS publishers, New Delhi.
- M.E. Aulton, Pharmaceutics, The Science& Dosage Form Design, Churchill Livingstone, Edinburgh.

- Indian pharmacopoeia.
- British pharmacopoeia.

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	To prepare and submit simple syrup IP.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
2	To prepare and submit simple syrup BP.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
3	To prepare and submit Paracetamol pediatric elixir	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
4	To prepare and submit Iodine Throat Paint.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
5	To prepare and submit Lugol's solution.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
6	To prepare and submit Calamine lotion	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
7	To prepare and submit turpentine liniment	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
8	To prepare and submit liquid paraffin emulsion	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
9	To prepare and submit zinc oxide dusting powder	Practical	CO1, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
10	To prepare and submit ORS powder	Practical	CO1, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
11	To prepare and submit effervescent powder	Practical	CO1, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
12	To prepare and submit Glycero gelatin suppository.	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
13	To prepare and submit Non staining-iodine ointment	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End

	with methyl salicylate,			Sem Exam
14	To prepare and submit Carbopol gel	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
15	To prepare and submit iodine gargle	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	
BP109P.1	To recall the principles used in the preparation of solid, liquid, and semi-solid dosage forms.	3		2	1	2	1	-	2	1	2	1	
BP109P.2.	Operate equipment used in the manufacturing of different dosage forms	2	-	-	1	-	1	-	-	-	-	3	
BP109P.3.	Formulate various conventional dosage forms such as solid dosage forms.	3	2	2	1	-	2	-	2	-	-	3	
BP109P.4.	Design various liquid dosage forms and semi-solid dosage forms.	2	2	2	1	-	2	-	2	-	-	3	
BP109P.5.	Estimate the ingredients calculation for preparation	1	2	3	-	-	2	-	2	-	-	3	

	of dosage form.											

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutics I MID-SEMESTER (SEM –Ist) 2019-20						
Class: B.Pharm, I Semester						
Subject Name: BP109P Pharmaceutics-I Practical		Time: 4 Hrs			Max. Marks: 40	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,4	Q.2,3	Q.4	Q.2,5,6		

Student will be able to

CO.1. To recall the principles used in the preparation of solid, liquid, and semi-solid dosage forms.

CO.2. Operate equipment used in the manufacturing of different dosage forms

CO.3. Formulate various conventional dosage forms such as solid dosage forms.

CO.4. Design various liquid dosage forms and semi-solid dosage forms.

CO.5. Estimate the ingredients calculation for preparation of dosage form

CO Map	Question No.	Question	Marks
CO1,2,4	Q.1a	Synopsis- Compare throat paint and mouth washes.	2
CO1,2,4	Q.1b	Synopsis- Define gels.	2
CO1,2,4	Q.1c	Synopsis- Illustrate the formula for suppositories.	2
CO1,2,4	Q.1d	Synopsis- List the ingredients required for the preparation of suspensions.	2
CO1,2,4	Q.1e	Synopsis- What is the concentration of sugar in simple syrup BP?	2
CO1,2, 4,5	Q.2	Experiment To formulate and submit Carbopol gel.	25
CO1,2,3,4,5	Q.3	Viva	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

90.4 % Percentage of students secured more than 60% marks, so this course attained Level - 3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2019-2020

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2].Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMMEARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
ISEM	BP110P	3	2	3	1	1	2		3		1	2				
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICAL CHEMISTRY
Course Handout
Course : PHARMACEUTICAL INORGANIC CHEMISTRY (Practical)
Course Code : BP110P, Crédits : 02, Session : **2019-2020** (Odd Sem.), Class : B.Pharm. 1st Year
Faculty Name: Dr. Pawan Kumar Porwal

A. Introduction: This subject deals with the monographs of inorganic drugs and pharmaceuticals.

B. Course Outcomes: At the end of the course, students will be able to:

BP110P.1. To recognize various sources of impurities and carry out limit test of ions in inorganic compounds.

BP110P.2. Describe the effects of impurities in pharmacopoeial substances.

BP110P.3. Perform the identification test of various inorganic compounds as per Indian pharmacopeia.

BP110P.4. Carry out the test for purity of inorganic compounds.

BP110P.5. Prepare various inorganic pharmaceuticals preparation.

C. Programme Outcomes:

[PO.1].Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2].Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

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D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance isrequiredtobemaintainedbyastudentto be qualified for taking up the EndSemester examination. The allowanceof 20%includesalltypesofleaves includingmedicalleaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

E. Syllabus;

I **Limit tests for following ions:** Limit test for Chlorides and Sulphates; Modified limit test for Chlorides and Sulphates; Limit test for Iron ;Limit test for Heavy metals; Limit test for Lead ;Limit test for Arsenic.

IIIdentification test: Magnesium hydroxide; ferrous sulphate; Sodium bicarbonate; Calcium gluconate; Copper sulphate.

III Test for purity: Swelling power of Bentonite; Neutralizing capacity of aluminum hydroxide gel; Determination of potassium iodate and iodine in potassium Iodide.

IV Preparation of inorganic pharmaceuticals: Boric acid Potash alum ferrous sulphate

F. Examination Scheme:

Components	A	CT	LR	V	EE
Weightage (%)	2	10	1	2	35

CT: Class Test, LR: Lab Record, V: Viva, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, Stahlone Press of University of London, 4 th edition.
2. A.I. Vogel, Text Book of Quantitative Inorganic analysis
3. P. Gundu Rao, Inorganic Pharmaceutical Chemistry, 3 rd Edition
4. M.L Schroff, Inorganic Pharmaceutical Chemistry
5. Bentley and Driver's Textbook of Pharmaceutical Chemistry
6. Anand & Chatwal, Inorganic Pharmaceutical Chemistry
7. Indian Pharmacopoeia

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	To perform limit test for chloride in given sample.	Practical	CO1, 2, 4	Mid Term-1, Quiz & End Sem Exam
2	To perform limit test for sulphate in given sample.	Practical	CO1, 2, 4	Mid Term-1, Quiz & End Sem Exam
3	To perform limit test for iron in given sample.	Practical	CO1, 2, 4	Mid Term-1, Quiz & End Sem Exam
4	To perform identification test for boric acid.	Practical	CO1,3, 4,	Mid Term-1, Quiz & End Sem Exam
5	To perform the identification test of ammonium chloride.	Practical	CO1, 3, 4,	Mid Term-1, Quiz & End Sem Exam
6	To identify cation & anion in given pharmaceutical compounds.	Practical	CO1,3, 4,	Mid Term-1, Quiz & End Sem Exam
7	To prepare and submit aluminum hydroxide.	Practical	CO1, 4,5,	Mid Term-2, Quiz & End Sem Exam
8	To prepare and submit Boric acid (H3BO3)	Practical	CO1, 4,5,	Mid Term-2, Quiz & End Sem Exam
9	To prepare and submit Potash alum (K2SO4. Al2(SO4)3 .24 H2O)	Practical	CO1, 4,5,	Mid Term-2, Quiz & End Sem Exam
10	To prepare and submit Zinc sulphate (ZnSO4).	Practical	CO1, 4,5,	Mid Term-2, Quiz & End Sem Exam
11	To prepare and submit magnesium carbonate (MgCO3)	Practical	CO1,4,5,	Mid Term-2, Quiz & End Sem Exam
12	To prepare and submit calcium carbonate (CaCO3).	Practical	CO1, 4,5,	Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	
BP110P.1	To recognize various sources of impurities and carry out limit test of ions in inorganic compounds.	3	-	2	1	2	1	-	2	1	2	1	
BP110P.2.	Describe the effects of impurities in pharmacopoeial substances.	2	-	-	1	-	1	-	-	-	-	3	
BP110P.3.	Perform the identification test of various inorganic compounds as per Indian pharmacopeia.	3	2	2	1	-	2	-	2	-	-	3	
BP110P.4.	Carry out the test for purity of inorganic compounds.	2	2	2	1	-	2	-	2	-	-	3	
BP110P.5.	Prepare various inorganic pharmaceutic als preparation.	1	2	3	-	-	2	-	2	-	-	3	

Sample Question Paper

Amity Institute of Pharmacy
Department of pharmaceutical chemistry
I MID-SEMESTER(SEM–I st) 2019-20

Class: B.Pharm, I Semester

Subject Name: BP110P-Pharmaceutical inorganic chemistry -I Practical	Time: 4Hrs	Max.Marks: 40

Levels of thequestions as perBloomsTaxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
QuestionMapping	Q.1,4,5	Q.4	Q.2,3,5	Q.2,3,5		

Student willbeableto

CO.1. To recall different chemical methods to prepare inorganic pharmaceuticals.
CO.2. To Perform identification tests as per Indian Pharmacopoeia.
CO.3. Determine the impurities qualitatively be performing tests for purity
CO.4. Understand the medicinal and pharmaceutical importance of inorganic compounds
CO.5. Adjudge the level of specific impurities in the given inorganic compounds by performing different limit tests.

COMap	QuestionNo.	Question	Marks
CO1,2,4	Q.1a	Synopsis-define impurities and discuss types of impurities	2
CO1,2,4	Q.1b	Synopsis- Define limit test and uses	2
CO1,2,4	Q.1c	Synopsis- writes the principle of the limit test of sulphate.	2
CO 3, 5	Q.1d	Synopsis- writes the uses and molecular formula of and prepn of boric acid.	2
CO 3, 5	Q.1e	Synopsis- write the molecular formula and uses of boric acid	2
CO1,2, 4,5	Q.2	Experiment To perform the limit test of iron for given sample.	25
CO1,2,3,4,5	Q.3	Viva	5

Attainments		**Rubric**
Level	1	IF60%ofstudentssecuremorethan60%marksthenlevel1
Level	2	IF70%ofstudentssecuremorethan60%marksthenlevel2
Level	3	IF80%ofstudentssecuremorethan60%marksthenlevel3

Dr. Mohanty

Attainment Level 3:

100.0 % Percentage of students secured more than 60% marks, so this course attained Level -3.

AMITY UNIVERSITY
MADHYA PRADESH
Established vide Government of Madhya Pradesh Act No. 27 of 2010

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICS

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2019-20

Programme Outcomes:

[PO.1]. Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

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Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I SEM																
	BP111P	1	1	3	1	1	3	1	1	2	3	3				

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACOLOGY
Course Handout
Course : Communication Skills- Practicals
Course Code : BP111P, Crédits : 01, Session :2019-20 (Odd Sem.), Class : B.Pharm. 1st Year
Faculty Name: Dr. Bishakha Mandal

A. Introduction: The course is designed to import knowledge about basic communication.

B. Course Outcomes: At the end of the course, students will be able to:

BP111P: 1. Practice different types of skills such as presentation skills, communications skills, and listening skills.

BP111P: 2. Practice of basic communication.

BP111P: 3. Interview handling skills.

BP111P: 4. Practice of **pronunciations**.

BP111P: 5. Communicate effectively (Verbal and Non Verbal)

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	Description	Code	Weightage %
Continuous Internal Evaluation	Mid Term 1	CT	5%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	15%
Total			**25%**

E. Syllabus

Basic communication covering the following topics

Meeting People

Asking Questions

Making Friends

What did you do?

Do's and Dont's

Pronunciations covering the following topics

Pronunciation (Consonant Sounds)

Pronunciation and Nouns

Pronunciation (Vowel Sounds)

Advanced Learning

Listening Comprehension / Direct and Indirect Speech

Figures of Speech

Effective Communication

Writing Skills

Effective Writing

Interview Handling Skills

E-Mail etiquette

Presentation Skills

F. Examination Scheme:

Components	A	CT	LR	V	EE

Weightage (%)	2	5	1	2	15

CT: Class Test, LR: Lab Record, V: Viva, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. Basic communication skills for Technology, Andreja. J. Ruther Ford, 2nd Edition, Pearson Education, 2011
2. Communication skills, Sanjay Kumar, Pushpalata, 1stEdition, Oxford Press, 2011
3. Organizational Behaviour, Stephen .P. Robbins, 1stEdition, Pearson, 2013
4. Brilliant- Communication skills, Gill Hasson, 1stEdition, Pearson Life, 2011
5. The Ace of Soft Skills: Attitude, Communication and Etiquette for success, Gopala Swamy Ramesh, 5thEdition, Pearson, 2013
6. Developing your influencing skills, Deborah Dalley, Lois Burton, Margaret, Green hall, 1st Edition Universe of Learning LTD, 2010
7. Communication skills for professionals, Konar nira, 2ndEdition, New arrivals – PHI, 2011
8. Personality development and soft skills, Barun K Mitra, 1stEdition, Oxford Press, 2011
9. Soft skill for everyone, Butter Field, 1st Edition, Cengage Learning india pvt.ltd,

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Meeting People, Asking Questions, Making Friends What did you do?	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
2	Pronunciation (Consonant Sounds) Pronunciation and Nouns Pronunciation (Vowel Sounds)	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
3	Pronunciation (Consonant Sounds) Pronunciation and Nouns Pronunciation (Vowel Sounds)	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
4	Listening Comprehension / Direct and Indirect Speech	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
5	Figures of Speech	Practical	CO2	Mid Term-1, Quiz & End Sem Exam
6	Effective Communication	Practical	CO3	Mid Term-1, Quiz &

				End Sem Exam
7	Writing Skills Effective Writing	Practical	CO4	Mid Term-2, Quiz & End Sem Exam
8	Interview Handling Skills	Practical	CO3,5	Mid Term-2, Quiz & End Sem Exam
9	Interview Handling Skills	Practical	CO6	Mid Term-2, Quiz & End Sem Exam
10	Interview Handling Skills	Practical	CO4	Mid Term-2, Quiz & End Sem Exam
11	E-Mail etiquette	Practical	CO3	Mid Term-2, Quiz & End Sem Exam
12	Presentation Skills	Practical	CO1	Mid Term-2, Quiz & End Sem Exam

A. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	
BP111P: 1.	**BP111P: 1.** Practice different types of skills such as presentation skills, communications skills, and listening skills.	2	2	2	3	2	1	1	3	1	2	3	

BP111P: 2.	**BP111P: 2.** Practice of basic communication	2	1	3	2	1	1	1	3	1	3	2	
BP111P: 3.	**BP111P: 3.** Interview handling skills.	2	2	2	2	1	2	-	3	-	3	2	
BP111P: 4.	**BP111P: 4.** Practice of **pronunciations**.	2	2	2	3	1	2	1	3	1	2	2	
BP111P: 5.	**BP111P: 5.** Communicate effectively (Verbal and Non Verbal)	2	2	2	3	1	2	-	3	-	3	3	

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutics I MID-SEMESTER (SEM –Ist) 2019-20						
Class: B.Pharm, I Semester						
Subject Name: Communication Skills-Practical (BP111P)		Time: 2 Hrs			Max. Marks: 40	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1a,b,c,d,e	Q.3	Q.3	Q.2,5,6	Q.3	Q.2

Student will be able to

BP111P: 1. Practice different types of skills such as presentation skills, communications skills, and listening skills.

BP111P: 2. Practice of basic communication.

BP111P: 3. Interview handling skills.

BP111P: 4. Practice of **pronunciations**.

CO Map	Question No.	Question	Marks
CO1	Q.1a	Synopsis- verbal communication	2
CO1	Q.1b	Synopsis- What are the types of communication?	2

CO2	Q.1c	Synopsis- What are Do's of interview.	2
CO3	Q.1d	Synopsis- Discuss group discussion	2
CO3	Q.1e	Synopsis- What is listening skills	2
CO4	Q.2	Experiment Participate in Mock Interview.	25
CO1,2,3,4	Q.3	Viva	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 0:

55.8 % Percentage of students secured more than 60% marks, so this course did not attain any Level.

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MADHYA PRADESH
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AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOLOGY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2019-20

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I SEM																
	BP112RBP	1	1	3	1	1	3	1	1	2	3	3				

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACOLOGY
Course Handout
Course : Remedial Biology- PRACTICAL
Course Code : BP112RBP, Crédits : 01, Session :2019-20 (OddSem.), Class : B.Pharm. 1st Year
Faculty Name: Dr. Naveen Sharma

A. Introduction: The course is designed to import knowledge about physiology of animals and plants.

B. Course Outcomes: At the end of the course, students will be able to:

BP112RBP: 1. Know about several type of microscopes, staining techniques.

BP112RBP: 2. Study of types and components of cell.

BP112RBP: 3. Study about the modifications of Stem, Root, Leaf, seed, fruit etc.

BP112RBP: 4. Give detailed study of frog by using computer models.

BP112RBP: 5. Microscopic study and identification of tissues pertinent to Stem, Root, Leaf, seed, fruit and flower

BP112RBP: 6. Identify types of bones

BP112RBP: 7. Determination of blood group and blood pressure of human.

C. Programme Outcomes:

[PO.1]. Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	5%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	15%
Total			**25%**

E. Syllabus

1. Introduction to experiments in biology

a) Study of Microscope

b) Section cutting techniques

c) Mounting and staining

d) Permanent slide preparation

2. Study of cell and its inclusions

3. Study of Stem, Root, Leaf, seed, fruit, flower and their modifications

4. Detailed study of frog by using computer models

5. Microscopic study and identification of tissues pertinent to Stem, Root, Leaf, seed, fruit and flower

6. Identification of bones

7. Determination of blood group

8. Determination of blood pressure

9. Determination of tidal volume

F. Examination Scheme:

Components	A	CT	LR	V	EE
Weightage (%)	2	5	1	2	15

CT: Class Test, LR: Lab Record, V: Viva, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. Practical human anatomy and physiology. by S.R.Kale and R.R.Kale.

2. A Manual of pharmaceutical biology practical by S.B.Gokhale, C.K.Kokate and S.P.Shriwastava.

3. Biology practical manual according to National core curriculum .Biology forum of Karnataka. Prof. M.J.H.Shafi

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	1. Introduction to experiments in biology a) Study of Microscope	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
2	1. Introduction to experiments in biology b) Section cutting techniques	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
3	1. Introduction to experiments in biology c) Mounting and staining	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
4	1. Introduction to experiments in biology d) Permanent slide preparation	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
5	Study of cell and its inclusions	Practical	CO2	Mid Term-1, Quiz & End Sem Exam
6	Study of Stem, Root, Leaf, seed, fruit, flower and their modifications	Practical	CO3	Mid Term-1, Quiz & End Sem Exam

7	Detailed study of frog by using computer models	Practical	CO4	Mid Term-2, Quiz & End Sem Exam
8	Microscopic study and identification of tissues pertinent to Stem, Root Leaf, seed, fruit and flower	Practical	CO3,5	Mid Term-2, Quiz & End Sem Exam
9	Identification of bones	Practical	CO6	Mid Term-2, Quiz & End Sem Exam
10	Determination of blood group	Practical	CO7	Mid Term-2, Quiz & End Sem Exam
11	Determination of blood pressure	Practical	CO7	Mid Term-2, Quiz & End Sem Exam
12	Determination of tidal volume	Practical	CO7	Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	
BP112RBP: 1.	Know about several type of microscopes, staining techniques.	2	2	2	3	2	1	1	1	1	2	3	
BP112RBP: 2.	Study of types and components of cell.	2	1	3	2	1	1	1	1	1	3	2	
BP112RBP: 3.	Study about the modifications of Stem, Root, Leaf, seed, fruit etc.	2	2	2	2	1	2	-	2	-	3	2	
BP112RBP: 4.	Give detailed study of frog by using computer models.	2	2	2	3	1	2	1	2	1	2	2	

BP112RBP: 5.	Microscopic study and identification of tissues pertinent to Stem, Root, Leaf, seed, fruit and flower	2	2	2	3	1	2	-	2	-	3	3	
BP112RBP: 6.	Identify types of bones	3	1	2	2	2	1	2	1	1	2	3	
BP112RBP: 7.	Determination of blood group and blood pressure of human.	3	1	2	2	1	1	2	2	1	1	3	

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutics I MID-SEMESTER (SEM –Ist) 2019-20						
Class: B.Pharm, I Semester						
Subject Name: BP112RBP-Practical		Time: 2 Hrs			Max. Marks: 40	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1a,b,c,d,e	Q.3	Q.3	Q.2,5,6	Q.3	Q.2

Student will be able to

CO: 1. Know about several type of microscopes, staining techniques.

CO: 2. Study of types and components of cell.

CO: 3. Study about the modifications of Stem, Root, Leaf, seed, fruit etc.

CO: 4. Give detailed study of frog by using computer models.

CO Map	Question No.	Question	Marks
CO1	Q.1a	Synopsis- Write the use of culture media.	2
CO1	Q.1b	Synopsis- Discuss the types of microscopes?	2
CO2	Q.1c	Synopsis- Differentiate human and animal cell.	2
CO3	Q.1d	Synopsis- Discuss the modifications of root.	2
CO3	Q.1e	Synopsis- Discuss about modifications of leaf.	2
CO4	Q.2	Experiment Perform detailed study of frog by using computer models.	25
CO1,2,3,4	Q.3	Viva	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

100.0 % Percentage of students secured more than 60% marks, so this course attained Level -3.

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DEPARTMENT OF PHARMACOLOGY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2019-20

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

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1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
II SEM	BP201T	3	2	2	1	1	3	2	1	1	1	3				

Dr. Mohanty

DEPARTMENT OF PHARMACOLOGY
Course Handout
Course : HUMAN ANATOMY AND PHYSIOLOGY – II THEORY
Course Code : BP201T, Crédits : 04, Session :2019-20 (Even Sem.), Class : B.Pharm. Ist Year
Faculty Name: Dr. Anantha Naik Nagappa, Dr. Naveen Sharma

A. Introduction: This subject is designed to impart fundamental knowledge on the structure and functions of the various systems of the human body. It also helps in understanding both homeostatic mechanisms.

B. Course Outcomes: At the end of the course, students will be able to:

BP201T.1. Explain the gross morphology, structure and functions of various organs of the human body.

BP201T.2. Describe the various homeostatic mechanisms and their imbalances.

BP201T.3. Identify the various tissues and organs of different systems of human body.

BP201T.4. Perform the hematological tests like blood cell counts, haemoglobin estimation, bleeding/clotting time etc and also record blood pressure, heart rate, pulse and respiratory volume.

BP201T.5. Appreciate coordinated working pattern of different organs of each system

C. Programme Outcomes:

[PO.1]. Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

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D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

Unit I

Nervous system

Organization of nervous system, neuron, neuroglia, classification and properties of nerve fibre, electrophysiology, action potential, nerve impulse, receptors, synapse, neurotransmitters.

Central nervous system: Meninges, ventricles of brain and cerebrospinal fluid. structure and functions of brain (cerebrum, brain stem, cerebellum), spinal cord (gross structure, functions of afferent and efferent nerve tracts, reflex activity)

Unit II

Digestive system

Anatomy of GI Tract with special reference to anatomy and functions of stomach, Acid production in the stomach, regulation of acid production through parasympathetic nervous system, pepsin role in protein digestion) small intestine and large intestine, anatomy and functions of salivary glands, pancreas and liver, movements of GIT, digestion and absorption of nutrients and disorders of GIT.

Energetics

Formation and role of ATP, Creatinine Phosphate and BMR.

Unit III

Respiratory system

Anatomy of respiratory system with special reference to anatomy of lungs, mechanism of respiration, regulation of respiration Lung Volumes and capacities transport of respiratory gases, artificial respiration, and resuscitation methods.

Urinary system

Anatomy of urinary tract with special reference to anatomy of kidney and nephrons, functions of kidney and urinary tract, physiology of urine formation, micturition reflex and role of kidneys in acid base balance, role of RAS in kidney and disorders of kidney.

Unit IV

Endocrine system

Classification of hormones, mechanism of hormone action, structure and functions of pituitary gland, thyroid gland, parathyroid gland, adrenal gland, pancreas, pineal gland, thymus and their disorders.

Unit V

Reproductive system

Anatomy of male and female reproductive system, Functions of male and female reproductive system, sex hormones, physiology of menstruation, fertilization, spermatogenesis, oogenesis, pregnancy and parturition

Introduction to genetics

Chromosomes, genes and DNA, protein synthesis, genetic pattern of inheritance

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypee brothers medical publishers, New Delhi.

2. Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York

3. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co,Riverview,MI USA

4. Text book of Medical Physiology- Arthur C,Guyton andJohn.E. Hall. Miamisburg, OH, U.S.A.

5. Principles of Anatomy and Physiology by Tortora Grabowski. Palmetto, GA, U.S.A.

6. Textbook of Human Histology by Inderbir Singh, Jaypee brothers medical publishers, New Delhi.

7. Textbook of Practical Physiology by C.L. Ghai, Jaypee brothers medical publishers, New Delhi.

8. Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee brother's medical publishers, New Delhi.

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Organization of nervous system	Lecture	1	Mid Term-1, Quiz & End Sem Exam
2	neuron, neuroglia, classification and properties of nerve fibre,	Lecture	1	Mid Term-1, Quiz & End Sem Exam
3	electrophysiology, action potential,	Lecture	1	Mid Term-1, Quiz & End Sem Exam
4	nerve impulse, receptors, synapse, neurotransmitters.	Tutorial	1	Mid Term-1, Quiz & End Sem Exam
5	Central nervous system: Meninges, ventricles of brain	Lecture	1	Mid Term-1, Quiz & End Sem Exam
6	cerebrospinal fluid. structure and functions of brain	Lecture	1,4	Mid Term-1, Quiz & End Sem Exam
7	structure and functions of cerebrum,	Lecture	1	Mid Term-1, Quiz & End Sem Exam
8	structure and functions of brain stem, cerebellum	Lecture	1	Mid Term-1, Quiz & End Sem Exam
9	spinal cord: gross structure,	Lecture	4	Mid Term-1, Quiz & End Sem Exam
10	functions of afferent and efferent nerve tracts, reflex activity	Lecture	4	Mid Term-1, Quiz & End Sem Exam
11	Unit-1	Tutorial		Mid Term-1, Quiz & End Sem Exam

12	Anatomy of GI Tract with special reference to anatomy and functions of stomach	Lecture	1	Mid Term-1, Quiz & End Sem Exam
13	Acid production in the stomach, regulation of acid production through parasympathetic nervous system,	Lecture	5	Mid Term-1, Quiz & End Sem Exam
14	pepsin role in protein digestion small intestine and large intestine,	Lecture	5	Mid Term-1, Quiz & End Sem Exam
15	anatomy and functions of salivary glands, pancreas and liver,	Lecture	5	Mid Term-1, Quiz & End Sem Exam
16	movements of GIT, digestion and absorption of nutrients and disorders of GIT.	Lecture	2,3	Mid Term-1, Quiz & End Sem Exam
17	Formation and role of ATP, Creatinine Phosphate and BMR.	Lecture	1	Mid Term-1, Quiz & End Sem Exam
18	Unit-2	Tutorial		Mid Term-1, Quiz & End Sem Exam
19	Anatomy of respiratory system with special reference to anatomy of lungs	Lecture	2,3	Mid Term-1, Quiz & End Sem Exam
20	mechanism of respiration,	Lecture		Mid Term-1, Quiz & End Sem Exam
21	regulation of respiration Lung Volumes and capacities	Lecture	1	Mid Term-1, Quiz & End Sem Exam
22	transport of respiratory gases,	Lecture	4	Mid Term-1, Quiz & End Sem Exam
23	artificial respiration, and resuscitation methods.	Lecture	4	Mid Term-1, Quiz & End Sem Exam
24	Anatomy of urinary tract with special reference to anatomy of kidney and nephrons	Lecture	1	Mid Term-1, Quiz & End Sem Exam
25	functions of kidney and urinary tract,	Lecture	4	Mid Term-1, Quiz & End Sem Exam
26	physiology of urine formation,	Lecture	1	Mid Term-1, Quiz & End Sem Exam
27	micturition reflex and role of kidneys in acid base balance,	Lecture	1	Mid Term-1, Quiz & End Sem Exam
28	role of RAS in kidney and disorders of kidney.	Lecture	4	Mid Term-1, Quiz & End Sem Exam
29	Unit 3	Tutorial		Mid Term-1, Quiz & End Sem Exam

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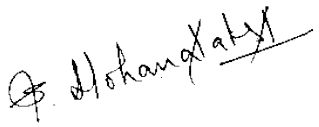
30	Classification of hormones,	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
31	mechanism of hormone action,	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
32	structure and functions of pituitary gland,	Lecture	1	Mid Term-2, Quiz & End Sem Exam
33	structure and functions of thyroid gland,	Lecture	1,4	Mid Term-2, Quiz & End Sem Exam
34	structure and functions of parathyroid gland,	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
35	Structure and functions of Adrenal gland,	Lecture	4	Mid Term-2, Quiz & End Sem Exam
36	Structure and functions of pancreas, pineal gland,	Lecture	1	Mid Term-2, Quiz & End Sem Exam
37	Structure and functions of thymus and their disorders.	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
38	Anatomy of male and female reproductive system	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
39	Functions of male and female reproductive system,	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
40	sex hormones	Lecture	1	Mid Term-2, Quiz & End Sem Exam
41	physiology of menstruation, fertilization,	Lecture	4	Mid Term-2, Quiz & End Sem Exam
42	spermatogenesis, oogenesis,	Lecture	5,45	Mid Term-2, Quiz & End Sem Exam
43	pregnancy and parturition,	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
44	Chromosomes, genes and DNA,	Lecture	4	Mid Term-2, Quiz & End Sem Exam
45	protein synthesis, genetic pattern of inheritance	Lecture	1,4	Mid Term-2, Quiz & End Sem Exam



I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP201T.1	**BP201T.1**. Explain the gross morphology, structure and functions of various organs of the human body.	3	1	1	1	2	3	1	1	1	1	3				
BP201T.2	**BP201T.2**. Describe the various homeostatic mechanisms and their imbalances.	2	1	2	1	2	2	1	1	1	1	3				
BP201T.3	**BP201T.3**. Identify the various tissues and organs of different systems of human body.	2	1	1	1	2	3	1	1	1	1	3				
BP201T.4	**BP201T.4**. Perform the hematological tests like blood cell counts, haemoglobin estimation, bleeding/clotting time etc and also record blood pressure, heart rate, pulse and respiratory volume.	2	1	1	1	2	3	1	1	1	1	3				
BP201T.5	**BP201T.5**. Appreciate coordinated working pattern of different organs of each system	3	1	2	1	2	3	1	1	1	1	3				

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacology I MID-SEMESTER (SEM –IInd) 2019-20						
Class: B.Pharm, II Semester						
Subject Name: BP201T Human Anatomy and Physiology-II Theory		Time: 1 Hrs			Max. Marks: 30	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3,4,5,7	Q.6,8,9	Q.2			Q2

The student will be able to

CO.1. Explain the gross morphology, structure and functions of various organs of the human body.

CO.2. Describe the various homeostatic mechanisms and their imbalances.

CO.3. Identify the various tissues and organs of different systems of human body.

CO Map	Question No.	Question	Marks
CO1	Q.1	Discuss about parts of Nervous System.	2
CO1	Q.2	Discuss about functions of neuron.	2
CO1	Q.3	Define neurotransmitters?	2
CO2	Q.4	Write the functions of salivary glands	2
CO2	Q.5	What is the role of pepsin in protein digestion?	2
CO3	Q.6	Write the Anatomy of GI Tract with special reference to functions of stomach	10
CO2	Q.7	Explain the process of Acid production in the stomach and regulation of acid production through parasympathetic nervous system	10
CO1	Q.8	Give the classification and properties of nerve fibre	5
CO2	Q.9	Discuss the Formation and role of ATP.	5
CO2	Q.10	Write the Anatomy of respiratory system with special reference to anatomy of lungs	5

Attainments	**Rubric**

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Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

92.3 % Percentage of students secured more than 60% marks, so this course attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2019-20

Programme Outcomes:

[PO.1]. Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Programme Specific Outcomes:

PSO 1: Will be able to design, develop and implement efficient software for a given real life problem.

PSO 2: Will be able to apply knowledge of AI, Machine Learning and Data Mining in analyzing big data forextracting useful information from it and for performing predictive analysis.

PSO 3: Will be able to design, manage and secure wired/ wireless computer networks for transfer and sharing ofinformation.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
II SEM																
	BP202T	2	-	2	-	1	2	2	1	1	-					

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AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICAL CHEMISTRY
Course Handout
Course : PHARMACEUTICAL ORGANIC CHEMISTRY – I THEORY
Course Code : BP 202T, Crédits : 04, Session : 2019-20 (Even Sem.), Class : B.Pharm. I st Year
Faculty Name: Dr. Pawan Kumar Gupta

A. **Introduction:** The course is designed to impart fundamental knowledge on the preparatory Pharmacy with arts and science of preparing the different conventional dosage forms.

B. **Course Outcomes:** At the end of the course, students will be able to:

BP202 T.1. Relate pharmacy education with pharmacy career options.

BP202 T.2. Classify the different types of *organic compounds* based on medicinal use.

BP*202* T.3. Experiment in the preparation of various types organic compounds and their derivatives.

BP202 T.4. Able to analyse and also to *write the structure, name and the type of isomerism of the organic compound*.

BP202 T.5. Able to Solve and write *the reaction, name the reaction and also orientation of reactions* in different types of *organic compounds*

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well-being.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

C. Programme Specific Outcomes:

PSO 1: Will be able to design, develop and implement efficient software for a given real life problem.

PSO 2: Will be able to apply knowledge of AI, Machine Learning and Data Mining in analyzing big data forextracting useful information from it and for performing

predictive analysis.

PSO 3: Will be able to design, manage and secure wired/ wireless computer networks for transfer and sharing ofinformation.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

Classification, nomenclature and isomerism

Classification of Organic Compounds

Common and IUPAC systems of nomenclature of organic compounds

(up to 10 Carbons open chain and carbocyclic compounds)

Structural isomerisms in organic compounds

Alkanes*, Alkenes* and Conjugated dienes*

SP^3 hybridization in alkanes, Halogenation of alkanes, uses of paraffins.

Stabilities of alkenes, SP^2 hybridization in alkenes

E_1 and E_2 reactions – kinetics, order of reactivity of alkyl halides, rearrangement of carbocations, Saytzeffs orientation and evidences. E_1 verses E_2 reactions, Factors affecting E_1 and E_2 reactions. Ozonolysis, electrophilic addition reactions of alkenes, Markownikoff's orientation, free radical addition reactions of alkenes, Anti Markownikoff's orientation.

Stability of conjugated dienes, Diel-Alder, electrophilic addition, free radical addition reactions of conjugated dienes, allylic rearrangement

Alkyl halides*

SN_1 and SN_2 reactions - kinetics, order of reactivity of alkyl halides, stereochemistry andrearrangement of carbocations.

SN_1 versus SN_2 reactions, Factors affecting SN_1 and SN_2 reactions

Structure and uses of ethylchloride, Chloroform, trichloroethylene, tetrachloroethylene,dichloromethane, tetrachloromethane and iodoform.

Alcohols*- Qualitative tests, Structure and uses of Ethyl alcohol, Methyl alcohol, chlorobutanol, Cetosteryl alcohol, Benzyl alcohol, Glycerol, Propylene glycol

Carbonyl compounds* (Aldehydes and ketones)

Nucleophilic addition, Electromeric effect, aldol condensation, Crossed Aldol condensation, Cannizzaro reaction, Crossed Cannizzaro reaction, Benzoin condensation, Perkin condensation, qualitative tests, Structure and uses of Formaldehyde, Paraldehyde, Acetone, Chloral hydrate, Hexamine, Benzaldehyde, Vanilin, Cinnamaldehyde.

Carboxylic acids*

Acidity of carboxylic acids, effect of substituents on acidity, inductive effect and qualitative tests for carboxylic acids ,amide and ester

Structure and Uses of Acetic acid, Lactic acid, Tartaric acid, Citric acid, Succinic acid. Oxalic acid, Salicylic acid, Benzoic acid, Benzyl benzoate, Dimethyl phthalate, Methyl salicylate and Acetyl salicylic acid

Aliphatic amines* -

Basicity, effect of substituent on Basicity. Qualitative test, Structure and uses of Ethanolamine, Ethylenediamine, Amphetamine

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

Organic Chemistry by Morrison and Boyd

Organic Chemistry by I.L. Finar, Volume-I

Textbook of Organic Chemistry by B.S. Bahl & Arun Bahl.

Organic Chemistry by P.L.Soni

Practical Organic Chemistry by Mann and Saunders.

Vogel's text book of Practical Organic Chemistry

Advanced Practical organic chemistry by N.K.Vishnoi.

Introduction to Organic Laboratory techniques by Pavia, Lampman and Kriz.

Reaction and reaction mechanism by Ahluwaliah/Chatwal.

Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Classification of Organic Compounds on the basis of structure.	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
2	Classification of Organic Compounds on the basis of functional group.	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
3	IUPAC systems of nomenclature of Alkanes, Alkenes and Conjugated dienes.	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
4	IUPAC systems of nomenclature of Alkyl halides and alcohol.	Tutorial	CO1,4	Mid Term-1, Quiz & End Sem Exam
5	IUPAC systems of nomenclature of Carbonyl compound (Aldehydes and ketones).	Lecture	CO1,2	Mid Term-1, Quiz & End Sem Exam
6	IUPAC systems of nomenclature of Carboxylic acids.	Lecture	CO1,2	Mid Term-1, Quiz & End Sem Exam
7	IUPAC systems of nomenclature of aliphatic amines.	Lecture	CO1,2	Mid Term-1, Quiz & End Sem Exam
8	Structural isomerism in organic compounds.	Tutorial	CO1,3	Mid Term-1, Quiz & End Sem Exam
9	Structural isomerism in organic compounds.	Lecture	CO1,2	Mid Term-1, Quiz & End Sem Exam
10	Alkanes- method of Prepration,	Lecture	CO1,3	Mid Term-1, Quiz

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	reaction			& End Sem Exam
11	Quiz	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
12	SP^3 hybridization in alkanes.	Tutorial	CO1,4	Mid Term-1, Quiz & End Sem Exam
13	Halogenation of alkanes, uses of paraffin.	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
14	Stabilities of alkenes, SP^2 hybridization in alkenes.	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
15	Alkyl halide- method of Prepration, reaction	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
16	Unit test	Tutorial		Mid Term-1, Quiz & End Sem Exam
17	Rearrangement of carbocations.	Lecture	CO1,5	Mid Term-1, Quiz & End Sem Exam
18	Saytzeffs orientation and evidences.	Lecture	CO1,3	Mid Term-1, Quiz & End Sem Exam
19	E_1 verses E_2 reactions, Factors affecting E_1 and E_2 reactions.	Lecture	CO1,3	Mid Term-1, Quiz & End Sem Exam
20	Ozonolysis, electrophilic addition reactions of alkenes.	Tutorial	CO1,4	Mid Term-1, Quiz & End Sem Exam
21	Markownikoff's orientation, Anti Markownikoff's orientation.	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
22	Free radical addition reactions of alkenes,	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
23	Conjugated dienes* method of Prepration and reaction.	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
24	Quiz	Tutorial		Mid Term-1, Quiz & End Sem Exam
25	Stability of conjugated dienes, Diel-Alder.	Lecture	CO1,5	Mid Term-1, Quiz & End Sem Exam

26	Electrophilic addition reaction of dienes.	Lecture	CO1,3	Mid Term-1, Quiz & End Sem Exam
27	Free radical addition reactions of conjugated dienes, allylic rearrangement.	Lecture	CO1,5	Mid Term-1, Quiz & End Sem Exam
28	Method of Prepration and reaction of Alkyl halides. reaction Reaction of aromatic acid	Tutorial	CO1,5	Mid Term-1, Quiz & End Sem Exam
29	SN_1 and SN_2 reactions - kinetics, order of reactivity of alkyl halides.	Lecture	CO1,3	Mid Term-1, Quiz & End Sem Exam
30	SN_1 versus SN_2 reactions, Factors affecting SN_1 and SN_2 reactions.	Lecture	CO1,5	Mid Term-1, Quiz & End Sem Exam
31	Structure and uses of ethylchloride, Chloroform.	Lecture	CO1,2	Mid Term-2, Quiz & End Sem Exam
32	Structure and uses of trichloroethylene, tetrachloroethylene.	Tutorial	CO1,2	Mid Term-2, Quiz & End Sem Exam
33	Structure and uses of dichloromethane, tetrachloromethane and iodoform.	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
34	Alcohols- method of Prepration, reaction.	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
35	Qualitative tests of Alcohols.	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
36	Seminar	Tutorial	CO1,5	Mid Term-2, Quiz & End Sem Exam
37	Structure and uses of Ethyl	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam

	alcohol, Methyl alcohol.			
38	Carbonyl compounds (Aldehydes and ketones) method of Prepration, reaction.	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
39	Acidity of carboxylic acids, effect of substituent on acidity.	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
40	Unit test	Tutorial	CO1,5	Mid Term-2, Quiz & End Sem Exam
41	Inductive effect and qualitative tests for carboxylic acids.	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
42	Structure and Uses of Acetic acid, Lactic acid, Tartaric acid.	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
43	Qualitative tests for amide and ester .	Lecture	CO1,3	Mid Term-2, Quiz & End Sem Exam
44	Seminar	Tutorial	CO1,3	Mid Term-2, Quiz & End Sem Exam
45	Structure and uses of chlorobutanol, Cetosteryl alcohol, Benzyl alcohol.	Lecture	CO1,4	Mid Term-2, Quiz & End Sem Exam
46	Structure and uses of Glycerol, Propylene glycol. .	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
47	Structure and Uses of Acetic acid, Lactic acid, Tartaric acid. .	Lecture	CO1,5	Quiz & End Sem Exam
48	Quiz	Tutorial		Quiz & End Sem Exam
49	Structure and Uses of Citric acid, Succinic acid. Oxalic acid,	Lecture	CO1,5	Quiz & End Sem Exam

	Salicylic acid			
50	Structure and Uses of Benzoic acid, Benzyl benzoate, Dimethyl phthalate.	Lecture	CO1,4	Quiz & End Sem Exam
51	Structure and Uses of Methyl salicylate and Acetyl salicylic acid. .	Lecture	CO1,4	Quiz & End Sem Exam
52	Aliphatic amines method of Prepration and reaction.	Tutorial	CO1,4	Quiz & End Sem Exam
53	Aliphatic amines method of Prepration and reaction.	Lecture	CO1,4	Quiz & End Sem Exam
54	Basicity, effect of substituent on Basicity.	Lecture	CO1,2	Quiz & End Sem Exam
55	Basicity, effect of substituent on Basicity.	Lecture	CO1,3	Quiz & End Sem Exam
56	Unit test	Tutorial		Quiz & End Sem Exam
57	Aliphatic amines. Qualitative test of amine.	Lecture	CO1,2	Quiz & End Sem Exam
58	Aliphatic amines. Qualitative test of amine.	Lecture	CO1,2	Quiz & End Sem Exam
59	Structure and uses of Ethanolamine, Ethylenediamine, Amphetamine.	Lecture	CO1,2	Quiz & End Sem Exam
60	Structure and uses of Ethanolamine, Ethylenediamine, Amphetamine.	Tutorial	CO1,2	Quiz & End Sem Exam

H. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP202T.1	Relate pharmacy education with pharmacy career options.	2	-	-	-	2	2	1	-	1	-	-				
BP202T.2.	Classify the different types of *organic compounds* based on medicinal use.	3	-	-	1	-	2	-	-	-	-	3				
BP202T.3.	Experiment in the preparation of various types organic compounds and their derivatives.	3	2	-	3	-	2	-	-	-	-	3				
BP202T.4.	Able to analyse and also to *write the structure, name and the type of*	2	2	3	3	-	1	-	-	-	-	3				

G. Mohanalakshmi

	isomerism of the organic compound.															
BP202T.5.	Able to Solve and write *the reaction, name the reaction and also orientation of reactions* in different types of *organic compounds* .	1	-	3	-	-	-	-	-	-	-	3				

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacutical Chemistry I MID-SEMESTER (SEM –II nd) 2019-20						
Class: B.Pharm, IInd Semester						
Subject Name: BP202T Pharmaceutical Organic Chemistry-I Theory		Time: 1 Hrs		Max. Marks: 30		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,4,5	Q.2,3,6,8,9	Q.4,7	Q.2,5,		
Student will be able to CO1: List the broad perceptive of cloud architecture and model. CO2: Apply different cloud programming models as per need.						

CO Map	Question No.	Question	Marks
CO1	Q.1	Define organic compounds.	2
CO1	Q.2	Explain significance of ethyl Alcohol	2
CO2	Q.3	Classify structural Isomerism	2
CO2	Q.4	By showing structure of chloroform. And summarize any	2

		three medicinal uses of chloroform	
CO2	Q.5	What do you understand by Substitution reaction give example?	2
	Q.6	Explain IUPAn Nomenclature in carbonyl compounds.	10
CO1	Q.7	What relationship between Structural and Geometric Isomerism Give their Classification.	10
CO1	Q.8	Outline Markownikoff's rule with suitable example.	5
CO2	Q.9	Explain sp3 Hybridization.	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

86.5 % Percentage of students secured more than 60% marks, so this course attained Level - 3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2019-2020

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2].Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMMEARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
IIS EM																
	BP-203 T	3	-	1	-	1	2	2	1	1	-	2				

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DEPARTMENT OF PHARMACEUTICAL CHEMISTRY
Course Handout
Course : BIOCHEMISTRY (Theory)
Course Code : BP203T, Crédits : 04, Session :2019-2020 (Even Sem.), Class : B.Pharm. 1st Year
FacultyName: Dr. Naveen Sharma, Dr. Shvetank Bhatt

A. **Introduction:** Biochemistry deals with complete understanding of the molecular levels of the chemical process associated with living cells. The scope of the subject is providing biochemical facts and the principles to understand metabolism of nutrient molecules in physiological and pathological conditions. It is also emphasizing on genetic organization of mammalian genome and hetero & autocatalytic functions of DNA

B. **Course Outcomes:** At the end of the course, students will be able to:

BP203T.1. Describe the concept of biomolecules and bioenergetics.

BP203T.2. Explain the metabolic pathways of biomolecules in both physiological and pathological conditions.

BP203T.3. Understand the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes.

BP203T.4.Understand the genetic organization of mammalian genome and functions of DNA in the synthesis of RNAs and proteins.

BP203T.5. Describe the clinical pathology of blood and urine.

C. **Programme Outcomes:**

[PO.1].Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2].Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance isrequiredtobemaintainedbyastudentto be qualified for taking up the EndSemester examination. The allowanceof 20%includesalltypesofleaves includingmedicalleaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

UNIT – I

Biomolecules Introduction, classification, chemical nature and biological role of carbohydrate, lipids, nucleic acids, amino acids and proteins.

Bioenergetics Concept of free energy, endergonic and exergonic reaction, Relationship between free energy, enthalpy and entropy; Redox potential. Energy rich compounds; classification; biological significances of ATPand cyclic AMP

UNIT – II

Carbohydrate metabolism: Glycolysis – Pathway, energetics and significance Citric acid cycle- Pathway, energetics and significance HMP shunt and its significance; Glucose-6-Phosphate dehydrogenase (G6PD) deficiency Glycogen metabolism Pathways and glycogen storage diseases (GSD) Gluconeogenesis-Pathway and its significance Hormonal regulation of blood glucose level and Diabetes mellitus.

Biological oxidation:

Electron transport chain (ETC) and its mechanism.Oxidative phosphorylation & its mechanism and substrate

Phosphorylation Inhibitors ETC and oxidative phosphorylation/Uncouplers level.

UNIT – III

Lipid metabolism:

B-Oxidation of saturated fatty acid (Palmitic acid). Formation and utilization of ketone bodies; ketoacidosis, De novo synthesis of fatty acids (Palmitic acid),Biological significance of cholesterol and conversion of cholesterol into bile acids, steroid hormone and vitamin D, Disorders of lipid metabolism: Hypercholesterolemia, atherosclerosis, fatty liver and obesity.

Amino acid metabolism

General reactions of amino acid metabolism: Transamination, deamination & decarboxylation, urea cycle and its disorders Catabolism of phenylalanine and tyrosine and their metabolic disorders (Phenyketonuria, Albinism, alkeptonuria, tyrosinemia) Synthesis and significance of biological substances; 5-HT, melatonin, dopamine, noradrenaline, adrenaline Catabolism of heme; hyperbilirubinemia and jaundice.

UNIT – IV

Nucleic acid metabolism and genetic information transfer

Biosynthesis of purine and pyrimidine nucleotides Catabolism of purine nucleotides and Hyperuricemia and Gout disease Organization of mammalian genome Structure of DNA and RNA and their functions DNA replication (semi conservative model) Transcription or RNA synthesis Genetic code, Translation or Protein synthesis and inhibitors

UNIV – V

Enzymes:

Introduction, properties, nomenclature and IUB classification of enzymes Enzyme kinetics (Michaelis plot, Line Weaver Burke plot) Enzyme inhibitors with examples Regulation of enzymes: enzyme induction and repression, allosteric enzymes regulation Therapeutic and diagnostic applications of enzymes and isoenzymes Coenzymes –Structure and biochemical functions

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

- Principles of Biochemistry by Lehninger.
- Harper's Biochemistry by Robert K. Murry, Daryl K. Granner and Victor W. Rodwell.
- Biochemistry by Stryer.
- Biochemistry by D. Satyanarayan and U.Chakrapani
- Textbook of Biochemistry by Rama Rao.
- Textbook of Biochemistry by Deb.
- Outlines of Biochemistry by Conn and Stump

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Introduction, classification, chemical nature of biomolecules	Lecture	1	Mid Term-1, Quiz & End Sem Exam
2	biological role of carbohydrate and lipids	Lecture	1	Mid Term-1, Quiz & End Sem Exam
3	Biological role of nucleic acids, amino acids and proteins.	Lecture		Mid Term-1, Quiz & End Sem Exam
4	Revision of biomolecules	Tutorial	1	Mid Term-1, Quiz & End Sem Exam
5	Concept of free energy, endergonic and exergonic reaction,	Lecture	1	Mid Term-1, Quiz & End Sem Exam
6	Relationship between free energy, enthalpy and entropy; Redox potential.	Lecture	1	Mid Term-1, Quiz & End Sem Exam
7	Classification and biological significances of ATP and cyclic AMP	Lecture	1	Mid Term-1, Quiz & End Sem Exam
8	Quiz	Tutorial		Mid Term-1, Quiz & End Sem Exam
9	Introduction of carbohydrate metabolism, Glycolysis – Pathway, energetics and significance	Lecture	1,2	Mid Term-1, Quiz & End Sem Exam
10	Pathway, energetics and significance ofCitric acid cycle	Lecture	2	Mid Term-1, Quiz & End Sem Exam
11	HMP shunt and its significance; Glucose-6-Phosphate dehydrogenase (G6PD) deficiency	Lecture	2	Mid Term-1, Quiz & End Sem Exam
12	Revision of carbohydrate metabolic pathways.	Tutorial		Mid Term-1, Quiz & End Sem Exam
13	Glycogen metabolism Pathways and glycogen storage diseases (GSD)	Lecture	2	Mid Term-1, Quiz & End Sem Exam

14	Gluconeogenesis- Pathway and its significance	Lecture	2	Mid Term-1, Quiz & End Sem Exam
15	Hormonal regulation of blood glucose level and Diabetes mellitus	Lecture	2	Mid Term-1, Quiz & End Sem Exam
16	Complete discussion of carbohydrate metabolism.	Tutorial		Mid Term-1, Quiz & End Sem Exam
17	Electron transport chain (ETC) and its mechanism	Lecture	1	Mid Term-1, Quiz & End Sem Exam
18	Oxidative phosphorylation & its mechanism and substrate Phosphorylation.	Lecture	1	Mid Term-1, Quiz & End Sem Exam
19	Inhibitors ETC and oxidative phosphorylation/Uncouplers	Lecture	1	Mid Term-1, Quiz & End Sem Exam
20	Group discussion on biological oxidation.	Tutorial		Mid Term-1, Quiz & End Sem Exam
21	β-Oxidation of saturated fatty acid (Palmitic acid)	Lecture	2	Mid Term-1, Quiz & End Sem Exam
22	ketoacidosis : Formation and utilization of ketone bodies;	Lecture	2	Mid Term-1, Quiz & End Sem Exam
23	De novo synthesis of fatty acids (Palmitic acid	Lecture	2	Mid Term-1, Quiz & End Sem Exam
24	Revision of lipid metabolism	Tutorial		Mid Term-1, Quiz & End Sem Exam
25	conversion of cholesterol into bile acids, steroid hormone and vitamin D	Lecture	2	Mid Term-1, Quiz & End Sem Exam
26	Metabolic disorder of lipids.	Lecture	2,5	Mid Term-1, Quiz & End Sem Exam
27	Hypercholesterolemia, atherosclerosis, fatty liver and obesity	Lecture	2,5	Mid Term-1, Quiz & End Sem Exam
28	Quiz	Tutorial		Mid Term-1, Quiz & End Sem Exam
29	General reactions of amino acid metabolism: Transamination, deamination & decarboxylation	Lecture	2	Mid Term-1, Quiz & End Sem Exam
30	urea cycle and its disorders	Lecture	2,5	Mid Term-1, Quiz & End Sem Exam
31	Catabolism of phenylalanine and tyrosine and their metabolic disorders (Phenyketonuria, Albinism, alkeptonuria, tyrosinemia)	Lecture	2,5	Mid Term-2, Quiz & End Sem Exam
32	Group discussion on amino acid metabolism	Tutorial		Mid Term-2, Quiz & End Sem Exam
33	Synthesis and significance of biological substances; 5-	Lecture	2	Mid Term-2, Quiz & End Sem Exam

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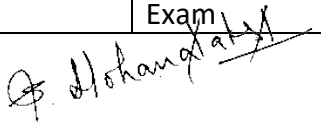
	HT, melatonin,			
34	dopamine, noradrenaline, adrenaline	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
35	Catabolism of heme; hyperbilirubinemia and jaundice methods to overcome	Lecture	4	Mid Term-2, Quiz & End Sem Exam
36	Seminar	Tutorial		Mid Term-2, Quiz & End Sem Exam
37	Introduction of Nucleic acid metabolism and genetic information transfer	Lecture	4	Mid Term-2, Quiz & End Sem Exam
38	Biosynthesis of purine nucleotides	Lecture	4	Mid Term-2, Quiz & End Sem Exam
39	Biosynthesis of pyrimidine nucleotides	Lecture	4	Mid Term-2, Quiz & End Sem Exam
40	Catabolism of purine nucleotides and Hyperuricemia and Gout disease	Lecture	4	Mid Term-2, Quiz & End Sem Exam
41	Unit test	Tutorial		Mid Term-2, Quiz & End Sem Exam
42	Organization of mammalian genome Structure of DNA and RNA and their functions.	Lecture	4	Mid Term-2, Quiz & End Sem Exam
43	DNA replication (semi conservative model)	Lecture	4	Mid Term-2, Quiz & End Sem Exam
44	Transcription or RNA synthesis	Lecture	4	Mid Term-2, Quiz & End Sem Exam
45	Seminar	Tutorial		Mid Term-2, Quiz & End Sem Exam
46	Genetic code	Lecture	4	Mid Term-2, Quiz & End Sem Exam
47	Translation or Protein synthesis and inhibitors	Lecture	4	Mid Term-2, Quiz & End Sem Exam
48	Introduction and properties of enzymes	Lecture	3	Mid Term-2, Quiz & End Sem Exam
49	nomenclature and IUB classification of enzymes	Lecture	3	Mid Term-2, Quiz & End Sem Exam
50	Enzyme kinetics (Michaelis plot, Line Weaver Burke plot	Lecture	3	Quiz & End Sem Exam
51	Revision of enzyme kinetics	Tutorial		Quiz & End Sem Exam
52	Enzyme inhibitors with examples	Lecture	3	Quiz & End Sem Exam
53	Enzyme induction and repression	Lecture	3	Quiz & End Sem Exam
54	Regulation of enzymes	Lecture	3	Quiz & End Sem Exam



55	Group discussion on enzyme inhibitors	Tutorial		Quiz & End Sem Exam
56	Therapeutic applications of enzyme	Lecture	3	Quiz & End Sem Exam
57	Diagnostic applications of enzyme	Lecture	3	Quiz & End Sem Exam
58	isoenzymes	Lecture	3	Quiz & End Sem Exam
59	Structure and biochemical functions of coenzymes	Lecture	3	Quiz & End Sem Exam
60	Unit test	Tutorial		Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP203T.1	**BP203T.1**. Describe the concept of biomolecules and bioenergetics.	3	-	-	-	2	2	1	-	1	-	3				
BP203T.2.	**BP203T.2**. Explain the metabolic pathways of biomolecules in both physiological and pathological conditions.	3	-	-	1	-	2	-	-	-	-	3				
BP203T.3.	**BP203T.3**. . Understand the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes.	3	2	-	3	-	2	-	-	-	-	3				
BP203T.4.	**BP203T.4**. Understand the genetic	2	2	3	3	-	1	-	-	-	-	3				

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	organization of mammalian genome and functions of DNA in the synthesis of RNAs and proteins.															
BP203T.5.	**BP203T.5**. Describe the clinical pathology of blood and urine.	1	-	3	-	-	-	-	-	-	-	3				

SampleQuestionPaper

Amity Institute of Pharmacy DepartmentofPharmaceutics IMID-SEMESTER(SEM–IInd) 2019-2020						
Class: B.Pharm, IInd Semester						
SubjectName: BP203T BIOCHEMISTRY (Theory)-I		Time:1Hrs			Max.Marks:30	
Levels of thequestions as perBloomsTaxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
QuestionMapping	Q.1,4,5	Q.2,3	Q.7,9,10	Q.6, 8		

The student willbeableto

CO1. Describe the concept of biomolecules and bioenergetics.

CO2. Explain the metabolic pathways of biomolecules in both physiological and pathological conditions.

CO3. Understand the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes.

CO4. Understand the genetic organization of mammalian genome and functions ofDNA in the synthesis of RNAs and proteins.

CO5. Describe the clinical pathology of blood and urine.

COMap	QuestionNo.	Question	Marks
CO1	Q.1	Write the components of electron transport.	2
CO4	Q.2	Give biochemical role of folic acid.	2
CO2	Q.3	Write a short note on oxidative phosphorylations.	2

CO2	Q.4	Write about the glycogen storage diseases.	2
CO2	Q.5	Discuss the energetic of glycolysis pathways.	2
CO2	Q.6	What are ketone bodies? Explain in detail about ketogenesis.	10
CO4	Q.7	Enumerate the biosynthesis of purine and pyrimidine nucleotides.	10
CO3	Q.8	Give details primary structure of protein.	5
CO3	Q.9	What is enzyme inhibition? Discuss in detail with its importance.	5
CO3	Q.10	Enlist the various enzyme used for diagnostic purpose	5

Attainments		**Rubric**
Level	1	IF60%ofstudentssecuremorethan60%marksthenlevel1
Level	2	IF70%ofstudentssecuremorethan60%marksthenlevel2
Level	3	IF80%ofstudentssecuremorethan60%marksthenlevel3

Attainment Level 3:

94.2 % Percentage of students secured more than 60% marks, so this course attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOLOGY

PROGRAMME OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2019-20

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[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge asscoited with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices

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Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "-"

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
II SEM	BP 204T	3	3	3	3	2	2	3	1	1	3	1	-	-	-

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACOLOGY
Course Handout
Course : PATHOPHYSIOLOGY (THEORY)
Course Code : BP 204T, Credits : 04, Session : 2019-20 (Even Sem.), Class : B. Pharm.1st Year
Faculty Name : Mrs. Monika Kaushik, Dr. Jovita Kanoujia

Introduction: This subject is intended to impart the fundamental knowledge on various aspects (the study of causes of diseases and reactions of the body to such disease producing causes), emphasis the basic concepts of bioassay.:

1. The relevant aspects of pathology of various conditions with reference to its pharmacological applications.
2. Understanding of basic pathophysiological mechanisms.
3. Help to study the syllabus of pathology.
4. Give baseline knowledge required to practice medicine safely, confidently, rationally, and effectively.
5.

Course Outcomes: At the end of the course, students will be able to:

BP204T.1. Describe the etiology and pathogenesis of the selected disease states.Discuss the

BP204T.2. Name the signs and symptoms of the diseases

BP204T.3. Mention the complications of the diseases.

BP204T.4. Distinguish environmental factors, physical, psychosocial, and cognitive characteristics of various diseases and conditions.

BP204T.5 Identify implications of therapeutic interventions for diseases and conditions.

A. Programme Outcomes:

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[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

B. Assessment Plan:

Component of Evaluation	Description	Code	Weightage

			%
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	A minimum of 80% attendance is required to be maintained by a student to be qualified for taking up the Odd Semester examination	A	4 %
	Quiz/ Assignment/Open book test/ Field work/Group discussion/ Seminar	Q/A/OBT/FW/GD/S	3%
	Student – Teacher interaction	STA	3%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

Q: Quiz, A: Assignment, OBT: Open book test, FW: Field work, GD: Group discussion, S: Seminar

C. Syllabus

Unit I. 10Hours

Basic principles of Cell injury and Adaptation: Introduction, definitions, Homeostasis, Components and Types of Feedback systems, Causes of cellular injury,Pathogenesis (Cell membrane damage, Mitochondrial damage, Ribosome damage, Nuclear damage),Morphology of cell injury – Adaptive changes (Atrophy, Hypertrophy, hyperplasia, Metaplasia, Dysplasia),Cell swelling, Intra cellular accumulation, Calcification, Enzyme leakage and Cell Death Acidosis &Alkalosis,Electrolyte imbalance.

Basic mechanism involved in the process of inflammation and repair: Introduction, Clinical signs of inflammation, Different types of Inflammation,Mechanism of Inflammation – Alteration in vascular permeability and blood flow, migration of WBC's,Mediators of inflammation,Basic principles of wound healing in the skin,Pathophysiology of Atherosclerosis

Unit II. 10Hours

Cardiovascular System: Hypertension, congestive heart failure, ischemic heart disease (angina,myocardial infarction, atherosclerosis and arteriosclerosis)

Respiratory system:Asthma, Chronic obstructive airways diseases. Renal system:Acute and chronic renal failure .

Unit III. 10Hours

Haematological Diseases:
Iron deficiency, megaloblastic anemia (Vit B12 and folic acid), sickle cell anemia, thalasemia, hereditary acquired anemia, hemophilia
Endocrine system: Diabetes, thyroid diseases, disorders of sex hormones
Nervous system: Epilepsy, Parkinson's disease, stroke, psychiatric disorders: depression, schizophrenia and Alzheimer's disease.
Gastrointestinal system: Peptic Ulcer
Unit IV. 8 Hours
Inflammatory bowel diseases, jaundice, hepatitis (A,B,C,D,E,F) alcoholic liver disease.
Disease of bones and joints: Rheumatoid arthritis, osteoporosis and gout
Principles of cancer: classification, etiology and pathogenesis of cancer
Diseases of bones and joints:Rheumatoid Arthritis, Osteoporosis,Gout
Principles of Cancer: Classification, etiology and pathogenesis of Cancer
Unit V. 7 Hours
Infectious diseases:Meningitis,Typhoid, Leprosy, Tuberculosis
Urinary tract infections
Sexually transmitted diseases:AIDS, Syphilis, Gonorrhea

Examination Scheme:

Components	CT	A	Q/A/OBT/FW/GD/S	STI	EE
Weightage (%)	15	4	3	3	75

Q: Quiz, A: Assignment, OBT: Open book test, FW: Field work, GD: Group discussion, S: Seminar, STI: Student – Teacher interaction

D. Suggested Text/Reference Books:

A. 1. Vinay Kumar, Abul K. Abas, Jon C. Aster; Robbins &Cotran Pathologic Basis of Disease; South Asia edition; India; Elsevier; 2014.
B. 2. Harsh Mohan; Text book of Pathology; 6th edition; India; Jaypee Publications; 2010.
C. 3. Laurence B, Bruce C, Bjorn K. ; Goodman Gilman's The Pharmacological Basis of Therapeutics; 12th edition; New York; McGraw-Hill; 2011. 4. Best, Charles Herbert 1899-1978; Taylor, Norman Burke 1885-1972; West, John B (John Burnard); Best and Taylor's Physiological basis of medical practice; 12th ed; united states; 5. William and Wilkins, Baltimore;1991 [1990 printing]. 6. Nicki R. Colledge, Brian R. Walker, Stuart H. Ralston;Davidson's Principles and Practice of Medicine; 21st edition; London; ELBS/Churchill Livingstone; 2010.
7. Guyton A, John .E Hall; Textbook of Medical Physiology; 12th edition; WB Saunders Company; 2010. 8. Joseph DiPiro, Robert L. Talbert, Gary Yee, Barbara Wells, L. Michael Posey; Pharmacotherapy: A Pathophysiological Approach; 9th edition; London; McGraw-Hill Medical; 2014. 9. V. Kumar, R. S. Cotran and S. L. Robbins; Basic Pathology; 6th edition; Philadelphia; WB Saunders Company; 1997. 10. Roger Walker, Clive Edwards; Clinical Pharmacy and Therapeutics; 3rd edition; London; Churchill Livingstone publication; 2003.

E. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1.	Introduction of cellular injury	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
2.	Definitions of cellular injury,	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
3.	Homeostasis,	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
4.	Tutorial 1	Tutorial 1		
5.	Components and Types of Feedback systems,	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
6.	Causes of cellular injury	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
7.	Pathogenesis (Cell membrane damage, Mitochondrial damage)	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
8.	Tutorial 2	Tutorial 2		
9.	Pathogenesis (Ribosome damage, Nuclear damage)	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
10.	Morphology of cell injury – Adaptive changes	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
11.	(Atrophy, Hypertrophy, hyperplasia, Metaplasia, Dysplasia)	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
12.	Tutorial 3	Tutorial 3		
13.	Cell swelling, Intra cellular accumulation,	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
14.	Acidosis & Alkalosis, Electrolyte imbalance	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
15.	Introduction, Clinical signs of inflammation,	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
16.	Tutorial 4	Tutorial 4		

17.	Different types of Inflammation, Mechanism of Inflammation – Alteration in vascular permeability and blood flow	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
18.	migration of WBC's, Mediators of inflammation,Basic principles of wound healing in the skin,	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
19.	Pathophysiology of Atherosclerosis	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
20.	Hypertension, congestive heart failure,	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
21.	Tutorial 5	Tutorial 5		
22.	ischemic heart disease (angina, myocardial infarction)	Lecture	BP204T.2	Mid Term-1, Quiz & End Sem Exam
23.	atherosclerosis and arteriosclerosis	Lecture	BP204T.2	Mid Term-1, Quiz & End Sem Exam
24.	Tutorial 6	Tutorial 6		
25.	Asthma	Lecture	BP204T.2	Mid Term-1, Quiz & End Sem Exam
26.	Chronic obstructive airways diseases.	Lecture	BP204T.2	Mid Term-1, Quiz & End Sem Exam
27.	Acute and chronic renal failure	Tutorial	BP204T.2	Mid Term-1, Quiz & End Sem Exam
28.	Tutorial 7	Tutorial 7		
29.	Iron deficiency, megaloblastic anemia (Vit B12 and folic acid),	Lecture	BP204T.3	Mid Term-2, Quiz & End Sem Exam
30.	sickle cell anemia, thalasemia	Lecture	BP204T.3	Mid Term-2, Quiz & End Sem Exam
31.	hereditary acquired anemia, hemophilia	Lecture	BP204T.3	Mid Term-2, Quiz & End Sem Exam
32.	Tutorial 8	Tutorial 8		
33.	Diabetes, thyroid diseases	Tutorial	BP204T.3	Mid Term-2, Quiz & End Sem Exam
34.	disorders of sex hormones	Lecture	BP204T.3	Mid Term-2, Quiz & End

				Sem Exam
35.	Epilepsy	Lecture	BP204T.3	Mid Term-2, Quiz & End Sem Exam
36.	Tutorial 9	Tutorial 9		
37.	stroke	Lecture	BP204T.3	Mid Term-2, Quiz & End Sem Exam
38.	Schizophrenia	Tutorial	BP204T.3	Mid Term-2, Quiz & End Sem Exam
39.	Alzheimer‘s disease	Lecture	BP204T.3	Mid Term-2, Quiz & End Sem Exam
40.	Tutorial 10	Tutorial 10		
41.	Peptic Ulcer	Lecture	BP204T.3	Mid Term-2, Quiz & End Sem Exam
42.	Inflammatory bowel diseases.	Lecture	BP204T.4	Mid Term-2, Quiz & End Sem Exam
43.	jaundice	Tutorial	BP204T.4	Mid Term-2, Quiz & End Sem Exam
44.	Tutorial 11	Tutorial 11		
45.	hepatitis (A,B,C,D,E,F)	Lecture	BP204T.4	Mid Term-2, Quiz & End Sem Exam
46.	alcoholic liver disease	Lecture	BP204T.4	Mid Term-2, Quiz & End Sem Exam
47.	Rheumatoid arthritis,	Lecture	BP204T.4	Mid Term-2, Quiz & End Sem Exam
48.	Tutorial 12	Tutorial 12		
49.	osteoporosis	Tutorial	BP204T.4	Mid Term-2, Quiz & End Sem Exam
50.	gout	Lecture	BP204T.4	Quiz & End Sem Exam
51.	psychiatric disorders: depression	Lecture	BP204T.4	Quiz & End Sem Exam
52.	Tutorial 13	Tutorial 13		
53.	Classification, etiology and pathogenesis of cancer	Lecture	BP204T.5	Quiz & End Sem Exam
54.	Parkinson’s disease	Tutorial	BP204T.5	Quiz & End Sem Exam
55.	Meningitis	Lecture	BP204T.5	Quiz & End

				Sem Exam
56.	Tutorial 14	Tutorial 14		
57.	Typhoid,	Lecture	BP204T.5	Quiz & End Sem Exam
58.	Leprosy,	Lecture	BP602T.5	Mid Term-2, Quiz & End Sem Exam
59.	Tuberculosis	Lecture	BP204T.5	Quiz & End Sem Exam
60.	Tutorial 15	Tutorial 15		
61.	Urinary tract infections	Lecture	BP204T.5	Quiz & End Sem Exam
62.	AIDS, Syphilis, Gonorrhea	Lecture	BP204T.5	Quiz & End Sem Exam

F. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP204T.1	Discuss the diffrenet type of components and feedback systems present in the body.	2	2	3	2	-	1	2	1	-	-	1
BP204T.2	What are the adaptaive changes ocuurs in morphology during cell injury.	2	2	2	3	-	1	1	1	-	-	1
BP204T.3	Write a descriptive note on disease know as porous bone or silent disease.	2	1	1	-	-	1	3	2	-	-	-
BP204T.4	What are the causes, symptoms and treatment of epilepsy.	2	2	2	1	-	1	-	-	-	-	-
BP204T.5	*Write a descriptive note on Tuberculosis.*	2	1	-	-	-	2	1	1	-	-	1

Sample Question Paper

Amity School of Pharmacy Department of Pharmacology I MID-SEMESTER(SEM–II)2021-22						
Class: B.Pharm. II Semester						
Subject Name: BP204T Pathophysiology		Time:1 Hrs		Max.Marks:30		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,4	Q.2,3	Q.4	Q.2,5,6		

CO Map	Question No.	Question	Marks
CO1	Q.1	Write about the disease caused by deficiency of Vit B12.	2
CO1	Q.2	Discuss the symptoms of Alzheimer's disease.	2
	Q.3	Write a note on Stroke.	2
	Q.4	Write a note on Rheumatoid Arthritis.	2
	Q.5	What is cancer?	2
CO1	Q.6	Write a about etiology, clinical presentation, diagnosis, and treatment of Peptic Ulcer.	10
CO2	Q.7	Discuss the symptoms and management of Schizophrenia.	10
CO2	Q.8	Write the descriptive note on CHF.	5
	Q.9	Write an explanatory note on hepatitis A, B and C?	5
CO2	Q.10	Explain the pathophysiology and treatment strategy for alcoholic liver disease.	5

Attainments		Rubric
Level	1	IF60%ofstudentssecuremorethan60%marksthenlevel1
Level	2	IF70%ofstudentssecuremorethan60%marksthenlevel2
Level	3	IF80%ofstudentssecuremorethan60%marksthenlevel3

Attainment Level 2:

78.8 % Percentage of students secured more than 60% marks, so this course attained Level - 2.

AMITY UNIVERSITY
MADHYA PRADESH
Established vide Government of Madhya Pradesh Act No. 27 of 2010

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICS

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2019-20

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

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Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
II SEM																
	BP205T	3	-	2	3	1	3	2	1	1	2	2				

Dr. Mohan Yadav

DEPARTMENT OF PHARMACEUTICS
Course Handout
Course : COMPUTER APPLICATION IN PHARMACY THEORY
Course Code: BP205T, Credits: 03, Session:2019-20 (Even Sem.), Class: B.Pharm - 1st Year
Faculty Name: Dr. Jovita Kanoujia and Mr. Vivek Parashar

A. Introduction: This subject deals with the introduction database, database management system, computer application in clinical studies and use of databases.

B. Course Outcomes: At the end of the course, students will be able to:

BP205T.1. Apply one's complement, and two's complement methods to solve various problems based on the binary system.

BP205T.2. Illustrate data flow diagrams, product cycle and discover web technologies application in pharmacy.

BP205T.3. Define the role of computer in various fields of pharmacy

BP205T.4. Explain the application of bioinformatics in various disciplines.

BP205T.5. Outline the use of LIMS, TIMS and CDS in pre-clinical development.

C. Programme Outcomes:

[PO.1]. Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

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[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	50%
Total			**75%**

E. Syllabus

UNIT – I

Number system: Binary number system, Decimal number system, Octal number system, Hexadecimal number systems, conversion decimal to binary, binary to decimal, octal to binary etc, binary addition, binary subtraction – One's complement, Two's complement method, binary multiplication, binary division**.**
Concept of Information Systems and Software **:** Information gathering, requirement and feasibility analysis, data flow diagrams, process specifications, input/output design, process life cycle, planning and managing the project

UNIT –II

Web technologies:Introduction to HTML, XML,CSS and Programming languages, introduction to web servers and Server Products**,** Introduction to databases, MYSQL, MS ACCESS, Pharmacy Drug database

UNIT – III

Application of computers in Pharmacy – Drug information storage and retrieval, Pharmacokinetics, Mathematical model in Drug design, Hospital and Clinical Pharmacy, Electronic Prescribing and discharge (EP) systems, barcode medicine identification and automated dispensing of drugs, mobile technology and adherence monitoring Diagnostic System, Lab-diagnostic System, Patient Monitoring System, Pharma Information System.

UNIT – IV

Bioinformatics: Introduction, Objective of Bioinformatics, Bioinformatics Databases, Concept of Bioinformatics, Impact of Bioinformatics in Vaccine Discovery

UNIT-V

Computers as data analysis in Preclinical development: Chromatographic dada analysis(CDS), Laboratory Information management System (LIMS) and Text Information Management System(TIMS).

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

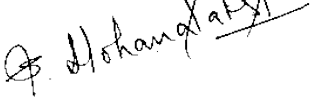
- Computer Application in Pharmacy – William E.Fassett –Lea and Febiger, 600 South Washington Square, USA, (215) 922-1330.
- Computer Application in Pharmaceutical Research and Development –Sean Ekins –Wiley-Interscience, A John Willey and Sons, INC., Publication, USA.
- Bioinformatics (Concept, Skills and Applications) – S.C.Rastogi-CBS Publishers and Distributors, 4596/1- A, 11 Darya Gani, New Delhi – 110 002(INDIA)
- Microsoft office Access - 2003, Application Development Using VBA, SQL Server, DAP and Infopath – Cary N.Prague – Wiley Dreamtech India (P) Ltd., 4435/7, Ansari Road, Daryagani, New Delhi – 110002.

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Binary number system, Decimal number system, Octal number system, Hexadecimal number systems,	Lecture	1	Mid Term-1, Quiz & End Sem Exam
2	Conversion decimal to binary, binary to decimal, octal to binary etc,	Lecture	1	Mid Term-1, Quiz & End Sem Exam
3	Conversion decimal to binary, binary to decimal, octal to binary etc,	Lecture	1	Mid Term-1, Quiz & End Sem Exam
4	Binary addition, binary subtraction – One's complement, binary	Lecture	1	Mid Term-1, Quiz & End Sem Exam
5	Two's complement method, Binary multiplication, binary division	Lecture	1	Mid Term-1, Quiz & End Sem Exam
6	Two's complement method, Binary multiplication, binary division	Lecture	1	Mid Term-1, Quiz & End Sem Exam
7	**Concept of Information Systems and Software :** Information gathering, requirement and feasibility analysis,	Lecture	2	Mid Term-1, Quiz & End Sem Exam
8	Data flow diagrams, process Specifications	Lecture	2	Mid Term-1, Quiz & End Sem Exam
9	Input/output design, process life cycle,	Lecture	2	Mid Term-1, Quiz & End Sem Exam
10	Planning and managing the project	Lecture	2	Mid Term-1, Quiz & End Sem Exam
11	**Web technologies**:Introduction to HTML,	Lecture	2	Mid Term-1, Quiz & End Sem Exam
12	XML, CSS	Lecture	2	Mid Term-1, Quiz & End Sem Exam
13	Programming languages,	Lecture	2	Mid Term-1, Quiz & End Sem Exam
14	Introduction to web servers and Server Products	Lecture	2	Mid Term-1, Quiz & End Sem Exam
15	Introduction to databases, MYSQL, MS ACCESS,	Lecture	2	Mid Term-1, Quiz & End Sem Exam
16	Pharmacy Drug database	Lecture	3	Mid Term-1, Quiz & End Sem Exam
17	**Application of computers in Pharmacy** – Drug information storage and retrieval,	Lecture	3	Mid Term-1, Quiz & End Sem Exam

Dr. Mohanty

18	Pharmacokinetics, Mathematical model in Drug design,	Lecture	3	Mid Term-1, Quiz & End Sem Exam
19	Hospital and Clinical Pharmacy,	Lecture	3	Mid Term-1, Quiz & End Sem Exam
20	Electronic Prescribing and discharge (EP) systems,	Lecture	3	Mid Term-1, Quiz & End Sem Exam
21	Barcode medicine identification	Lecture	3	Mid Term-1, Quiz & End Sem Exam
22	Automated dispensing of drugs,	Lecture	3	Mid Term-1, Quiz & End Sem Exam
23	Mobile technology and adherence monitoring	Lecture	3	Mid Term-2, Quiz & End Sem Exam
24	Diagnostic System, Lab-diagnostic System,	Lecture	3	Mid Term-2, Quiz & End Sem Exam
25	Patient Monitoring System,	Lecture	3	Mid Term-2, Quiz & End Sem Exam
26	Pharma Information System	Lecture	3	Mid Term-2, Quiz & End Sem Exam
27	**Bioinformatics:** Introduction,	Lecture	4	Mid Term-2, Quiz & End Sem Exam
28	Objective of Bioinformatics,	Lecture	4	Mid Term-2, Quiz & End Sem Exam
29	Bioinformatics Databases,	Lecture	4	Mid Term-2, Quiz & End Sem Exam
30	Bioinformatics Databases,	Lecture	4	Mid Term-2, Quiz & End Sem Exam
31	Concept of Bioinformatics,	Lecture	4	Mid Term-2, Quiz & End Sem Exam
32	Concept of Bioinformatics,	Lecture	4	Mid Term-2, Quiz & End Sem Exam
33	Impact of Bioinformatics in Vaccine Discovery	Lecture	4	Mid Term-2, Quiz & End Sem Exam
34	Impact of Bioinformatics in Vaccine Discovery	Lecture	4	Mid Term-2, Quiz & End Sem Exam
35	Impact of Bioinformatics in Vaccine Discovery	Lecture	4	Mid Term-2, Quiz & End Sem Exam
36	Chromatographic dada analysis(CDS),	Lecture	5	Mid Term-2, Quiz & End Sem Exam
37	Features of CDS	Lecture	5	Mid Term-2, Quiz & End Sem Exam
38	HPLC, GC	Lecture	5	Mid Term-2, Quiz & End Sem Exam
39	Laboratory Information management System (LIMS)	Lecture	5	Mid Term-2, Quiz & End Sem Exam
40	Laboratory Information management System (LIMS)	Lecture	5	Mid Term-2, Quiz & End Sem Exam
41	Laboratory Information	Lecture	5	Mid Term-2, Quiz



	management System (LIMS)			& End Sem Exam
42	Text Information Management System(TIMS)	Lecture	5	Mid Term-2, Quiz & End Sem Exam
43	Steps in TIMS	Lecture	5	Mid Term-2, Quiz & End Sem Exam
44	Features of TIMS	Lecture	5	Mid Term-2, Quiz & End Sem Exam
45	Uses in Pharmacy	Lecture	5	Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP205T.1	**BP205T.1**. Apply one's complement, and two's complement methods to solve various problems based on the binary system.	3	-	3	3	1	2	1	-	1	-	-				
BP205T.2.	**BP205T.2**. Illustrate data flow diagrams, product cycle and discover web technologies application in pharmacy.	2	1	3	3	-	2	1	-	-	-	3				
BP205T.3.	**BP205T.3**. Define the role of computer in various fields of pharmacy	3	2	2	3	2	2	3	3	2	1	2				
BP205T.4.	**BP205T.4**. Explain the application of bioinformatics in various disciplines.	2	1	3	3	-	2	-	2	1	1	3				
BP205T.5.	**BP205T.5**. Outline the use of LIMS, TIMS and CDS in pre-clinical development.	2	3	3	3	2	2	-	3	1	-	3				

G. Mohanalaxmi

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutics I MID-SEMESTER (SEM –IInd) 2019-20						
Class: B.Pharm, II Semester						
Subject Name: BP205T Computer Application in Pharmacy-Theory		Time: 1 Hrs		Max. Marks: 30		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q1,3,4,9,10	Q2,5,6	Q7	Q8		

The student will be able to

CO.3. Define the role of computer in various fields of pharmacy

CO.4. Explain the application of bioinformatics in various disciplines.

CO Map	Question No.	Question	Marks
CO5	Q.1	What is the use of MS-Access?	2
CO3	Q.2	Outline the limitation of handwritten prescription.	2
CO3	Q.3	What is the PMS?	2
CO4	Q.4	Define vaccine.	2
CO4	Q.5	Classify database used in pharmacy?	2
CO3	Q.6	Explain the role of computers in hospital pharmacy.	10
CO3	Q.7	Make use of a drug information and retrieval system in pharmacy.	10
CO3	Q.8	Compare HPLC and GC for chromatic data analysis.	5
CO3	Q.9	How barcode medicine identification systems are useful in pharmacy?	5
CO4	Q.10	Write about genomic and proteomic databases.	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2

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Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

94.2 % Percentage of students secured more than 60% marks, so this course attained Level -3.

AMITY UNIVERSITY
MADHYA PRADESH
Established vide Government of Madhya Pradesh Act No. 27 of 2010

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOLOGY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2019-20

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honor personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3: Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
II SEM																
	BP206T	2	1	2	3	1	3	2	1	2	3	3				

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DEPARTMENT OF PHARMACOLOGY
Course Handout
Course : ENVIRONMENTAL SCIENCES-THEORY
Course Code: BP206T, Credits: 03, Session:2019-20 (Even Sem.), Class: B.Pharm - 1st Year
Faculty Name: Dr. Rwitabrata Mallick

A. **Introduction:** This subject deals with the scientific study of the environmental system and the status of its inherent or induced changes on organisms. It includes not only the study of physical and biological characters of the environment but also the social and cultural factors and the impact of man on environment.

B. **Course Outcomes:** At the end of the course, students will be able to:

BP206T: 1. Create the awareness about environmental problems among learners.

BP206T: 2. Impart basic knowledge about the environment and its allied problems.

BP206T: 3. Develop an attitude of concern for the environment.

BP206T: 4. Motivate learner to participate in environment protection and environment improvement.

BP206T: 5. Acquire skills to help the concerned individuals in identifying and solving environmental problems.

C. **Programme Outcomes:**

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	50%
Total			**75%**

E. Syllabus

Unit-I

The Multidisciplinary nature of environmental studies

Natural Resources

Renewable and non-renewable resources:

Natural resources and associated problems

a) Forest resources; b) Water resources; c) Mineral resources; d) Food resources; e) Energy resources; f) Land resources: Role of an individual in conservation of natural resources.

Unit-II

Ecosystems

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Introduction, types, characteristic features, structure and function of the ecosystems: Forest ecosystem; Grassland ecosystem; Desert ecosystem; Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Unit- III

Environmental Pollution: Air pollution; Water pollution; Soil pollution

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. Y.K. Sing, Environmental Science, New Age International Pvt, Publishers, Bangalore
2. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
3. Bharucha Erach, The Biodiversity of India, Mapin Pu blishing Pvt. Ltd., Ahmedabad – 380 013, India,
4. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
5. Clark R.S., Marine Pollution, Clanderson Press Oxford
6. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumbai, 1196p
7. De A.K., Environmental Chemistry, Wiley Eastern Ltd.

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	The Multidisciplinary nature of environmental studies	Lecture	3,4	Mid Term-1, Quiz & End Sem Exam
2	Natural Resources Renewable and non-renewable resources.	Lecture	3,4	Mid Term-1, Quiz & End Sem Exam
3	Natural resources and associated problems	Lecture	3,4	Mid Term-1, Quiz & End Sem Exam
4	a) Forest resources;	Lecture	3,4	Mid Term-1, Quiz & End Sem Exam
5	b) Water resources;	Lecture	3,4	Mid Term-1, Quiz & End Sem Exam
6	c) Mineral resources;	Lecture	3,4	Mid Term-1, Quiz & End Sem Exam
7	d) Food resources;	Lecture	3,4	Mid Term-1, Quiz & End Sem Exam
8	e) Energy resources;	Lecture	3,4	Mid Term-1, Quiz & End Sem Exam
9	f) Land resources:	Lecture	3,4	Mid Term-1, Quiz & End Sem Exam
10	Role of an individual in conservation of natural resources	Lecture	2	Mid Term-1, Quiz & End Sem Exam
11	Ecosystems	Lecture	2	Mid Term-2, Quiz & End Sem Exam
12	□ Concept of an ecosystem.	Lecture	2	Mid Term-2, Quiz & End Sem Exam
13	□ Structure and function of an ecosystem.	Lecture	2	Mid Term-2, Quiz & End Sem Exam
14	□ Introduction, types of ecosystems.	Lecture	3	Mid Term-2, Quiz & End Sem Exam
15	characteristic features of the ecosystems	Lecture	3	Mid Term-2, Quiz & End Sem Exam
16	structure and function of the ecosystems	Lecture	3	Mid Term-2, Quiz & End Sem Exam
17	Forest ecosystem;	Lecture	3	Mid Term-2, Quiz

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				& End Sem Exam
18	Grassland ecosystem;	Lecture	3	Mid Term-2, Quiz & End Sem Exam
19	Desert ecosystem;	Lecture	3	Mid Term-2, Quiz & End Sem Exam
20	Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)	Lecture	3	Mid Term-2, Quiz & End Sem Exam
21	Environmental Pollution	Lecture	1,2	Mid Term-2, Quiz & End Sem Exam
22	Air pollution;	Lecture	1,2	Mid Term-2, Quiz & End Sem Exam
23	Air pollution;	Lecture	1,2	Mid Term-2, Quiz & End Sem Exam
24	Quiz	Lecture	1,2	Mid Term-2, Quiz & End Sem Exam
25	Water pollution;	Lecture	1,2	Mid Term-2, Quiz & End Sem Exam
26	Water pollution;	Lecture	1,2	Mid Term-2, Quiz & End Sem Exam
27	Quiz	Lecture	1,2	Mid Term-2, Quiz & End Sem Exam
28	Soil pollution	Lecture	1,2	Mid Term-2, Quiz & End Sem Exam
29	Soil pollution	Lecture	1,2	Mid Term-2, Quiz & End Sem Exam
30	Quiz	Lecture	1,2	Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP206T: 1	**BP206T: 1**. Create the awareness about environmental problems among learners.	3	1	1	1	1	2	1	-	1	3	2				

BP206T: 2	**BP206T: 2**. Impart basic knowledge about the environment and its allied problems.	2	1	2	1	-	2	1	-	1	3	3				
BP206T: 3	**BP206T: 3.** Develop an attitude of concern for the environment.	2	1	2	2	2	2	2	1	2	3	2				
BP206T: 4	**BP206T: 4**. Motivate learner to participate in environment protection and environment improvement.	2	1	1	1	-	2	1	1	1	3	3				
BP206T: 5	**BP206T: 5**. Acquire skills to help the concerned individuals in identifying and solving environmental problems	2	1	1	1	2	2	1	1	1	3	3				

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacology I MID-SEMESTER (SEM –IInd) 2019-20						
Class: B. Pharm, II Semester						
Subject Name: Environmental Sciences BP206T-Theory		Time: 1 Hrs		Max. Marks: 30		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q1,Q2,Q5	Q3,Q4				

The student will be able to

CO: 3. Develop an attitude of concern for the environment.

CO: 4. Motivate learner to participate in environment protection and environment improvement.

CO Map	Question No.	Question	Marks
CO3,4	Q.1	Discuss the Multidisciplinary nature of environmental studies.	5
CO3,4	Q.2	Discuss in detail about natural resources and associated problems with the forest resources.	5
CO3,4	Q.3	Explain the role of an individual in conservation of natural resources.	5
CO3,4	Q.4	Write a note on water resources.	5
CO3,4	Q.5	Gives a detailed note on Renewable and non-renewable resources.	10

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

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Attainment Level 1:

64.5 % Percentage of students secured more than 60% marks, so this course attained Level - 1.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOLOGY

PROGRAMME OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2019-20

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

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Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3: Substantial (High)

If there is no correlation, put "-"

PROGRAMME ARTICULATION MATRIX												
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
II SEM	BP 207P	3	2	2	3	1	2	2	1	3	2	3

AMITY UNIVERSITY

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Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACOLOGY
Course Handout
Course : Human Anatomy and Physiology (Practical)
Course Code : BP207P, Credits : 02, Session : 2019-20 (Even Sem.), Class : B. Pharm. First Year
Faculty Name : Dr. Naveen Sharma

Introduction: This subject is designed to impart fundamental and practical knowledge of pharmaceutical *microbiology* and various categories of microorganisms especially for the production of alcohol, antibiotics, vaccines, vitamins enzymes etc.

A. Course Outcomes: At the end of the course, students will be able to:

BP207P: 1. To study the human body systems using specimen, models, etc.,

BP207P: 2. Recording of body temperature.

BP207P: 3. To demonstrate positive and negative feedback mechanism.

BP207P: 4. Determination of tidal volume and vital capacity.

BP207P: 5. Study of family planning devices and pregnancy diagnosis test.

BP207P: 6. Demonstration of total blood count by cell analyser.

B. Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

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employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

C. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance isrequiredtobemaintainedbyastudentto be qualified for taking up the EndSemester examination. The allowanceof 20%includesalltypesofleaves includingmedicalleaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

PR: Practical Records, RV: Regular viva, As: Assignment

D. Syllabus

1. To study the integumentary and special senses using specimen, models, etc.,
2. To study the nervous system using specimen, models, etc.,
3. To study the endocrine system using specimen, models, etc
4. To demonstrate the general neurological examination
5. To demonstrate the function of olfactory nerve
6. To examine the different types of taste.
7. To demonstrate the visual acuity
8. To demonstrate the reflex activity
9. Recording of body temperature
10. To demonstrate positive and negative feedback mechanism.
11. Determination of tidal volume and vital capacity.
12. Study of digestive, respiratory, cardiovascular systems, urinary and reproductive systems with the help of models, charts and specimens.
13. Recording of basal mass index.
14. Study of family planning devices and pregnancy diagnosis test.
15. Demonstration of total blood count by cell analyser
16. Permanent slides of vital organs and gonads.

E. Examination Scheme:

Components	A	CT	LR	V	EE
Weightage (%)	2	10	1	2	35

PR: Practical Records, RV: Regular viva, As: Assignment

F. Suggested Text/Reference Books:

1. Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypee brothers medical publishers, New Delhi.
2. Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York
3. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co,Riverview,MI USA
4. Text book of Medical Physiology- Arthur C,Guyton andJohn.E. Hall. Miamisburg, OH, U.S.A.
5. Principles of Anatomy and Physiology by Tortora Grabowski. Palmetto, GA, U.S.A.
6. Textbook of Human Histology by Inderbir Singh, Jaypee brothers medical publishers, New Delhi.
7. Textbook of Practical Physiology by C.L. Ghai, Jaypee brothers medical publishers, New

Delhi.

8. Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee brother's medical publishers, New Delhi.

G. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1.	1. To study the integumentary and special senses using specimen, models, etc.,	Practical	CO1	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
2.	2. To study the nervous system using specimen, models, etc.,	Practical	CO1	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
3.	3. To study the endocrine system using specimen, models, etc	Practical	CO1	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
4.	4. To demonstrate the general neurological examination	Practical	CO, 9	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
5.	*5.* To demonstrate the function of olfactory nerve	Practical	CO1, 11	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
6.	6. To examine the different types of taste.	Practical	CO1, 9	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
7.	7. To demonstrate the visual activity	Practical	CO1, 9, 10, 11	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
8.	8. To demonstrate the reflex activity	Practical	CO1, 10, 11	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
9.	9. Recording of body temperature	Practical	CO1, 9	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
10.	10. To demonstrate positive and negative feedback mechanism.	Practical	CO1	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
11.	11. Determination of tidal volume and vital capacity.	Practical	CO1, 11	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
12.	12. Study of digestive,	Practical	CO1,11	Mid Term-2 & End Sem

	respiratory, cardiovascular systems, urinary and reproductive systems with the help of models, charts and specimens.			Exam as Synopsis/ Experiments/ Viva voce for both
13.	13. Recording of basal mass index.	Practical	CO1, 11	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
14.	14. Study of family planning devices and pregnancy diagnosis test.	Practical	CO1, 11	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
15.	15. Demonstration of total blood count by cell Analyzer	Practical	CO1, 11	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
16.	16. Permanent slides of vital organs and gonads.	Practical	CO1, 11	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both

H. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP207P: 1.	**BP207P: 1**. To study the human body systems using specimen, models, etc.,	1	1	1	3	1	-	-	1	2	2	3
BP207P: 2	**BP207P: 2**. Recording of body temperature.	2	1	1	3	1	-	1	1	2	2	2
BP207P: 3	**BP207P: 3**. To demonstrate positive and negative feedback mechanism.	1	1	1	2	1	-	-	1	1	2	2
BP207P: 4	**BP207P: 4**. Determination of tidal volume and vital capacity.	2	1	1	3	1	-	1	1	2	3	2

BP207P: 5	**BP207P: 5**. Study of family planning devices and pregnancy diagnosis test.	2	1	1	3	1	-	1	1	2	2	2
BP207P: 6	**BP207P: 6**. Demonstration of total blood count by cell analyser.	3	1	1	2	1	-	1	1	2	2	2

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacy I MID-SEMESTER (SEM–II) 2019-20						
Class: B. Pharm II Semester						
Subject Name: Human Anatomy and Physiology-II BP 207P (Practical)		Time: 4 Hrs			Max. Marks: 40	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3	Q.2		Q.2	Q.2	

Student will be able to
CO1: To study the human body systems using specimen, models, etc.,
CO2: To demonstrate positive and negative feedback mechanism.

CO Map	Question No.	Question	Marks
CO1 and CO3	Q.1	Synopsis	10
CO3	Q.2	To demonstrate the function of olfactory nerve	25
CO1 and CO3	Q.3	Viva voce	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

100.0 % Percentage of students secured more than 60% marks, so this course attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2019-20

Programme Outcomes:

[PO.1]. Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
II SEM	BP208P	3	1	2	1	1	2		2							

Dr. Mohan Yadav

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICAL CHEMISTRY
Course Handout
Course : PHARMACEUTICAL ORGANIC CHEMISTRY – I PRACTICAL
Course Code : BP208P, Crédits : 02, Session :2019-20(Even Sem.), Class : B.Pharm. 1st Year
Faculty Name: Dr. Pawan Kumar Gupta

A. Introduction: The course is designed to impart skill development in the arts and science of preparing the different conventional dosage forms.

B. Course Outcomes: At the end of the course, students will be able to:

BP208P.1. Understand the principles of analysis

BP208P.2. Operate equipment used in chemical analysis

BP208P.3. Carryout various qualitative test for determination of unknown compound.

BP208P.4. Carryout various functional group test.

BP208P.5. Develop analytical skills

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

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C. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance	A	2%

	is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.		
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

D. Syllabus

Systematic qualitative analysis of unknown organic compounds like

a. Preliminary test: Color, odour, aliphatic/aromatic compounds, saturationand unsaturation, etc.

b. Detection of elements like Nitrogen, Sulphur and Halogenby Lassaigne's test

c. Solubility test

d. Functional group test like Phenols, Amides/ Urea, Carbohydrates, Amines, Carboxylic acids, Aldehydes and Ketones, Alcohols, Esters, Aromatic and Halogenated Hydrocarbons, Nitro compounds and Anilide.

e. Melting point/Boiling point of organic compounds

f. Identification of the unknown compound from the literature usingmelting point/ boiling point.

g. Preparation of the derivatives and confirmation of the unknown compound by melting point/ boiling point.

h. Minimum 5 unknown organic compounds to be analysed systematically.

Preparation of suitable solid derivatives from organic compounds
Construction of molecular models

E. Examination Scheme:

Components	A	CT	LR	V	EE
Weightage (%)	2	10	1	2	35

CT: Class Test, LR: Lab Record, V: Viva, EE: End Semester Examination; A: Attendance

F. Suggested Text/Reference Books:

A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, StahlonePress of University of London

A.I. Vogel, Text Book of Quantitative Inorganic analysis

P. Gundu Rao, Inorganic Pharmaceutical Chemistry

Bentley and Driver's Textbook of Pharmaceutical Chemistry

John H. Kennedy, Analytical chemistry principles

Indian Pharmacopoeia.

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G. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	To determine melting point of the given sample.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
2	To determine boiling point of the given sample.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
3	To perform solubility test of given sample.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
4	To perform preliminary investigation of following organic compound.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
5	To perform elemental analysis of the given sample.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
6	To perform identification of functional group in the given sample (Carbohydrate).	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
7	To perform identification of functional group in the given sample (Urea and Thiourea)).	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
8	To perform identification of functional group in the given sample (Carboxylic Acid).	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam

9	To perform identification of functional group in the given sample (Phenol).	Practical	CO1, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
10	To perform identification of functional group in the given sample (Aldehyde)	Practical	CO1, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
11	To perform identification of functional group in the given sample (Ketone)	Practical	CO1, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
12	To perform identification of functional group in the given sample (Amine) .	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
13	To determine Iodine value of the given sample of castor oil.	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
14	To Synthesize Benzanilide (Benzylaniline) by Bezoylation process.	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
15	To prepare and submit Phenyl Benzoate from Phenol.	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam

H. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	

BP208P.1	Understand the principles of analysis	3		2	1	2	1	-	2	1	2	1	
BP208P.2.	Operate equipment used in chemical analysis	2	-	-	1	-	1	-	-	-	-	3	
BP208P.3.	Carryout various qualitative test for determination of unknown compound	3	2	2	1	-	2	-	2	-	-	3	
BP208P 4.	Carryout various functional group test.	2	2	2	1	-	2	-	2	-	-	3	
BP208P.5.	Develop analytical skills	1	2	3	-	-	2	-	2	-	-	3	

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutical Chemistry I MID-SEMESTER (SEM –IInd) 2022-23						
Class: B.Pharm, IInd Semester						
Subject Name: BP108P Pharmaceutical Organic Chemistry-I Practical		Time: 4 Hrs		Max. Marks: 40		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,4	Q.2,3	Q.4	Q.2,5,6		
Student will be able to **CO.1**. Understand the principles of analysis **CO.2**. Operate equipment used in chemical analysis **CO.3**. Carryout various qualitative test for determination of unknown compound						

CO.4. Carryout various functional group test. **CO.5**. Develop analytical skills			
CO Map	Question No.	Question	Marks
CO1,2,4	Q.1a	Synopsis- Define Elemental Analysis.	2
CO1,2,4	Q.1b	Synopsis- Define Solubility and its parameters.	2
CO1,2,4	Q.1c	Synopsis- Illustrate the formula of Oxalic Acid.	2
CO1,2,4	Q.1d	Synopsis- List the any three methods of qualitative Analysis.	2
CO1,2,4	Q.1e	Synopsis- What are various functional groups?	2
CO1,2, 4,5	Q.2	Experiment To perform Functional Group analysis of the given sample.	25
CO1,2,3,4,5	Q.3	Viva	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

100.0 % Percentage of students secured more than 60% marks, so this course attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES
Bachelor of Pharmacy (B. Pharm.), Academic Year – 2019-20

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

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Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMMEARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
IISEM																
	BP209P	3	2	3	1	1	2		3		1	2				

Dr. Mohanty

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICAL CHEMISTRY
Course Handout
Course : BIOCHEMISTRY (Practical)
Course Code : BP209P, Crédits : 02, Session :2019-20 (Even Sem.), Class : B.Pharm. 1st Year
Faculty Name: Dr. Naveen Sharma, Dr. Shvetank Bhatt

A. Introduction: Biochemistry deals with complete understanding of the molecular levels of the chemical process associated with living cells. The scope of the subject is providing biochemical facts and the principles to understand metabolism of nutrient molecules in physiological and pathological conditions. It is also emphasizing on genetic organization of mammalian genome and hetero & autocatalytic functions of DNA.

B. Course Outcomes: At the end of the course, students will be able to:

BP209P.1. Perform various Qualitative analysis of biomolecules i.e. carbohydrates (Glucose, Fructose, Lactose, Maltose,Sucrose and starch), proteins (albumin and Casein).

BP209P.2. Learn about the normal constituents of urine, blood and their significance in maintaining good health.

BP209P.3. Learn qualitative and quantitative analysis of constituents of biological fluids such as urine, blood and their estimation using standard methods.

BP209P.4. Prepare various buffer solution with specific pH Value

BP209P.5. Perform various enzymatic activities.

C. Programme Outcomes:

[PO.1].Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2].Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance isrequiredtobemaintainedbyastudentto be qualified for taking up the EndSemester examination. The allowanceof 20%includesalltypesofleaves includingmedicalleaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

E. Syllabus;

1. Qualitative analysis of carbohydrates (Glucose, Fructose, Lactose, Maltose, Sucrose and starch) 2. Identification tests for Proteins (albumin and Casein)

3. Quantitative analysis of reducing sugars (DNSA method) and Proteins (Biuret method)
4. Qualitative analysis of urine for abnormal constituents
5. Determination of blood creatinine
6. Determination of blood sugar
7. Determination of serum total cholesterol
8. Preparation of buffer solution and measurement of pH
9. Study of enzymatic hydrolysis of starch
10. Determination of Salivary amylase activity
11. Study the effect of Temperature on Salivary amylase activity.
12. Study the effect of substrate concentration on salivary amylase activity.

Examination Scheme:

Components	A	CT	LR	V	EE
Weightage (%)	2	10	1	2	35

CT: Class Test, LR: Lab Record, V: Viva,EE: End Semester Examination; A: Attendance

F. Suggested Text/Reference Books:

1. Practical Biochemistry by R.C. Gupta and S. Bhargavan.

2. Introduction of Practical Biochemistry by David T. Plummer. (3rd Edition)

3. Practical Biochemistry for Medical students by Rajagopal and Ramakrishna.

4. Practical Biochemistry by Harold Varley

5. Indian Pharmacopoeia

G. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	To perform the qualitative analysis of different unknown sample of carbohydrates.	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
2	To perform the qualitative analysis of different unknown sample of carbohydrates.	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
3	To perform the qualitative analysis of different unknown sample of carbohydrates.	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
4	To estimate creatinine in given blood sample.	Practical	CO2,3	Mid Term-1, Quiz & End Sem Exam
5	To perform the identification Test For albumin in given sample.	Practical	CO2,3	Mid Term-1, Quiz & End Sem Exam
6	To prepare carbonate – bicarbonate buffer of pH 10.2	Practical	CO 4	Mid Term-1, Quiz & End Sem Exam
7	To perform qualitative	Practical	CO 2,3	Mid Term-2, Quiz

	analysis of abnormal constituent of urine Sample.			& End Sem Exam
8	To perform qualitative analysis of normal constituent of urine Sample.	Practical	CO2,3	Mid Term-2, Quiz & End Sem Exam
9	To analyze the effect of pH on activity of salivary amylase	Practical	CO 4,5	Mid Term-2, Quiz & End Sem Exam
10	To determine the time needed for hydrolysis of starch in presence of amylase.	Practical	CO4,5,	Mid Term-2, Quiz & End Sem Exam
11	To determine the protein content of the serum sample	Practical	CO 2,3	Mid Term-2, Quiz & End Sem Exam
12	To determine serum total cholestrol.	Practical	CO 2,3	Mid Term-2, Quiz & End Sem Exam

H. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	
BP209P.1	Perform various Qualitative analysis of biomolecules i.e. carbohydrates (Glucose, Fructose, Lactose, Maltose, Sucrose and starch), proteins (albumin and Casein).	3	-	2	1	2	1	-	2	1	2	1	
BP209P.2.	Learn about the normal constituents of urine, blood and their significance in maintaining good health.	2	-	-	1	-	1	-	-	-	-	3	
BP209P.3.	Learn qualitative and quantitative analysis of constituents of biological fluids	3	2	2	1	-	2	-	2	-	-	3	

	such as urine, blood and their estimation using standard methods												
BP209P.4.	Prepare various buffer solution with specific pH Value	2	2	2	1	-	2	-	2	-	-	3	
BP209P.5.	Perform various enzymatic activities.	1	2	3	-	-	2	-	2	-	-	3	

SampleQuestionPaper

Amity Institute of Pharmacy DepartmentofPharmaceuticalchemistry IMID-SEMESTER(SEM–II)2019-20						
Class: B.Pharm, IISemester						
SubjectName: BP209PBiochemistry Practical		Time:4 Hrs		Max.Marks:40		
Levels of thequestions as perBloomsTaxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
QuestionMapping	Q.1,2,5	Q.4,5	Q.3	Q.3, 4		

Student willbeableto

CO.1. Recall different qualitative testfor identification of carbohydrates.
CO.2.perform identification tests of protein in given sample.
CO.3. Determine the normal and abnormal constituents of urine sample.
CO.4.analyze the effect of time for the hydrolysis of starch in presence of amylase.
CO.5.prepare various buffer solution of given pH

COMap	QuestionNo.	Question	Marks
CO1	Q.1a	Synopsis-Define sugars.	2
CO2	Q.1b	Synopsis- Define polypeptides with suitable examples..	2
CO 2,3	Q.1c	Synopsis- enlist the various normal and abnormal constituents of urine	2
CO1	Q.1d	Synopsis- What is barfoed's test?	2
CO1	Q.1e	Synopsis- what is saliwanoff test?	2
CO 2,3,4	Q.2	Experiment To perform qualitative analysis of abnormal constituent of urine Sample.	25

CO1,2,3,4,5	Q.3	Viva voce	5

Attainments		Rubric
Level	1	IF60%ofstudentssecuremorethan60%marksthenlevel1
Level	2	IF70%ofstudentssecuremorethan60%marksthenlevel2
Level	3	IF80%ofstudentssecuremorethan60%marksthenlevel3

Attainment Level 3:

98.1 % Percentage of students secured more than 60% marks, so this course attained Level -3.

AMITY UNIVERSITY
MADHYA PRADESH
Established vide Government of Madhya Pradesh Act No. 27 of 2010

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICS

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2019-20

Programme Outcomes:

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[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

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[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
II SEM																
	BP210P	3	1	2	1	1	2		2		3	2				

Dr. Mohan Yaty

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICS
Course Handout
Course : COMPUTER APPLICATIONS IN PHARMACY- PRACTICAL
Course Code : BP210P, Crédits : 01, Session :2019-20 (Even Sem.), Class : B.Pharm. 1st Year
Faculty Name: Mr. Vivek Parashar

A. **Introduction:** The course is designed to impart skill development in database management.

B. **Course Outcomes:** At the end of the course, students will be able to:

BP210P.1. Create and manage databases on the given information

BP210P.2. Design a questionnaire using various processing packages to gather information about a particular disease.

BP210P.3. Generate, edit and print reports and webpage and XML pages based on patient information.

BP210P.4. Explain drug information storage and retrieval system.

BP210P.5. Utilize Ms-office, Ms-Access for data management

C. **Programme Outcomes:**

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	5%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	15%
Total			**25%**

E. Syllabus

1. Design a questionnaire using a word processing package to gather information
2. about a particular disease.
3. Create a HTML web page to show personal information.
4. Retrieve the information of a drug and its adverse effects using online tools
5. Creating mailing labels Using Label Wizard, generating label in MS WORD
6. Create a database in MS Access to store the patient information with the required
7. fields Using access
8. Design a form in MS Access to view, add, delete and modify the patient record in
9. the database

10. Generating report and printing the report from patient database
11. Creating invoice table using – MS Access
12. Drug information storage and retrieval using MS Access
13. Creating and working with queries in MS Access
14. Exporting Tables, Queries, Forms and Reports to web pages
15. Exporting Tables, Queries, Forms and Reports to XML pages

F. Examination Scheme:

Components	A	CT	LR	V	EE
Weightage (%)	2	5	1	2	15

CT: Class Test, LR: Lab Record, V: Viva, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. Computer Application in Pharmacy – William E.Fassett –Lea and Febiger, 600 South Washington Square, USA, (215) 922-1330.
2. Computer Application in Pharmaceutical Research and Development –Sean Ekins – Wiley-Interscience, A John Willey and Sons, INC., Publication, USA
3. Bioinformatics (Concept, Skills and Applications) – S.C.Rastogi-CBS Publishers and Distributors, 4596/1- A, 11 Darya Gani, New Delhi – 110 002(INDIA)
4. Microsoft office Access - 2003, Application Development Using VBA, SQL Server, DAP and Infopath – Cary N.Prague – Wiley Dreamtech India (P) Ltd., 4435/7,Ansari Road, Daryagani, New Delhi – 110002

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Design a questionnaire using a word processing package to gather information about a particular disease.	Practical	CO1, 2	Mid Term-1, Quiz & End Sem Exam
2	Design a questionnaire using a word processing package to gather information about a particular disease.	Practical	CO1, 2	Mid Term-1, Quiz & End Sem Exam
3	Create a HTML web page to show personal information.	Practical	CO3	Mid Term-1, Quiz & End Sem Exam
4	Retrieve the information of a drug using online tools	Practical	CO4	Mid Term-1, Quiz & End Sem Exam
5	Retrieve the information of drug adverse effects using online tools	Practical	CO4	Mid Term-1, Quiz & End Sem Exam
6	Creating mailing labels Using Label Wizard, generating label in MS WORD	Practical	CO5	Mid Term-1, Quiz & End Sem Exam
7	Create a database in MS Access to store the patient information with the required fields using access	Practical	CO1	Mid Term-1, Quiz & End Sem Exam

8	Design a form in MS Access to view, add, delete and modify the patient record in the database	Practical	CO1,5	Mid Term-2, Quiz & End Sem Exam
9	Design a form in MS Access to view, add, delete and modify the patient record in the database	Practical	CO1, 5	Mid Term-2, Quiz & End Sem Exam
10	Generating report and printing the report from patient database	Practical	CO1, 3	Mid Term-2, Quiz & End Sem Exam
11	Creating invoice table using – MS Access	Practical	CO5	Mid Term-2, Quiz & End Sem Exam
12	Drug information storage and retrieval using MS Access	Practical	CO5	Mid Term-2, Quiz & End Sem Exam
13	Creating and working with queries in MS Access	Practical	CO5	Mid Term-2, Quiz & End Sem Exam
14	Exporting Tables, Queries, Forms and Reports to web pages	Practical	CO3	Mid Term-2, Quiz & End Sem Exam
15	Exporting Tables, Queries, Forms and Reports to XML pages	Practical	CO3	Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	
BP210P.1	Create and manage databases on the given information	2	2	3	3	2	1	-	1	1	1	1	
BP210P.2.	Design a questionnaire using various processing packages to gather information about a particular disease	2	1	3	3	1	1	-	1	1	1	1	

BP210P.3.	Generate, edit and print reports and webpage and XML pages based on patient information.	2	2	3	3	1	2	-	2	-	-	2	
BP210P.4.	Explain drug information storage and retrieval system.	2	2	3	3	1	2	-	2	-	-	2	
BP210P.5.	Utilize Ms-office, Ms-Access for data management	2	2	3	3	1	2	-	2	-	1	3	

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutics I MID-SEMESTER (SEM –IInd) 2019-20						
Class: B.Pharm, II Semester						
Subject Name: BP210P Computer Application in Pharmacy-Practical		Time: 2 Hrs			Max. Marks: 40	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1a,b,c,d,e	Q.3	Q.3	Q.2,5,6	Q.3	Q.2

Student will be able to

CO.1. Create and manage databases on the given information

CO.2. Design a questionnaire using various processing packages to gather information about a particular disease.

CO.3. Generate, edit and print reports and webpage and XML pages based on patient information.

CO.4. Explain drug information storage and retrieval system.

CO.5. Utilize Ms-office, Ms-Access for data management

CO Map	Question No.	Question	Marks
CO5	Q.1a	Synopsis- What is the use of a questionnaire?	2
CO5	Q.1b	Synopsis- What is the use of MS word in data management?	2
CO1,3	Q.1c	Synopsis- What is the full form of HTML and XML?	2
CO5	Q.1d	Synopsis- Which field type will you select if you need to enter long name in MS Access?	2

CO5	Q.1e	Synopsis- What is the Microsoft word shortcut key to Copy and paste a file?	2
CO3	Q.2	Experiment To Create an HTML web page to show drug information	25
CO1,2,3,4,5	Q.3	Viva	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

84.6 % Percentage of students secured more than 60% marks, so this course attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2019-20

Programme Outcomes:

[PO.1]. Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

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[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Programme Specific Outcomes:

PSO 1: Will be able to design, develop and implement efficient software for a given real life problem.

PSO 2: Will be able to apply knowledge of AI, Machine Learning and Data Mining in analyzing big data forextracting useful information from it and for performing predictive analysis.

PSO 3: Will be able to design, manage and secure wired/ wireless computer networks for transfer and sharing ofinformation.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
III SEM																
	BP301T	2	-	2	-	1	2	2	1	1	-	2				

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICAL CHEMISTRY
Course Handout
Course : PHARMACEUTICAL ORGANIC CHEMISTRY – II THEORY
Course Code : BP 301T, Crédits : 04, Session : 2019`-20 (Odd Sem.), Class : B.Pharm. II nd Year
Faculty Name:Dr Pawan K Porwal and Dr. Pawan Kumar Gupta

A. Introduction: The course is designed to impart fundamental knowledge on the preparatory pharmacy with arts and science of preparing the different conventional dosage forms.

B. Course Outcomes: At the end of the course, students will be able to:

BP301T.1. Relate pharmacy education with pharmacy career options.

BP301T.2. Classify the different types of *organic compounds* based on medicinal use.

BP301T.3. Experiment in the preparation of various types organic compounds and their derivatives.

BP301T.4. Able to analyse and also to *write the structure, name and the type of isomerism of the organic compound*.

BP301T.5. Able to Solve and write *the reaction, name the reaction and also orientation of reactions* in different types of *organic compounds*

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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C. Programme Specific Outcomes:

PSO 1: Will be able to design, develop and implement efficient software for a given real life problem.

PSO 2: Will be able to apply knowledge of AI, Machine Learning and Data Mining in analyzing big data forextracting useful information from it and for performing predictive analysis.

PSO 3: Will be able to design, manage and secure wired/ wireless computer networks for transfer and sharing ofinformation.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

UNIT – I Benzene and its derivatives

Analytical, synthetic and other evidences in the derivation of structure of benzene, Orbital picture, resonance in benzene, aromatic characters, Huckel's rule Reactions of benzene - nitration, sulphonation, halogenation- reactivity, Friedelcrafts alkylation- reactivity, limitations, Friedelcrafts acylation. Substituents, effect of substituents on reactivity and orientation of mono substituted benzene compounds towards electrophilic substitution reaction Structure and uses of DDT, Saccharin, BHC and Chloramine

UNIT – II

Phenols* - Acidity of phenols, effect of substituents on acidity, qualitativetests, Structure and uses of phenol, cresols, resorcinol, naphthols **Aromatic Amines* -** Basicity of amines, effect of substituents on basicity,and synthetic uses of aryl diazonium salts **Aromatic Acids*** Acidity, effect of substituents on acidity andimportant reactions of benzoic acid

UNIT – III Fats and Oil

Fatty acids reaction Hydrolysis, Hydrogenation, Saponification and Rancidity of oils, Drying oils. Analytical constants – Acid value, Saponification value, Ester value, Iodine value, Acetyl value, Reichert Meissl (RM) value- significance and principle involved in their determination.

UNIT – IV Polynuclear hydrocarbons:

Synthesis, reactions Structure and medicinal uses of Naphthalene, Phenanthrene, Anthracene,Diphenylmethane, Triphenylmethane and their derivatives.

UNIT – V Cyclo alkanes*

Stabilities – Baeyer's strain theory, limitation of Baeyer's strain theory,Coulson and Moffitt's modification, Sachse Mohr's theory (Theory of strainless rings), reactions of cyclopropane and cyclobutane only

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

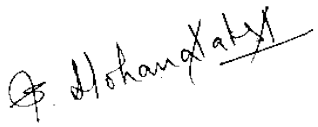
Organic Chemistry by Morrison and Boyd.

Organic Chemistry by I.L. Finar, Volume-I
Textbook of Organic Chemistry by B.S. Bahl & Arun Bahl.
Organic Chemistry by P.L.Soni.
Practical Organic Chemistry by Mann and Saunders.
Vogel's text book of Practical Organic Chemistry.
Advanced Practical organic chemistry by N.K.Vishnoi.

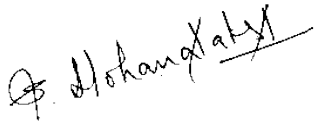
H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Analytical, evidences in the derivation of structure of benzene.	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
2	Synthetic and other evidences in the derivation of structure of benzene.	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
3	Orbital picture, resonance in benzene.	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
4	Aromatic characters, Hückel's rule of benzene.	Tutorial	CO1,4	Mid Term-1, Quiz & End Sem Exam
5	Nitration Reactions of benzene	Lecture	CO1,2	Mid Term-1, Quiz & End Sem Exam
6	Sulfonation Reactions of benzene	Lecture	CO1,2	Mid Term-1, Quiz & End Sem Exam
7	Halogenation Reactions of benzene	Lecture	CO1,2	Mid Term-1, Quiz & End Sem Exam
8	Friedel Craft Alkylation Reactions of benzene	Tutorial	CO1,3	Mid Term-1, Quiz & End Sem Exam
9	Friedel Craft Acylation Reactions of benzene	Lecture	CO1,2	Mid Term-1, Quiz & End Sem Exam
10	Substituents effect on	Lecture	CO1,3	Mid Term-1, Quiz

	Reactivity and orientation of benzene.			& End Sem Exam
11	Quiz	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
12	Structure and uses of D.D.T.	Tutorial	CO1,4	Mid Term-1, Quiz & End Sem Exam
13	Structure and uses of Saccharin.	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
14	Structure and uses of BHC.	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
15	Structure and uses of Chloramine.	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
16	Unit test	Tutorial		Mid Term-1, Quiz & End Sem Exam
17	Method of prepration and reaction Reaction of Phenol	Lecture	CO1,5	Mid Term-1, Quiz & End Sem Exam
18	Acidity of phenols. Effect of substituents on acidity	Lecture	CO1,3	Mid Term-1, Quiz & End Sem Exam
19	Qualitative tests of Phenol	Lecture	CO1,3	Mid Term-1, Quiz & End Sem Exam
20	Structure and uses of phenol	Tutorial	CO1,4	Mid Term-1, Quiz & End Sem Exam
21	Structure and uses of cresol	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
22	Structure and uses of resorcinol	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
23	Structure and uses of naphthol	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
24	Quiz	Tutorial		Mid Term-1, Quiz & End Sem Exam
25	Method of prepration and reaction Reaction of amine	Lecture	CO1,5	Mid Term-1, Quiz & End Sem Exam
26	Basicity of amine. Effect of substituents on Basicity	Lecture	CO1,3	Mid Term-1, Quiz & End Sem Exam
27	synthetic uses of aryl diazonium salt	Lecture	CO1,5	Mid Term-1, Quiz & End Sem Exam
28	Method of prepration and reaction Reaction of aromatic acid	Tutorial	CO1,5	Mid Term-1, Quiz & End Sem Exam
29	Acidity of aromatic acid Effect of substituents on acidity	Lecture	CO1,3	Mid Term-1, Quiz & End Sem Exam
30	Important reaction of Benzoic acid	Lecture	CO1,5	Mid Term-1, Quiz & End Sem Exam



31	Fats and Oils Definition, Properties and Classification	Lecture	CO1,2	Mid Term-2, Quiz & End Sem Exam
32	Fats and Oils Nomenclature	Tutorial	CO1,2	Mid Term-2, Quiz & End Sem Exam
33	Fatty acids – reactions. Hydrolysis	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
34	Fatty acids – reactions, Hydrogenation	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
35	Saponification and Rancidity of oils	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
36	Seminar	Tutorial	CO1,5	Mid Term-2, Quiz & End Sem Exam
37	Drying of oil Analytical constants: Acetyl value	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
38	Analytical constants: Acid value	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
39	Analytical constants: Saponification value	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
40	Unit test	Tutorial	CO1,5	Mid Term-2, Quiz & End Sem Exam
41	Analytical constants: Iodine value	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
42	Analytical constants: Ester value , Reichert Meissl (RM) value	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
43	Polycyclic Aromatic Hydrocarbons, Classification.	Lecture	CO1,3	Mid Term-2, Quiz & End Sem Exam
44	Seminar	Tutorial	CO1,3	Mid Term-2, Quiz & End Sem Exam
45	Preparation, Reactions *and derivative of* biphenyl.	Lecture	CO1,4	Mid Term-2, Quiz & End Sem Exam
46	Synthesis and reactions of Naphthalene.	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam



47	Synthesis and reactions of anthracene.	Lecture	CO1,5	Quiz & End Sem Exam
48	Quiz	Tutorial		Quiz & End Sem Exam
49	*Synthesis and reactions of Phenanthrene*	Lecture	CO1,5	Quiz & End Sem Exam
50	Structure and medicinal uses of Naphthalene.	Lecture	CO1,4	Quiz & End Sem Exam
51	Structure and medicinal uses of Phenanthrene .	Lecture	CO1,4	Quiz & End Sem Exam
52	*Structure and medicinal uses of Diphenylmethane and Triphenylmethane*	Tutorial	CO1,4	Quiz & End Sem Exam
53	*Prepration, Reaction **of** Cyclo alkanes.*	Lecture	CO1,4	Quiz & End Sem Exam
54	Baeyer's strain theory.	Lecture	CO1,2	Quiz & End Sem Exam
55	Limitation of Baeyer's strain theory.	Lecture	CO1,3	Quiz & End Sem Exam
56	Unit test	Tutorial		Quiz & End Sem Exam
57	Coulson and Moffitt's modification.	Lecture	CO1,2	Quiz & End Sem Exam
58	Sachse Mohr's theory.	Lecture	CO1,2	Quiz & End Sem Exam
59	Reactions of cyclopropane.	Lecture	CO1,2	Quiz & End Sem Exam
60	*Reactions of cyclobutane*	Tutorial	CO1,2	Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP301T.1	Relate pharmacy education with pharmacy career options.	2	-	-	-	2	2	1	-	1	-	-				
BP103T.2.	Classify the different types of *organic compounds* based on medicinal use.	3	-	-	1	-	2	-	-	-	-	3				
BP103T.3.	Experiment in the preparation of various types organic compounds and their derivatives.	3	2	-	3	-	2	-	-	-	-	3				
BP103T.4.	Able to analyse and also to *write the structure, name and the type of isomerism of the organic compound*.	2	2	3	3	-	1	-	-	-	-	3				
BP103T.5.	Able to Solve and write *the reaction, name the reaction and also orientation of reactions* in different types of *organic compounds* .	1	-	3	-	-	-	-	-	-	-	3				

Sample Question Paper

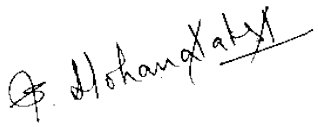
Amity Institute of Pharmacy Department of Pharmacutical Chemistry I MID-SEMESTER (SEM –Ist) 2022-23						
Class: B.Pharm, III Semester						
Subject Name: BP301T Pharmaceutical Organic Chemistry-II Theory		Time: 1 Hrs		Max. Marks: 30		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,4,5	Q.2,3,6,8,9	Q.4,7	Q.2,5,		

Student will be able to
CO1: List the broad perceptive of cloud architecture and model.
CO2: Apply different cloud programming models as per need.

CO Map	Question No.	Question	Marks
CO1	Q.1	Define Acid Value.	2
CO1	Q.2	Explain significance of Saponification Value .	2
CO2	Q.3	Classify Polynuclear hydrocarbons.	2
CO2	Q.4	By showing structure of Phenanthrene. And summarize any three medicinal uses of Phenanthrene.	2
CO2	Q.5	What do you understand by Cyclo alkanes give example?	2
	Q.6	Explain Halogenation reaction in benzene.	10
CO1	Q.7	What relationship between Fat and Oil Give their Classification and Nomenclature.	10
CO1	Q.8	Outline Huckel's rule for determination of aromaticity with suitable example.	5
CO2	Q.9	Explain Basicity of Amine.	5

Attainment Level 3:

80.0 % Percentage of students secured more than 60% marks, so this course attained Level - 3.



AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICS

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2019-20

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
III SEM																
	B302T	3	-	2	-	1	3	2	1	1	-	2				
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

AMITY UNIVERSITY

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Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICS
Course Handout
Course : PHYSICAL PHARMACEUTICS I
Course Code : BP302T, Programme : B. Pharmacy III-Semester **Crédits : 04, Session :2019-20(Odd Sem.)**
Faculty Name: Dr. Jovita Kanoujia

A. Scope: The course deals with the various physical and physicochemical properties, and principle involved in dosage forms/formulations. Theory and practical components of the subject help the student to get a better insight into various areas of formulation research and development, and stability studies of pharmaceutical dosage forms.

B. Course Outcome: ***At the end of each course, the student will be able to:***

CO302.1	Write the importance of solubility in designing of dosage forms and principles of diffusion in biological systems.
CO302.2	Classify the states of matter and understand the applications of various physiochemical properties to design dosage forms
CO302.3	Explain the principles of interfacial tension and the applications of surface active agents in drug solubilization
CO302.4	Make use of concepts of complexation and protein binding in pharmacy
CO302.5	Function of pH, buffers and their use in the stabilization of pharmaceutical formulations.

C. 1.Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices**.**

2. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

3. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice.

Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

4. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

5. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well-being.

6. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

7. Pharmaceutical Ethics: Honor personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

8. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

9. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional Pharmacy Practice

10. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

11. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively

D.Programme specific outcomes:

1. Scientific Thinking: Enable student's knowledge in scientific perception to understand the concepts and to solve the problems positively while making pharmaceutical formulations.
2. Analytical Skills: Assimilate and develop analytical skills using advanced equipment to design and evaluate pharmaceutical products, also to assess their quality.
3. Resource Management: Utilize and manage resources from natural, semi synthetic and synthetic origin to develop real time products with utmost benefit and safety.
4.Public Health Care: Promote and empower the healthy living in the community by various means of awareness and health strategies.
5. Entrepreneurship: Acquire and develop entrepreneurship and administration skills to establish community pharmacy, learning and training centers for the long term wellbeing of society.

E. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2 quiz, assignment, open book test, field work, group discussion and seminar)		
	Seminar/ Assignment/Quiz/ Open book test	S/As/Q/OBT	3%
Interaction	Student-Teacher interaction	ST	3%

Attendance	A minimum of 80% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

F. Syllabus

UNIT-I

Solubility of drugs: Solubility expressions, mechanisms of solute solvent interactions, ideal solubility parameters, solvation & association, quantitative approach to the factors influencing solubility of drugs, diffusion principles in biological systems. Solubility of gas in liquids, solubility of liquids in liquids, (Binary solutions, ideal solutions) Raoult's law, real solutions. Partially miscible liquids, Critical solution temperature and applications. Distribution law, its limitations and applications

UNIT-II

States of Matter and properties of matter: State of matter, changes in the state of matter, latent heats, vapor pressure, sublimation critical point, eutectic mixtures, gases, aerosols– inhalers, relative humidity, liquid complexes, liquid crystals, glassy states, solid crystalline, amorphous & polymorphism.

Physicochemical properties of drug molecules: Refractive index, optical rotation, dielectric constant, dipole moment, dissociation constant, determinations and applications

UNIT-III

Surface and interfacial phenomenon: Liquid interface, surface & interfacial tensions, surface free energy, measurement of surface & interfacial tensions, spreading coefficient, adsorption at liquid interfaces, surface active agents, HLB Scale, solubilization, detergency, adsorption at solid interface.

UNIT-IV

Complexation and protein binding: Introduction, Classification of Complexation, Applications, methods of analysis, protein binding, Complexation and drug action, crystalline structures of complexes and thermodynamic treatment of stability constants.

UNIT-V 07 Hours

pH, buffers and Isotonic solutions: Sorensen's pH scale, pH determination (electrometric and calorimetric), applications of buffers, buffer equation, buffer capacity, buffers in pharmaceutical and biological systems, buffered isotonic solutions.

G. Examination Scheme:

Components	**A**	**ST**	**CT**	**S/As/Q/OBT**	**EE**
Weightage (%)	4	3	15	3	75

CT: Class Test, As: Assignment, ST: Student teacher interaction,

S/A/Q/OBT: Seminar/ Assignment/Quiz/ Open book test, EE: End Semester Examination; A: Attendance

H. Suggested Text/Reference Books:

1. Physical Pharmacy by Alfred Martin
2. Experimental Pharmaceutics by Eugene, Parott.

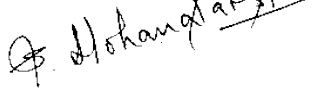
3. Tutorial Pharmacy by Cooper and Gunn.
4. Stocklosam J. Pharmaceutical Calculations, Lea &Febiger, Philadelphia.
5. Liberman H.A, Lachman C., Pharmaceutical Dosage forms, Tablets, Volume-1 to 3, MarcelDekkar Inc.
6. Liberman H.A, Lachman C, Pharmaceutical Dosage forms. Disperse systems, volume 1, 2, 3. Marcel Dekkar Inc.
7. Physical Pharmaceutics by Ramasamy C and ManavalanR.
8. Laboratory Manual of Physical Pharmaceutics, C.V.S. Subramanian, J. Thimma settee
9. Physical Pharmaceutics by C.V.S. Subramanyam

I. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Introduction, Solvent-solute interactions	Lecture	BP302T.1	Mid Term-1, Quiz & End Sem Exam
2	Solubility of gas in liquids	Lecture	BP302T.1	Mid Term-1, Quiz & End Sem Exam
3	Solubility of liquids in liquids and solids in liquids	Lecture	BP302T.1	Mid Term-1, Quiz & End Sem Exam
4	Distribution of solutes in solvents	Tutorial	BP302T.1	Mid Term-1, Quiz & End Sem Exam
5	Fick's first law and second law	Lecture	BP302T.1	Mid Term-1, Quiz & End Sem Exam
6	Raoult's law, real solutions	Lecture	BP302T.1	Mid Term-1, Quiz & End Sem Exam
7	Partially miscible liquids	Lecture	BP302T.1	Mid Term-1, Quiz & End Sem Exam
8	Critical solution temperature and applications	Tutorial	BP302T.1	Mid Term-1, Quiz & End Sem Exam
9	Solubility of liquids in liquids and solids in liquids	Lecture	BP302T.1	Mid Term-1, Quiz & End Sem Exam
10	Fick's first law and second law	Lecture	BP302T.1	Mid Term-1, Quiz & End Sem Exam
11	mechanisms of solute solvent interactions,	Lecture	BP302T.1	Mid Term-1, Quiz & End Sem Exam
12	mechanisms of solute solvent interactions,	Tutorial	BP302T.1	Mid Term-1, Quiz & End Sem Exam
13	States of Matter and properties of matter: State of matter	Lecture	BP302T.2	Mid Term-1, Quiz & End Sem Exam
14	changes in the state of matter	Lecture	BP302T.2	Mid Term-1, Quiz & End Sem Exam
15	changes in the state of matter	Lecture	BP302T.2	Mid Term-1, Quiz &

Dr. Mohan Yadav

				End Sem Exam
16	latent heats, vapor pressure	Tutorial	BP302T.2	Mid Term-1, Quiz & End Sem Exam
17	sublimation critical point, eutectic mixtures	Lecture	BP302T.2	Mid Term-1, Quiz & End Sem Exam
18	sublimation critical point, eutectic mixtures	Lecture	BP302T.2	Mid Term-1, Quiz & End Sem Exam
19	Refractive index, optical rotation,	Lecture	BP302T.2	Mid Term-1, Quiz & End Sem Exam
20	optical rotation, dielectric constant	Tutorial	BP302T.2	Mid Term-1, Quiz & End Sem Exam
21	dielectric constant, optical rotatory dispersion	Lecture	BP302T.2	Mid Term-1, Quiz & End Sem Exam
22	optical rotatory dispersion	Lecture	BP302T.2	Mid Term-1, Quiz & End Sem Exam
23	Liquid interface, surface & interfacial tensions	Lecture	BP302T.3	Mid Term-1, Quiz & End Sem Exam
24	Liquid interface, surface & interfacial tensions	Tutorial	BP302T.3	Mid Term-1, Quiz & End Sem Exam
25	surface free energy	Lecture	BP302T.3	Mid Term-1, Quiz & End Sem Exam
26	measurement of surface & interfacial tensions	Lecture	BP302T.3	Mid Term-1, Quiz & End Sem Exam
27	measurement of surface & interfacial tensions	Lecture	BP302T.3	Mid Term-1, Quiz & End Sem Exam
28	measurement of surface & interfacial tensions	Tutorial	BP302T.3	Mid Term-2, Quiz & End Sem Exam
29	spreading coefficient	Lecture	BP302T.3	Mid Term-2, Quiz & End Sem Exam
30	spreading coefficient	Lecture	BP302T.3	Mid Term-2, Quiz & End Sem Exam
31	adsorption at liquid interfaces,	Lecture	BP302T.3	Mid Term-2, Quiz & End Sem Exam
32	adsorption at liquid interfaces,	Tutorial	BP302T.3	Mid Term-2, Quiz & End Sem Exam
33	adsorption at liquid interfaces,	Lecture	BP302T.3	Mid Term-2, Quiz & End Sem Exam
34	surface active agents	Lecture	BP302T.3	Mid Term-2, Quiz & End Sem Exam
35	HLB Scale, solubilization, detergency,	Lecture	BP302T.3	Mid Term-2, Quiz & End Sem Exam
36	adsorption at solid interface	Tutorial	BP302T.3	Mid Term-2, Quiz & End Sem Exam



37	adsorption at solid interface	Lecture	BP302T.3	Mid Term-2, Quiz & End Sem Exam
38	Complexation and protein binding: Introduction,	Lecture	BP302T.4	Mid Term-2, Quiz & End Sem Exam
39	Classification of Complexation	Lecture	BP302T.4	Mid Term-2, Quiz & End Sem Exam
40	Classification of Complexation	Tutorial	BP302T.4	Mid Term-2, Quiz & End Sem Exam
41	Classification of Complexation	Lecture	BP302T.4	Mid Term-2, Quiz & End Sem Exam
42	methods of analysis,	Lecture	BP302T.4	Mid Term-2, Quiz & End Sem Exam
43	methods of analysis	Lecture	BP302T.4	Mid Term-2, Quiz & End Sem Exam
44	methods of analysis	Tutorial	BP302T.4	Mid Term-2, Quiz & End Sem Exam
45	protein binding	Lecture	BP302T.4	Mid Term-2, Quiz & End Sem Exam
46	protein binding	Lecture	BP302T.4	Mid Term-2, Quiz & End Sem Exam
47	Complexation and drug action	Lecture	BP302T.4	Mid Term-2, Quiz & End Sem Exam
48	Complexation and drug action	Tutorial	BP302T.4	Mid Term-2, Quiz & End Sem Exam
49	crystalline structures of complexes	Lecture	BP302T.4	Mid Term-2, Quiz & End Sem Exam
50	Sorensen's pH scale	Lecture	BP302T.5	Mid Term-2, Quiz & End Sem Exam
51	pH determination (electrometric and calorimetric)	Lecture	BP302T.5	Mid Term-2, Quiz & End Sem Exam
52	pH determination (electrometric and calorimetric)	Tutorial	BP302T.5	Mid Term-2, Quiz & End Sem Exam
53	applications of buffers	Lecture	BP302T.5	Mid Term-2, Quiz & End Sem Exam
54	buffer equation	Lecture	BP302T.5	Mid Term-2, Quiz & End Sem Exam
55	buffer equation, buffer capacity,	Lecture	BP302T.5	Mid Term-2, Quiz & End Sem Exam
56	buffer capacity, buffers in pharmaceutical and biological systems	Tutorial	BP302T.5	Mid Term-2, Quiz & End Sem Exam
57	buffered isotonic solutions	Lecture	BP302T.5	Mid Term-2, Quiz & End Sem Exam

58	buffered isotonic solutions	Lecture	BP302T.5	Mid Term-2, Quiz & End Sem Exam
59	buffered isotonic solutions	Lecture	BP302T.5	Mid Term-2, Quiz & End Sem Exam
60	buffered isotonic solutions	Tutorial	BP302T.5	Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

Code	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
C302.1	Write the importance of solubility in designing of dosage forms and principles of diffusion in biological systems.	3	3	-	-	3	2	-	-	-	1	-
C302.2	Classify the states of matter and understand the applications of various physiochemical properties to design dosage forms	1	-	3	2	-	-	-	-	-	1	1
C302.3	Explain the principles of interfacial tension and the applications of surface active agents in drug solubilization	3	2	1	-	-	-	-	1	-	-	1
C302.4	Make use of concepts of complexation and protein	1	2	1	1	0	1	-	-	1		2

	binding in pharmacy											
C302.5	Function of pH, buffers and their use in the stabilization of pharmaceutical formulations.	1	2	2	-	2	-	-	-	1	2	3
Average		1.8	1.8	1.66	1.4	1	0.6	1	0.2	0.4	0.8	1.4

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutics I MID-SEMESTER (SEM –IIIrd) 2019-20						
Class: B.Pharm, III Semester						
Subject Name: BP 302T Physical Pharmaceutics-I Theory		Time: 1 Hrs			Max. Marks: 30	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,4,5	Q.6,8, 10	Q.2,3	Q.7,9,		

The student will be able to

C302.1 Write the importance of solubility in designing of dosage forms and principles of diffusion in biological systems.

C302.2 Classify the states of matter and understand the applications of various physiochemical properties to design dosage forms

C302.3 Explain the principles of interfacial tension and the applications of surface active agents in drug solubilization

C302.4 Make use of concepts of complexation and protein binding in pharmacy

C302.5 Function of pH, buffers and their use in the stabilization of pharmaceutical formulations.

CO Map	Question No.	Question	Marks
CO1	Q.1	Define Raoults's law	2
CO3	Q.2	Define HLB scale	2
CO2	Q.3	State Dalton's law of vaour pressure and give two applications	2
CO5	Q.4	Define buffer and buffer capacity	2
CO1	Q.5	Define Ideal solution and real solution	2
CO4	Q.6	What is meant by pH solution? Describe the principle and experimental procedure for its determination by electro method	10
CO2	Q.7	Explain the causes and describe the deviations of the real gases from the ideal gas equation and postulate kinetic molecular theory	10
CO5	Q.8	Classify the methods of adjusting the tonicity and describe cryoscopic method with derivation	5
CO1	Q.9	Define dipole moment. Explain the correlations with the insecticidal activity method	5

Dr. Mohanty

CO5	Q.10	Application of buffers in pharmaceutical and biological system	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 1:

64.4 % Percentage of students secured more than 60% marks, so this course attained Level -1.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOLOGY

PROGRAMME OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2019-20

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[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge asscoited with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices

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If there is no correlation, put "-"

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
III SEM	BP 303T	3	3	3	3	2	2	3	1	1	3	1	-	-	-

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACOLOGY
Course Handout
Course : PHARMACEUTICAL MICROBIOLOGY (Theory)
Course Code : BP303T, Credits : 04, Session : 2019-20 (Odd Sem.), Class : B. Pharm. 2nd Year
Faculty Name : Dr. Naveen Sharma/Dr. Shvetank Bhatt

A. Introduction: This subject is intended to impart the fundamental knowledge on various aspects (study of all organisms that are invisible to the naked eye- that is the study of microorganisms. Microbiology has an impact on medicine and in addition, emphasis on to;

1. Microorganisms are necessary for the production of bread, cheese, beer, antibiotics, vaccines, vitamins, enzymes etc.
2. Microbiology has an impact on agriculture, food science, ecology, genetics, biochemistry, immunology etc.

B. Course Outcomes: At the end of the course, students will be able to:

BP303T.1. Understand methods of identification, cultivation and preservation of various microorganisms

BP303T.2. Importance of sterilization in microbiology. and pharmaceutical industry

BP303T.3. Learn sterility testing of pharmaceutical products.

BP303T.4. Microbiological standardization of Pharmaceuticals.

BP303T.5. Understand the cell culture technology and its applications in pharmaceutical industries.

C. Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

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[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		

	A minimum of 80% attendance is required to be maintained by a student to be qualified for taking up the Odd Semester examination	A	4 %
	Quiz/ Assignment/Open book test/ Field work/Group discussion/ Seminar	Q/A/OBT/FW/GD/S	3%
	Student – Teacher interaction	STA	3%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

Q: Quiz, A: Assignment, OBT: Open book test, FW: Field work, GD: Group discussion, S: Seminar

E. Syllabus

Unit I. 10 Hours

Introduction, history of microbiology, its branches, scope and its importance. a) Introduction to Prokaryotes and Eukaryotes. b) Study of ultra-structure and morphological classification of bacteria, nutritional requirements, raw materials used for culture media and physical parameters for growth, growth curve, isolation and preservation methods for pure cultures, cultivation of anaerobes, quantitative measurement of bacterial growth (total & viable count). c) Study of different types of phase constrast microscopy, dark field microscopy and electron microscopy.

Unit II. 10 Hours

a) Identification of bacteria using staining techniques (simple, Gram's &Acid fast staining) and biochemical tests (IMViC). b) Study of principle, procedure, merits, demerits and applications of Physical, chemical and mechanical method of sterilization. c) Evaluation of the efficiency of sterilization methods. d) Equipments employed in large scale sterilization. Sterility indicators.

Unit III. 10 Hours

a) Study of morphology, classification, reproduction/replication and cultivation of Fungi and Virus. b) Classification and mode of action of disinfectants. c) Factors influencing disinfection, antiseptics and their evaluation. For bacteriostatic and bactericidal actions. d) Evaluation of bactericidal & Bacteriostatic. e) Sterility testing of products (solids, liquids, ophthalmic and other sterile products) according to IP, BP and USP.

Unit IV. 08 Hours

Designing of aseptic area, laminar flow equipments; study of different sources of contamination in an aseptic area and methods of prevention, clean area classification. a) Principles and methods of different microbiological assay. Methods for standardization of antibiotics, vitamins and amino acids. b) Assessment of a new antibiotic and testing of antimicrobial activity of a new substance. c) General aspects-environmental cleanliness.

Unit V. 07Hours

a). Types of spoilage, factors affecting the microbial spoilage of pharmaceutical products, sources and types of microbial contaminants, assessment of microbial contamination and spoilage. b) Preservation of pharmaceutical products using antimicrobial agents, evaluation of microbial stability of formulations. c) Growth of animal cells in culture, general procedure for cell culture, Primary, established and transformed cell cultures. d) Application of cell cultures in pharmaceutical industry and research.

Examination Scheme:

Components	CT	A	Q/A/OBT/FW/GD/S	STI	EE
Weightage (%)	15	4	3	3	75

Q: Quiz, A: Assignment, OBT: Open book test, FW: Field work, GD: Group discussion, S: Seminar, STI: Student – Teacher interaction

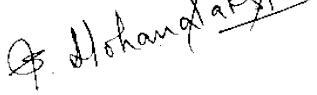
F. Suggested Text/Reference Books:

1. W.B. Hugo and A.D. Russel: Pharmaceutical Microbiology, Blackwell Scientific publications, Oxford London.
2. Prescott and Dunn., Industrial Microbiology, 4th edition, CBS Publishers & Distributors, Delhi.
3. Pelczar, Chan Kreig, Microbiology, Tata McGraw Hill edn.
4. Malcolm Harris, Balliere Tindall and Cox: Pharmaceutical Microbiology.
5. Rose: Industrial Microbiology.
6. Probisher, Hinsdill et al: Fundamentals of Microbiology, 9th ed. Japan
7. Cooper and Gunn's: Tutorial Pharmacy, CBS Publisher and Distribution.
8. Peppler: Microbial Technology.
9. I.P., B.P., U.S.P.- latest editions.
10. Ananthnarayan : Text Book of Microbiology, Orient-Longman, Chennai
11. Edward: Fundamentals of Microbiology.
12. N.K.Jain: Pharmaceutical Microbiology, Vallabh Prakashan, Delhi
13. Bergeys manual of systematic bacteriology, Williams and Wilkins- A Waverly company

G. Lecture Plan

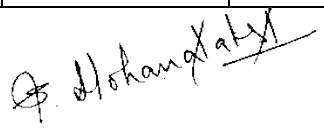
Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1.	Introduction, history of microbiology, its branches, scope and its importance.	Lecture	BP303T.1	Mid Term-1, Quiz & End Sem Exam
2.	Branches of microbiology, scope and its importance.	Lecture	BP303T.1	Mid Term-1, Quiz & End Sem Exam
3.	Introduction to Prokaryotes Eukaryotes	Lecture	BP303T.1	Mid Term-1, Quiz & End Sem Exam
4.	Tutorial 1	Tutorial1		

5.	*Study of ultra-structure of bacteria*	Lecture	BP303T.1	Mid Term-1, Quiz & End Sem Exam
6.	Study of morphological classification of bacteria	Lecture	BP303T.1	Mid Term-1, Quiz & End Sem Exam
7.	Study of nutritional requirements of bacteria, raw materials used for culture media	Lecture	BP303T.1	Mid Term-1, Quiz & End Sem Exam
8.	Tutorial 2	Tutorial 2		
9.	Study of physical parameters for of bacterial growth	Lecture	BP303T.1	Mid Term-1, Quiz & End Sem Exam
10.	Study of growth curve	Lecture	BP303T.1	Mid Term-1, Quiz & End Sem Exam
11.	Study of isolation and preservation methods for pure culture	Lecture	BP303T.1	Mid Term-1, Quiz & End Sem Exam
12.	Tutorial 3	Tutorial 3		
13.	Study of quantitative measurement of bacterial growth (total & viable count).	Lecture	BP303T.1	Mid Term-1, Quiz & End Sem Exam
14.	Study of different types of phase constrast microscopy	Lecture	BP303T.1	Mid Term-1, Quiz & End Sem Exam
15.	Study of dark field microscopy and electron microscopy.	Lecture	BP303T.1	Mid Term-1, Quiz & End Sem Exam
16.	Tutorial 4	Tutorial4		
17.	Identification of bacteria using staining techniques (simple staining, Gram's staining, Acid fast staining)	Lecture	BP303T.2	Mid Term-1, Quiz & End Sem Exam
18.	Identification of bacteria using biochemical tests (IMViC).	Lecture	BP303T.2	Mid Term-1, Quiz & End Sem Exam
19.	Study of principle, procedure, merits, demerits and applications of Physical, chemical and mechanical method of sterilization.	Lecture	BP701T.2	Mid Term-1, Quiz & End Sem Exam
20.	Tutorial 5	Tutorial 5		
21.	Evaluation of the efficiency of sterilization methods.	Lecture	BP303T.2	Mid Term-1, Quiz & End Sem Exam
22.	Equipments employed in large scale sterilization.	Lecture	BP303T.2	Mid Term-1, Quiz & End Sem Exam
23.	Sterility indicators	Lecture	BP303T.2	Mid Term-1,



				Quiz & End Sem Exam
24.	Tutorial 6	Tutorial 6		
25.	Study of morphology and classification of Fungi.	Lecture	BP303T.3	Mid Term-2, Quiz & End Sem Exam
26.	Study of reproduction/replication of Fungi	Lecture	BP303T.3	Mid Term-2, Quiz & End Sem Exam
27.	Study of cultivation of Fungi	Lecture	BP303T.3	Mid Term-2, Quiz & End Sem Exam
28.	Tutorial 7	Tutorial 7		
29.	Study of morphology of Virus.	Lecture	BP303T.3	Mid Term-2, Quiz & End Sem Exam
30.	Study of classification and cultivation of Virus.	Lecture	BP303T.3	Mid Term-2, Quiz & End Sem Exam
31.	Study of reproduction/replication of Virus.	Lecture	BP303T.3	Mid Term-2, Quiz & End Sem Exam
32.	Classification of action of disinfectants method of sterilization.	Lecture	BP303T.3	Mid Term-2, Quiz & End Sem Exam
33.	Classification and mode of action of disinfectants method of sterilization.	Lecture	BP303T.3	Mid Term-1, Quiz & End Sem Exam
34.	Tutorial 08	Tutorial 08		
35.	Factors influencing disinfection, antiseptics and their evaluation.	Lecture	BP303T.3	Mid Term-1, Quiz & End Sem Exam
36.	applications of Physical, chemical and mechanical method of sterilization	Lecture	BP303T.3	Mid Term-2, Quiz & End Sem Exam
37.	Evaluation of bactericidal & Bacteriostatic.	Lecture	BP303T.3	Mid Term-2, Quiz & End Sem Exam
38.	Tutorial 09	Tutorial 09		
39.	Sterility testing of products (solids, liquids, ophthalmic and other sterile products) according to IP, BP and USP.	Lecture	BP303T.3	Mid Term-2, Quiz & End Sem Exam
40.	Designing of aseptic area, laminar flow.	Lecture	BP303T.4	Mid Term-2, Quiz & End Sem Exam
41.	Designing of study of different sources of contamination.	Lecture	BP303T.4	Mid Term-2, Quiz & End Sem Exam

42.	Tutorial 10	Tutorial 10		
43.	methods of prevention, clean area classification.	Lecture	BP303T.4	Mid Term-2, Quiz & End Sem Exam
44.	Principles and methods of different microbiological assay.	Lecture	BP303T.4	Mid Term-2, Quiz & End Sem Exam
45.	Tutorial 11	Tutorial 11		
46.	Methods for standardization of antibiotics, vitamins and amino acids.	Lecture	BP303T.4	Quiz & End Sem Exam
47.	Assessment of a new antibiotic.	Lecture	BP303T.4	Quiz & End Sem Exam
48.	testing of antimicrobial activity of a new substance.	Lecture	BP303T.4	Quiz & End Sem Exam
49.	Tutorial 12	Tutorial 12		
50.	General aspects- environmental cleanliness. Types of spoilage	Lecture	BP303T.5	Quiz & End Sem Exam
51.	factors affecting the microbial spoilage of pharmaceutical products, sources and types of microbial contaminants, assessment of microbial contamination and spoilage.	Lecture	BP303T.5	Quiz & End Sem Exam
52.	sources of microbial contaminants	Lecture	BP303T.5	Quiz & End Sem Exam
53.	Tutorial 13	Tutorial 13		
54.	types of microbial contaminants,	Lecture	BP303T.5	Quiz & End Sem Exam
55.	assessment of microbial contamination and spoilage.	Lecture	BP303T.5	Quiz & End Sem Exam
56.	Preservation of pharmaceutical products using antimicrobial agents, evaluation of microbial stability of formulations.	Lecture	BP303T.5	Quiz & End Sem Exam
57.	Tutorial 13	Tutorial 13		
58.	Growth of animal cells in culture	Lecture	BP303T.5	Mid Term-2, Quiz & End Sem Exam
59.	Tutorial 14	Tutorial 14		
60.	general procedure for cell culture, Primary, established and	Lecture	BP303T.5	Mid Term-2, Quiz & End Sem Exam



	transformed cell cultures			
61.	Application of cell cultures in pharmaceutical industry and research.	Lecture	BP303T.5	Mid Term-2, Quiz & End Sem Exam
62.	Tutorial 15	Tutorial 15		

H. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP303T.1	Discuss various methods used for evaluation of disinfectants.	2	2	3	2	-	1	2	1	-	-	1
BP303T.2	*Discuss phenol coefficient test.*	2	2	2	3	-	1	1	1	-	-	1
BP303T.3	*What is sterilization? Explain in detail the various physical methods of sterilization.*	2	1	1	-	-	1	3	2	-	-	-
BP303T.4	*Discuss the various applications of cell cultures in pharmaceutical industries*	2	2	2	1	-	1	-	-	-	-	-
BP303T.5	*Write a note on chemical indicators of sterilization.*	2	1	-	-	-	2	1	1	-	-	1

<u>Sample Question Paper</u>

Amity School of Pharmacy
Department of Pharmacology
I MID-SEMESTER(SEM–III)2021-22

Class: B.Pharm.- III Semester						
Subject Name: BP303T PHARMACEUTICAL MICROBIOLOGY (Theory)		Time:1 Hrs			Max.Marks:30	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,4	Q.2,3	Q.4	Q.2,5,6		

CO Map	Question No.	Question	Marks
CO1	Q.1	Write down the principle of pour plate.	2
CO1	Q.2	Define IMViC test.	2
	Q.3	Write down the microbiological assay of antibiotics.	2
	Q.4	Define Hanging drop method.	2
	Q.5	Differentiate among Gram +ve and Gram -ve bacteria.	2
CO1	Q.6	a) Give description of most common biochemical test used for identification of bacteria. b) Explain the principle of acid-fast staining of bacteria.	10
CO2	Q.7	a) Discuss the various applications of cell cultures in pharmaceutical industries. b) Write a note on Pour Plate method.	10
CO2	Q.8	Explain the growth curve of bacteria in detail.	5
	Q.9	Explain the various substances required for the growth of microorganisms.	5
CO2	Q.10	Explain the principle of moist heat and radiation sterilization method.	5

Attainments		Rubric
Level	1	IF60%ofstudentssecuremorethan60%marksthenlevel1
Level	2	IF70%ofstudentssecuremorethan60%marksthenlevel2
Level	3	IF80%ofstudentssecuremorethan60%marksthenlevel3

Attainment Level 2:

75.6 % Percentage of students secured more than 60% marks, so this course attained Level - 2.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICS

PROGRAMME OUTCOMES AND PROGRAMME-SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2019-20

Program Outcomes:

[PO.1]. Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills, and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific inquiry, thinking analytically, clearly, and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership, and team-building when planning changes required for the fulfillment of practice, and professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

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[PO.10]. Environment and sustainability: Understand the impact of professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Programme Specific Outcomes:

PSO 1: Will be able to design, develop and implement efficient software for a given real life problem.

PSO 2: Will be able to apply knowledge of AI, Machine Learning and Data Mining in analyzing big data forextracting useful information from it and for performing predictive analysis.

PSO 3: Will be able to design, manage and secure wired/ wireless computer networks for transfer and sharing ofinformation.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
III SEM	BP304T	3	2	3	1	-	-	1	-	-	3	2				

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICS
Course Handout
Course : PHARMACEUTICAL ENGINEERING THEORY
Course Code : BP304T, Crédits : 04, Session :2019-20 (Odd Sem.), Class : B.Pharm. 2nd Year
Faculty Name: Dr. Neeraj Mishra and Dr. Jovita Kanoujia

A. **Introduction:** This course is designed to impart fundamental knowledge on the art and science of various unit operations used in the pharmaceutical industry.

B. **Course Outcomes:** At the end of the course, students will be able to:

BP304T.1. **Define** various unit operations used in pharmaceutical industries.

BP304T.2. **Relate** the material handling techniques according to the available materials.

BP304T.3. **Explain** various processes & equipment involved in the pharmaceutical manufacturing process.

BP304T.4. **Analys**e various conditions & precautions to prevent environmental pollution.

BP304T.5. **Analyse & Plan** plant layout design for optimum use of resources.

BP304T.6 Utilize various preventive methods used for corrosion control in pharmaceutical industries.

C. **Programme Outcomes:**

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

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[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Programme Specific Outcomes:

PSO 1: Will be able to design, develop and implement efficient software for a given real life problem.

PSO 2: Will be able to apply knowledge of AI, Machine Learning and Data Mining in analyzing big data forextracting useful information from it and for performing predictive analysis.

PSO 3: Will be able to design, manage and secure wired/ wireless computer networks for transfer and sharing ofinformation.

E. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

F. Syllabus

UNIT – I

Flow of fluids: Types of manometers, Reynolds number and its significance, Bernoulli's theorem and its applications, Energy losses, Orifice meter, Venturimeter, Pitot tube and Rotometer.

Size Reduction: Objectives, Mechanisms & Laws governing size reduction, factors affecting size reduction, principles, construction, working, uses, merits and demerits of Hammer mill, ball mill, fluid energy mill, Edge runner mill & end runner mill.

Size Separation: Objectives, applications & mechanism of size separation, official standards of powders, sieves, size separation Principles, construction, working, uses, merits and demerits of Sieve shaker, cyclone separator, Air separator, Bag filter & elutriation tank.

UNIT – II

Heat Transfer: Objectives, applications & Heat transfer mechanisms. Fourier's law, Heat transfer by conduction, convection & radiation. Heat interchangers & heat exchangers.

Evaporation: Objectives, applications and factors influencing evaporation, differences between evaporation and other heat process. principles, construction, working, uses, merits and demerits of Steam jacketed kettle, horizontal tube evaporator, climbing film

evaporator, forced circulation evaporator, multiple effect evaporator& Economy of multiple effect evaporator.

Distillation: Basic Principles and methodology of simple distillation, flash distillation, fractional distillation, distillation under reduced pressure, steam distillation & molecular distillation

UNIT – III

Drying: Objectives, applications & mechanism of drying process, measurements & applications of Equilibrium Moisture content, rate of drying curve. principles, construction, working, uses, merits and demerits of Tray dryer, drum dryer spray dryer, fluidized bed dryer, vacuum dryer, freeze dryer.

Mixing: Objectives, applications & factors affecting mixing, Difference between solid and liquid mixing, mechanism of solid mixing, liquids mixing and semisolids mixing. Principles, Construction, Working, uses, Merits and Demerits of Double cone blender, twin shell blender, ribbon blender, Sigma blade mixer, planetary mixers, Propellers, Turbines, Paddles & Silverson Emulsifier,

UNIT – IV

Filtration: Objectives, applications, Theories & Factors influencing filtration, filter aids, filter medias. Principle, Construction, Working, Uses, Merits and demerits of plate & frame filter, filter leaf, rotary drum filter, Meta filter & Cartridge filter, membrane filters and Seidtz filter.

Centrifugation: Objectives, principle & applications of Centrifugation, principles, construction, working, uses, merits and demerits of Perforated basket centrifuge, Non-perforated basket centrifuge, semi continuous centrifuge & super centrifuge.

UNIV – V

Materials of pharmaceutical plant construction, Corrosion and its prevention: Factors affecting during materials selected for Pharmaceutical plant construction, Theories of corrosion, types of corrosion and there prevention. Ferrous and nonferrous metals, inorganic and organic non metals, basic of material handling systems.

G. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

H. Suggested Text/Reference Books:

1. Introduction to chemical engineering – Walter L Badger & Julius Banchero, Latest edition.

2. Solid phase extraction, Principles, techniques and applications by Nigel J.K. Simpson- Latest edition.

3. Unit operation of chemical engineering – Mcabe Smith, Latest edition.

4. Pharmaceutical engineering principles and practices – C.V.S Subrahmanyam et al., Latest edition.

5. Remington practice of pharmacy- Martin, Latest edition.

6. Theory and practice of industrial pharmacy by Lachmann., Latest edition.

7. Physical pharmaceutics- C.V.S Subrahmanyam et al., Latest edition. 8. Cooper and Gunn's Tutorial pharmacy, S.J. Carter, Latest edition.

I. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Introduction to flow of fluid and simple manometer	Lecture	2	Mid Term-1, Quiz & End Sem Exam
2	Differential and inclined manometer, Energy losses	Lecture	2,5	Mid Term-1, Quiz & End Sem Exam
3	Reynolds number and its significance	Lecture	3	Mid Term-1, Quiz & End Sem Exam
4	Doubt clearing session	Tutorial	2,3,5	Mid Term-1, Quiz & End Sem Exam
5	Bernoulli's theorem and its applications	Lecture	2	Mid Term-1, Quiz & End Sem Exam
6	Orifice meter, Venturimeter	Lecture	2	Mid Term-1, Quiz & End Sem Exam
7	Pitot tube, Rotameter	Lecture	2	Mid Term-1, Quiz & End Sem Exam
8	Revision of fluid flow	Tutorial	2.3.5	Mid Term-1, Quiz & End Sem Exam
9	Objectives, Mechanisms & Laws governing size reduction, factors affecting size reduction	Lecture	1	Mid Term-1, Quiz & End Sem Exam
10	Hammer mill, ball mill	Lecture	2, 3	Mid Term-1, Quiz & End Sem Exam
11	fluid energy mill, Edge runner mill & end runner mill	Lecture	2, 3. 5	Mid Term-1, Quiz & End Sem Exam
12	Class test	Tutorial	2,3,5	Mid Term-1, Quiz & End Sem Exam

13	Objectives, applications & mechanism of size separation, official standards of powders	Lecture	1, 2	Mid Term-1, Quiz & End Sem Exam
14	official standards of sieves, size separation Principles, construction, working, uses, merits and demerits of cyclone separator, Sieve shaker	Lecture	2,3,4	Mid Term-1, Quiz & End Sem Exam
15	Air separator, Bag filter & elutriation tank	Lecture	2,3,4	Mid Term-1, Quiz & End Sem Exam
16	Corelative discussion of size reduction & size separation	Tutorial	1,2,3,4,5	Mid Term-1, Quiz & End Sem Exam
17	Objectives, applications & Heat transfer mechanisms	Lecture	1,	Mid Term-1, Quiz & End Sem Exam
18	Heat transfer by conduction	Lecture	1	Mid Term-1, Quiz & End Sem Exam
19	Heat transfer by convection & radiation	Lecture	1	Mid Term-1, Quiz & End Sem Exam
20	Group discussion on different topics	Tutorial	1,2,3,4,5	Mid Term-1, Quiz & End Sem Exam
21	Heat interchangers	Lecture	2,3,4	Mid Term-1, Quiz & End Sem Exam
22	heat exchangers	Lecture	2,3,4	Mid Term-1, Quiz & End Sem Exam
23	Objectives, applications and factors influencing evaporation, differences between evaporation and other heat process, Steam jacketed kettle,	Lecture	1,2	Mid Term-1, Quiz & End Sem Exam
24	Revision of heat chapter	Tutorial	1,2,3,4	Mid Term-1, Quiz & End Sem Exam
25	principles, construction, working, uses, merits and demerits of horizontal tube evaporator, climbing film	Lecture	2,3,4	Mid Term-1, Quiz & End Sem Exam

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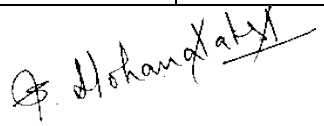
	evaporator			
26	forced circulation evaporator, multiple effect evaporator & Economy of multiple effect evaporator	Lecture	2,3,4	Mid Term-1, Quiz & End Sem Exam
27	Basic Principles and methodology of simple distillation, steam distillation	Lecture	2,3,4	Mid Term-1, Quiz & End Sem Exam
28	Model making	Tutorial	3	Mid Term-1, Quiz & End Sem Exam
29	flash distillation,	Lecture	2,3,4	Mid Term-1, Quiz & End Sem Exam
30	molecular distillation	Lecture	2,3,4	Mid Term-1, Quiz & End Sem Exam
31	distillation under reduced pressure	Lecture	2,3,4	Mid Term-2, Quiz & End Sem Exam
32	Group discussion on ditillation	Tutorial	1,2,3,4,5	Mid Term-2, Quiz & End Sem Exam
33	fractional distillation	Lecture	2,3,4	Mid Term-2, Quiz & End Sem Exam
34	Drying: Objectives, applications & mechanism of drying process, measurements & applications of Equilibrium Moisture content	Lecture	2,3,4	Mid Term-2, Quiz & End Sem Exam
35	rate of drying curve, principles, construction, working, uses, merits and demerits of Tray dryer	Lecture	2,3,4	Mid Term-2, Quiz & End Sem Exam
36	Class test	Tutorial	1,2,3,4,5	Mid Term-2, Quiz & End Sem Exam
37	drum dryer, spray dryer	Lecture	2,3,4	Mid Term-2, Quiz & End Sem Exam
38	fluidized bed dryer, vacuum dryer	Lecture	2,3,4	Mid Term-2, Quiz & End Sem Exam
39	freeze dryer,	Lecture	2,3,4	Mid Term-2,



				Quiz & End Sem Exam
40	Quiz	Tutorial	1,2,3,4,5	Mid Term-2, Quiz & End Sem Exam
41	Objectives, applications & factors affecting mixing, Difference between solid and liquid mixing	Lecture	1,2	Mid Term-2, Quiz & End Sem Exam
42	mechanism of solid mixing, liquids mixing and semisolids mixing	Lecture	2,3,4	Mid Term-2, Quiz & End Sem Exam
43	Principles, Construction, Working, uses, Merits and Demerits of Double cone blender, twin shell blender	Lecture	2,3,4	Mid Term-2, Quiz & End Sem Exam
44	Seminar	Tutorial	1,2,3,4,5	Mid Term-2, Quiz & End Sem Exam
45	ribbon blender, Sigma blade mixer, planetary mixers	Lecture	2,3,4	Mid Term-2, Quiz & End Sem Exam
46	Propellers, Turbines, Paddles & Silverson Emulsifier	Lecture	2,3,4	Mid Term-2, Quiz & End Sem Exam
47	Objectives, applications, Theories & Factors influencing filtration, filter aids	Lecture	1,2	Quiz & End Sem Exam
48	Discussion	Tutorial	1,2,3,4,5	Quiz & End Sem Exam
49	filter medias, rotary drum filter	Lecture	2,3,4	Quiz & End Sem Exam
50	Principle, Construction, Working, Uses, Merits and demerits of plate & frame filter	Lecture	2,3,4	Quiz & End Sem Exam
51	filter leaf, Meta filter & Cartridge filter, membrane filters and Seidtz filter	Lecture	2,3,4	Quiz & End Sem Exam
52	Model making	Tutorial	3	Quiz & End Sem Exam
53	Objectives, principle & applications of Centrifugation,	Lecture	1,2	Quiz & End Sem Exam

54	principles, construction, working, uses, merits and demerits of Perforated basket centrifuge, Non -perforated basket centrifuge	Lecture	2,3,4	Quiz & End Sem Exam
55	semi continuous centrifuge & super centrifuge	Lecture	2,3,4	Quiz & End Sem Exam
56	Test	Tutorial	1,2,3,4,5	Quiz & End Sem Exam
57	types of corrosion and there prevention	Lecture	1,2,5, 6	Quiz & End Sem Exam
58	Ferrous and nonferrous metals, inorganic and organic non metals	Lecture	1,2,5, 6	Quiz & End Sem Exam
59	basic of material handling systems	Lecture	1,2,5, 6	Quiz & End Sem Exam
60	Unit test	Tutorial	1,2,3,4,5 ,6	Quiz & End Sem Exam

J. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP304T.1	Define various unit operations used in pharmaceutical industries.	3	1	1	-	-	-	-	-	-	-	-				
BP304T.2.	Relate the material handling techniques according to the available materials.	3	3	3	2	-	-	-	-	-	1	2				

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BP304T.3.	Explain various processes & equipment involved in the pharmaceutical manufacturing process.	3	1	1	2	-	-	-	-	-	2	1				
BP304T.4.	Analyze various conditions & precautions to prevent environmental pollution.	3	3	2	1	-	-	3	-	-	3	3				
BP304T.5.	Analyze & plan plant layout design for optimum use of resources.	3	3	2	1	-	-	3	-	-	3	3				
BP304T.6.	Utilize various preventive methods used for corrosion control in pharmaceutical industries.	3	3	3	1	-	-	-	-	-	3	1				

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutics I MID-SEMESTER (SEM –IIIrd) 2019-20						
Class: B.Pharm, III Semester						
Subject Name: BP304T Pharmaceutical Engineering Theory		Time: 1 Hrs		Max. Marks: 30		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,2,4	Q.3,5	Q.7,9	Q. 8,		

Students will be able to
CO1: List the broad perceptive of cloud architecture and model.
CO2: Apply different cloud programming models as per need.

CO Map	Question No.	Question	Marks
CO2	Q.1	How evaporation rate can be enhanced?	2
CO3	Q.2	What are the basic objectives of drying?	2
CO3	Q.3	Explain the term “sieve number” & Nominal size of the aperture.	2
CO3	Q.4	Which working principle is there for the fluidized bed dryer?	2
CO2	Q.5	Illustrate the ribbon blender.	2
	Q.6	Derive the basic equation for the flow of fluid through the pipe and discuss its applications.	10
CO3	Q.7	Make use of a suitable diagram of a forced circulation evaporator for explaining its principle, construction, working, uses, advantages and disadvantages.	10
CO2	Q.8	List the types of mixing devices.	5
CO4	Q.9	Identify the various factors that can affect the size reduction of raw materials.	5
CO3	Q.10	Explain the mechanism of drying.	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 1:

66.7 % Percentage of students secured more than 60% marks, so this course attained Level - 1.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharmacy), Academic Year – 2019-2020

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturingpractices.

[PO.2].Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meetdeadlines.

[PO.3].Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensibledecisions.

[PO.4].Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5].Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6].Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7].Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values,

communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8].**Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clearinstructions.

[PO.9].**The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacypractice.

[PO.10].**Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11].**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoingbasis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMMEARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11				
III SEM	BP305P	3	3	3	3	-	-	1		1	-	3		-	-	-

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AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICAL CHEMISTRY
Course Handout
Course : PHARMACEUTICAL ORGANIC CHEMISTRY-II (Practical)
Course Code : BP305P, Crédits : 02, Session : 2019-20 (Odd Sem.), Class : B.Pharm. 2nd Year
Faculty Name : Dr. Pawan Kumar Porwal, Dr. Pawan Kumar Gupta

Introduction: This subject imparts knowledge on synthesis of organic compounds that could involve with design, chemical synthesis and development of medicinal compounds. Further, characterization of oils including standardization of their reagents.

A. ***Course Outcomes:***At the end of the course

BP305P.1. Students will be able to understand principle and procedure of melting point determination, purification and steam distillation.

BP305P.2. Students will be able to **estimate** different analytical constantstofindthequalityofoils.

BP305P.3. Students will be able to **acquire** knowledge about pharmaceutical organic compounds, with emphasis on their synthetic methods.

BP305P.4. Students will be able to **illustrate** the experiments relating to preparations of organic compounds.

BP305P.5. Students will be able to **apply**reagents and various named reactions for synthesis of organic compounds.

B. Programme Outcomes:

[PO.1].Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturingpractices.

[PO.2].Planning Abilities: Demonstrate effective planning abilities including

time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meetdeadlines.

[PO.3].**Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensibledecisions.

[PO.4].Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5].**Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6].**Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers,employees).

[PO.7].**Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with thedecisions.

[PO.8].**Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clearinstructions.

[PO.9].**The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and

the consequent responsibilities relevant to the professional pharmacypractice.

[PO.10].Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainabledevelopment.

[PO.11].Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoingbasis.

C. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance isrequiredtobemaintainedbyastudentto be qualified for taking up the EndSemester examination. The allowanceof 20%includesalltypesofleaves includingmedicalleaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

D. Syllabus

I . Experiments involving laboratory techniques

- Recrystallization
- Steam distillation

II . Determination of following oil values (including standardization of reagents)

- Acid value
- Saponification value

- Iodine value

III . **Preparation of compounds**

- Benzanilide/Phenyl benzoate/Acetanilide from Aniline/ Phenol /Aniline by acylation reaction.
- 2,4,6-Tribromo aniline/Para bromo acetanilide from Aniline/Acetanilide by halogenation (Bromination) reaction.
- 5-Nitro salicylic acid/Meta di nitro benzene from Salicylic acid / Nitro benzene by nitration reaction.
- Benzoic acid from Benzyl chloride by oxidation reaction.
- Benzoic acid/ Salicylic acid from alkyl benzoate/ alkyl salicylate by hydrolysis reaction.
- 1-Phenyl azo-2-napthol from Aniline by diazotization and coupling reactions.
- Benzil from Benzoin by oxidation reaction.
- Dibenzal acetone from Benzaldehyde by Claison Schmidt reaction
- Cinnammic acid from Benzaldehyde by Perkin reaction

E. Examination Scheme:

Components	A	CT	LR	V	EE
Weightage (%)	2	10	1	2	35

LT: Lab Test,PR/RVV: Practical Records/ Regular viva voce, EE: End Semester Examination; A: Attendance

F. Suggested Text/Reference Books:

- Organic chemistry by I.L. Finar, Volume-I & II.
- A text book of organic chemistry – Arun Bahl, B.S. Bahl.
- Heterocyclic Chemistry by Raj K. Bansal
- Organic Chemistry byMorrison and Boyd

G. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Recrystallization	Practical	BP305P.1	Mid Term-1, PR/RVV&End Sem Exam
2	Steam distillation	Practical	BP305P.1	Mid Term-1, PR/RVV & End Sem Exam
3	Melting point	Practical	BP305P.1	Mid Term-1,

				PR/RVV & End Sem Exam
4	Acid value	Practical	BP305P.2	Mid Term-1, PR/RVV & End Sem Exam
5	Saponification value	Practical	BP305P.2	Mid Term-1, PR/RVV & End Sem Exam
6	Iodine value	Practical	BP305P.2	Mid Term-1, PR/RVV & End Sem Exam
7	Benzanilide/Phenyl benzoate/Acetanilide from Aniline/ Phenol /Aniline by acylation reaction.	Practical	BP305P.3 & BP305P.4	Mid Term-1, PR/RVV & End Sem Exam
8	2,4,6-Tribromo aniline/Para bromo acetanilide from Aniline/Acetanilide by halogenation (Bromination)	Practical	BP305P.3 & BP305P.4	Mid Term-1, PR/RVV & End Sem Exam
9	5-Nitro salicylic acid/Meta di nitro benzene from Salicylic acid / Nitro benzene by nitration reaction.	Practical	BP305P.3 & BP305P.4	Mid Term-2, PR/RVV & End Sem Exam
10	Benzoic acid from Benzyl chloride by oxidation reaction.	Practical	BP305P.3 & BP305P.5	Mid Term-2, PR/RVV & End Sem Exam
11	Benzoic acid from alkyl benzoate by hydrolysis reaction.	Practical	BP305P.3 & BP305P.5	Mid Term-2, PR/RVV & End Sem Exam
12	1-Phenyl azo-2-napthol from Aniline by diazotization and coupling reactions.	Practical	BP305P.3 & BP305P.4	Mid Term-2, PR/RVV & End Sem Exam
13	Benzil from Benzoin by oxidation reaction.	Practical	BP305P.3 & BP305P.4	Mid Term-2, PR/RVV & End Sem

				Exam
14	Dibenzal acetone from Benzaldehyde by Claison Schmidt reaction	Practical	BP305P.3 & BP305P.4	Mid Term-2, PR/RVV & End Sem Exam
15	Cinnammic acid from Benzaldehyde by Perkin reaction	Practical	BP305P.3 & BP305P.4	Mid Term-2, PR/RVV & End Sem Exam
16	Salicylic acid from alkyl salicylate by hydrolysis reaction.	Practical	BP305P.3 & BP305P.5	Mid Term-2, PR/RVV & End Sem Exam

H. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP305P.1.	Students will be able to understand principle and procedure of melting point determination, purification and steam distillation..	3	3	3	3				1	1		3
BP305P.2.	Students will be able to **estimate** different analytical constantstofindthequalityof oils.	3	3	3	3				1	2		3
BP305P.3.	Students will be able to **acquire** knowledge about pharmaceutical organic compounds, with emphasis on their synthetic methods.	3	3	3	3				1	3		3
BP305P.4.	Students will be able to **illustrate** the experiments relating to preparations of organic compounds.	3	3	3	3				2	2		3

BP305P.5.	Students will be able to **apply** reagents and various named reactions for synthesis of organic compounds.	3	3	3	3				2	2		3

SampleQuestionPaper

Amity Institute of pharmacy DepartmentofPharmaceutical Chemistry IIMID-SEMESTER(SEM–III) 2019-20						
Class: B.PharmacyIIISemester						
Subject Name: BP305PPHARMACEUTICAL ORGANIC CHEMISTRY-II PRACTICALS		Time:4Hr		Max.Marks:40		
Levels of thequestions as perBloomsTaxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
QuestionMapping	Q5	Q.1,2	Q.3, 4			

CO.1. Students will be able to **understand** principle and procedure of melting point determination, purification and steam distillation.

CO.2. Students will be able to **estimate** different analytical constantstofindthequalityofoils.

CO.3. Students will be able to **acquire** knowledge about pharmaceutical organic compounds, with emphasis on their synthetic methods.

CO.4. Students will be able to **illustrate** the experiments relating to preparations of organic compounds.

CO.5. Students will be able to **apply** reagents and various named reactions for synthesis of organic compounds.

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COMap	QuestionNo.	Question	Marks
CO3	Q.1	Explain the principle involved in the preparation of tribromo aniline	5
CO3	Q.2	Explain the principle involved in the preparation of acetanelide	5

CO4 &CO5	Q.3	To prepare, submit and report the percentage yield of Dibenzal acetone	10
CO4 & CO5	Q.4	To prepare, submit and report the percentage yield of Benzoic acid	15
CO4 & CO5	Q5	Viva	5

Attainments		**Rubric**
Level	1	IF60%ofstudentssecuremorethan60%marksthenlevel1
Level	2	IF70%ofstudentssecuremorethan60%marksthenlevel2
Level	3	IF80%ofstudentssecuremorethan60%marksthenlevel3

Attainment Level 3:

91.1 % Percentage of students secured more than 60% marks, so this course attained Level - 3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICS

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-21

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

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Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
III SEM	BP306P	3	-	3	2	-	3	-	--	1	3	1				

Dr. Mohan Yadav

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICS
Course Handout
Course : PHYSICAL PHARMACEUTICS-I PRACTICAL
Course Code : BP306P, Programme :B. Pharmacy III-Semester **Crédits : 04, Session :2020-21 (Odd Sem.)**
Faculty Name : Dr. Jovita Kanoujia

A. Scope: The course deals with the various physical and physicochemical properties, and principle involved in dosage forms/formulations. Theory and practical components of the subject help the student to get a better insight into various areas of formulation research and development, and stability studies of pharmaceutical dosage forms.

B. Course Outcome: ***At the end of each course, the student will be able to:***

C306.1	To understand the significance of physical properties such as solubility, surface tension, partition coefficient and pKa in the design of dosage forms.
C306.2	To explain adsorption isotherms and determine Freundlich- Langmuir constant using activated charcoal
C306.3	To apply Henderson – Hasselbalch equation for interpretation of pKa value of drugs
C306.4	To determine the surface tension of sample liquids by drop count and drop weight methods
C306.5	To deduce the HLB value and critical micellar concentration of a surfactant.
C306.6	To estimate the stability constants of complexes by solubility and pH titration methods

C. 1.Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices**.**

2. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

3. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice.

Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

4. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

5. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well-being.

6. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

7. Pharmaceutical Ethics: Honor personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

8. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

9. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional Pharmacy Practice

10. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

11. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively

D.Programme specific outcomes:

1. Scientific Thinking: Enable student's knowledge in scientific perception to understand the concepts and to solve the problems positively while making pharmaceutical formulations.
2. Analytical Skills: Assimilate and develop analytical skills using advanced equipment to design and evaluate pharmaceutical products, also to assess their quality.
3. Resource Management: Utilize and manage resources from natural, semi synthetic and synthetic origin to develop real time products with utmost benefit and safety.
4.Public Health Care: Promote and empower the healthy living in the community by various means of awareness and health strategies.
5. Entrepreneurship: Acquire and develop entrepreneurship and administration skills to establish community pharmacy, learning and training centers for the long term wellbeing of society.

E. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance is required	A	2%

	to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.		
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

F. Syllabus

1. Determination the solubility of drug at room temperature
2. Determination of pKa value by Half Neutralization/ Henderson Hasselbalch equation.
3. Determination of Partition co- efficient of benzoic acid in benzene and water
4. Determination of Partition co- efficient of Iodine in CCl4 and water
5. Determination of % composition of NaCl in a solution using phenol-water system by CST method
6. Determination of surface tension of given liquids by drop count and drop weight method
7. Determination of HLB number of a surfactant by saponification method
8. Determination of Freundlich and Langmuir constants using activated char coal
9. Determination of critical micellar concentration of surfactants
10. Determination of stability constant and donor acceptor ratio of PABA-Caffeine complex by solubility method
11. Determination of stability constant and donor acceptor ratio of Cupric-Glycine complex by pH titration method

G. Examination Scheme:

Components	**A**	**CT**	**LR**	**V**	**EE**
Weightage (%)	2	10	1	2	35

LT: Lab Test,PR/RVV: Practical Records/ Regular viva voce, EE: End Semester Examination; A: Attendance

H. Suggested Text/Reference Books:

1. Physical Pharmacy by Alfred Martin
2. Experimental Pharmaceutics by Eugene, Parott.
3. Tutorial Pharmacy by Cooper and Gunn.
4. Stocklosam J. Pharmaceutical Calculations, Lea &Febiger, Philadelphia.
5. Liberman H.A, Lachman C., Pharmaceutical Dosage forms, Tablets, Volume-1 to 3, MarcelDekkar Inc.
6. Liberman H.A, Lachman C, Pharmaceutical Dosage forms. Disperse systems, volume 1, 2, 3. Marcel Dekkar Inc.
7. Physical Pharmaceutics by Ramasamy C and ManavalanR.

8. Laboratory Manual of Physical Pharmaceutics, C.V.S. Subramanian, J. Thimma settee
9. Physical Pharmaceutics by C.V.S. Subramanyam

I. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Determination the solubility of drug at room temperature	Practical	C306.1	Mid Term-1, PR/RVV & End Sem Exam
2	Determination of pKa value by Half Neutralization/ Henderson Hasselbalch equation.	Practical	C306.1& C306.3	Mid Term-1, PR/RVV & End Sem Exam
3	Determination of Partition co- efficient of benzoic acid in benzene and water	Practical	C306.1	Mid Term-1, PR/RVV & End Sem Exam
4	Determination of Partition co-efficient of Iodine in CCl4 and water	Practical	C306.1	Mid Term-1, PR/RVV & End Sem Exam
5	Determination of % composition of NaCl in a solution using phenol-water system by CST method	Practical	C306.1& C306.3	Mid Term-1, PR/RVV & End Sem Exam
6	Determination of surface tension of given liquids by drop count and drop weight method	Practical	C306.4	Mid Term-1, PR/RVV & End Sem Exam
7	Determination of HLB number of a surfactant by saponification method	Practical	C306.5	Mid Term-1, PR/RVV & End Sem Exam
8	Determination of Freundlich and Langmuir constants using activated char coal	Practical	C306.2	Mid Term-1, PR/RVV & End Sem Exam
9	Determination of critical micellar concentration of surfactants	Practical	C306.1& C306.3	Mid Term-2, PR/RVV & End Sem

				Exam
10	Determination of stability constant and donor acceptor ratio of PABA-Caffeine complex by solubility method.	Practical	C306.1& C306.3	Mid Term-2, PR/RVV & End Sem Exam
11	Determination of stability constant and donor acceptor ratio of Cupric-Glycine complex by pH titration method.	Practical	C306.1& C306.3	Mid Term-2, PR/RVV & End Sem Exam
12	Determination of surface tension of given liquids by drop count and drop weight method	Practical	C306.4	Mid Term-2, PR/RVV & End Sem Exam
13	Effect of sodium chloride on critical solution temperature of phenol- water system	Practical	C306.4	Mid Term-2, PR/RVV & End Sem Exam
14	Effect of ethanol on critical solution temperature of phenol-water system	Practical	C306.4	Mid Term-2, PR/RVV & End Sem Exam
15	Determination of buffer capacity of a pharmaceutical buffer.	Practical	C306.1& C306.3	Mid Term-2, PR/RVV & End Sem Exam
16	Effect of succinic acid on critical solution temperature of phenol-water system	Lecture	C306.1& C306.3	Mid Term-2, PR/RVV & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

Code	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
C306.1	To understand the significance of physical properties such as solubility, surface tension, partition coefficient and pKa in the design of dosage forms.	3	1	2	2	3	2	1	-	-	1	-
C306.2	To explain adsorption isotherms and determine Freundlich-Langmuir constant using activated charcoal	1	-	3	1	-	-	1	-	2	1	1
C306.3	To apply Henderson – Hasselbalch equation for interpretation of pKa value of drugs	1	2	-	1	2	-	2	1	-	-	1
C306.4	To determine the surface tension of sample liquids by	2	1	1	1	-	1	2	-	1	-	2

	drop count and drop weight methods											
C306.5	To deduce the HLB value and critical micellar concentration of a surfactant.	1	1	2	-	2	-	1	1	1	2	3
C306.6	To estimate the stability constants of complexes by solubility and pH titration methods	3	1	1	1	-	1	2	-	1	-	2
Average		1.8	1	1.5	1	1.16	0.66	1.3	0.3	0.83	0.66	1.5

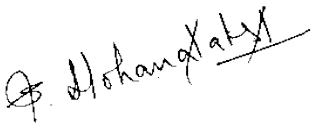
Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutics I MID-SEMESTER (SEM –III) 2020-21						
Class: B.Pharm, III Semester						
Subject Name: BP306P Physical Pharmaceutics-I Practical		Time: 4 Hrs			Max. Marks: 40	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,4	Q.2,3	Q.4	Q.2,5,6		

Student will be able to

C306.1	To understand the significance of physical properties such as solubility, surface tension, partition coefficient and pKa in the design of dosage forms.
C306.2	To explain adsorption isotherms and determine Freundlich- Langmuir constant using activated charcoal
C306.3	To apply Henderson – Hasselbalch equation for interpretation of pKa value of drugs
C306.4	To determine the surface tension of sample liquids by drop count and drop weight methods
C306.5	To deduce the HLB value and critical micellar concentration of a surfactant.
C306.6	To estimate the stability constants of complexes by solubility and pH titration methods

CO Map	Question No.	Question	Marks
CO1,2,4	Q.1a	Synopsis- Write the principle of buffer capacity of a pharmaceutical buffer	5
CO1,2,4	Q.2	Synopsis- Write the principle involved in stability constant and donor acceptor ratio of PABA-Caffeine complex by solubility method.	5
CO1,2, 4,5	Q.3	Experiment Determination HLB number of a surfactant by saponification method	25
CO1,2,3,4,5	Q.4	Viva	5



Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

100 % Percentage of students secured more than 60% marks, so this course attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOLOGY

PROGRAMME OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2019-20

Programme Outcomes:

[PO.1].**Pharmacy Knowledge:** Posses knowledge and compression of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions

[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess

societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "-"

PROGRAMME ARTICULATION MATRIX												
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
III SEM	BP 307P	2	2	2	3	1	2	2	1	3	2	3

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACOLOGY
Course Handout
Course : Pharmaceutical Microbiology (Practical)
Course Code : BP307P, Credits : 02, Session : 2019-20 (Odd Sem.), Class : B. Pharm. 2nd Year
Faculty Name : Dr. Ajay Sharma, Dr. Shvetank Bhatt

Introduction: This subject is designed to impart fundamental and practical knowledge of pharmaceutical microbiology and various categories of microorganisms especially for the production of alcohol, antibiotics, vaccines, vitamins enzymes etc.

A. Course Outcomes: At the end of the course, students will be able to:

BP307P: 1. Understand working of different equipment's used in experimental microbiology.
BP307P: 2 Sterilization methods of glassware, preparation and sterilization of media.
BP307P: 3 Preparation of culture media and Sub culturing of bacteria and fungus.
BP307P: 4 Staining methods for identification of microorganisms.
BP307P: 5 Microbiological assays of antibiotics and amino acids.
BP307P: 6 Process of Sterility testing of pharmaceuticals.

B. Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

C. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

PR: Practical Records, RV: Regular viva, As: Assignment

D. Syllabus

1. Introduction and study of different equipments and processing, e.g., B.O.D. incubator, laminar flow, aseptic hood, autoclave, hot air sterilizer, deep freezer, refrigerator, microscopes used in experimental microbiology.
2. Sterilization of glassware, preparation and sterilization of media.
3. Sub culturing of bacteria and fungus. Nutrient stabs and slants preparations.
4. Staining methods- Simple, Grams staining and acid fast staining (Demonstration with practical).
5. Isolation of pure culture of micro-organisms by multiple streak plate technique and other techniques.
6. Microbiological assay of antibiotics by cup plate method and other methods
7. Motility determination by Hanging drop method.
8. Sterility testing of pharmaceuticals.
9. Bacteriological analysis of water
10. Biochemical test.

E. Examination Scheme:

Components	A	CT	LR	V	EE
Weightage (%)	2	10	1	2	35

PR: Practical Records, RV: Regular viva, As: Assignment

F. Suggested Text/Reference Books:

1. W.B. Hugo and A.D. Russel: Pharmaceutical Microbiology, Blackwell Scientific publications, Oxford London.
2. Prescott and Dunn., Industrial Microbiology, 4th edition, CBS Publishers & Distributors, Delhi.
3. Pelczar, Chan Kreig, Microbiology, Tata McGraw Hill edn.
4. Malcolm Harris, Balliere Tindall and Cox: Pharmaceutical Microbiology.
5. Rose: Industrial Microbiology.
6. Probisher, Hinsdill et al: Fundamentals of Microbiology, 9th ed. Japan
7. Cooper and Gunn's: Tutorial Pharmacy, CBS Publisher and Distribution.
8. Peppler: Microbial Technology.
9. I.P., B.P., U.S.P.- latest editions.
10. Ananthnarayan : Text Book of Microbiology, Orient-Longman, Chennai
11. Edward: Fundamentals of Microbiology.
12. N.K.Jain: Pharmaceutical Microbiology, Vallabh Prakashan, Delhi
13. Bergeys manual of systematic bacteriology, Williams and Wilkins- A Waverly company

G. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1.	Introduction and study of different equipments and processing used in experimental microbiology, e.g., B.O.D. incubator,	Practical	CO4	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both

	laminar flow.			
2.	Introduction and study of different equipments and processing used in experimental microbiology, e.g aseptic hood, autoclave, hot air sterilizer.	Practical	CO4	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
3.	Introduction and study of different equipments and processing used in experimental microbiology, e.g deep freezer, refrigerator, microscopes	Practical	CO4	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
4.	Sterilization of glassware, preparation and sterilization of media.	Practical	CO4, 9	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
5.	Sub culturing of bacteria and fungus. Nutrient stabs and slants preparations.	Practical	CO4, 11	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
6.	Staining methods- Simple, Grams staining and acid fast staining (Demonstration with practical).	Practical	CO4, 9	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
7.	Isolation of pure culture of micro-organisms by multiple streak plate technique and other techniques.	Practical	CO4, 9, 10, 11	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
8.	Microbiological assay of antibiotics by cup plate method	Practical	CO4, 10, 11	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
9.	Microbiological assay of antibiotics by turbidity method	Practical	CO4, 9	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
10.	Motility determination by Hanging drop method.	Practical	CO4	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
11.	Sterility testing of pharmaceuticals.	Practical	CO4, 10	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
12.	Bacteriological analysis of	Practical	CO4,11	Mid Term-2 & End Sem

	water			Exam as Synopsis/ Experiments/ Viva voce for both
13.	Biochemical test for determination of microbials.	Practical	CO4, 11	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both

H. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP307P: 1.	Understand working of different equipment's used in experimental microbiology.	1	1	1	3	1	-	-	1	2	2	3
BP307P: 2	Sterilization methods of glassware, preparation and sterilization of media.	2	1	1	3	1	-	1	1	2	2	2
BP307P: 3	Preparation of culture media and Sub culturing of bacteria and fungus.	1	1	1	2	1	-	-	1	1	2	2
BP307P: 4	Staining methods for identification of microorganisms.	2	1	1	3	1	-	1	1	2	3	2
BP307P: 5	Microbiological assays of antibiotics and amino acids.	2	1	1	3	1	-	1	1	2	2	2
BP307P: 6	Process of Sterility testing of pharmaceuticals.	3	1	1	2	1	-	1	1	2	2	2

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacology I MID-SEMESTER (SEM–III) 2019-20						
Class: B. Pharm III Semester						
Subject Name: Pharmaceutical Microbiology BP 307P (Practical)		Time: 4 Hrs			Max. Marks: 40	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3	Q.2	Q.3	Q.2	Q.2	
Student will be able to CO1: Understand the different equipments used in experimental microbiology. CO2: Preparation of culture media and Sub culturing of bacteria and fungus.						

CO Map	Question No.	Question	Marks
CO1 CO2	Q.1	Synopsis	10
CO2	Q.2	To prepare culture media for given bacterial sample.	25
CO1 and CO2	Q.3	Viva voce	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

100.0 % Percentage of students secured more than 60% marks, so this course attained Level -3.

AMITY UNIVERSITY
MADHYA PRADESH
Established vide Government of Madhya Pradesh Act No. 27 of 2010

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICS

PROGRAMME OUTCOMES AND PROGRAMME-SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2019-20

Programme Outcomes:

[PO.1]. Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2, and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
III SEM	BP308P	3	-	3	2	-	3	-	--	1	3	1				

DEPARTMENT OF Pharmaceutics
Course Handout
Course : PHARMACEUTICAL ENGINEERING PRACTICAL
Course Code : BP308P, Crédits : 02, Session :2019-20 (Odd Sem.), Class : B.Pharm. 2nd Year
Faculty Name: Dr. Jovita Kanoujia, Dr. Neeraj Mishra

A. Introduction: The course is designed to impart skill development in the arts and science of preparing the different conventional dosage forms.

B. Course Outcomes: At the end of the course, students will be able to:

BP308P.1. To recall the principles used in the preparation of solid, liquid, and semi-solid dosage forms.

BP308P.2. Operate equipment used in the manufacturing of different dosage forms

BP308P.3. Formulate various conventional dosage forms such as solid dosage forms.

BP308P.4. Design various liquid dosage forms and semi-solid dosage forms.

BP308P.5. Estimate the ingredients calculation for preparation of dosage form

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

E. Syllabus

I. Determination of radiation constant of brass, iron, unpainted and painted glass.
II. Steam distillation – To calculate the efficiency of steam distillation.
III. To determine the overall heat transfer coefficient by heat exchanger.
IV. Construction of drying curves (for calcium carbonate and starch).
V. Determination of moisture content and loss on drying.
VI. Determination of humidity of air – i) From wet and dry bulb temperatures –use of Dew point method.

VII. Description of Construction working and application of Pharmaceutical Machinery such as rotary tablet machine, fluidized bed coater, fluid energy mill, de humidifier.

VIII. Size analysis by sieving – To evaluate size distribution of tablet granulations – Construction of various size frequency curves including arithmetic andlogarithmic probability plots.

IX. Size reduction: To verify the laws of size reduction using ball mill and determining Kicks, Rittinger's, Bond's coefficients, power requirement and critical speed of Ball Mill.

X. Demonstration of colloid mill, planetary mixer, fluidized bed dryer, freeze dryer and such othermajor equipment.

XI. Factors affecting Rate of Filtration and Evaporation (Surface area, Concentration and Thickness/ viscosity

XII. To study the effect of time on the Rate of Crystallization.

XIII. To calculate the uniformity Index for given sample by using Double Cone Blender.

F. Examination Scheme:

Components	A	CT	LR	V	EE
Weightage (%)	2	10	1	2	35

CT: Class Test, LR: Lab Record, V: Viva, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

- Laboratory Manual of Pharmaceutical Engineering C.V.S Subrahmanyam et. al
- Practical Pharmaceutical Engineering, Gary Prager
- Practical Manual Of Pharmaceutical Engineering By Mrs. B. Jeevana Jyothi
- Cooper and Gunn's Tutorial pharmacy, S.J. Carter, Latest edition

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Demonstrate the pharmaceutical machinery available in the lab	Practical	1, 2	Mid Term-1, Quiz & End Sem Exam
2	Explain the construction, working, and application of pharmaceutical equipment including fluidized bed coater, fluid energy mill, Silverson emulsifier	Practical	1,2	Mid Term-1, Quiz & End Sem Exam
3	Determine the effect of surface area on the rate of evaporation.	Practical	3	Mid Term-1, Quiz & End Sem Exam
4	Determine the effect of filter aid on the rate of filtration.	Practical	3, 5	Mid Term-1, Quiz & End Sem Exam

5	Determine the crystalline behavior of copper sulfate by shock cooling method.	Practical	3, 5	Mid Term-1, Quiz & End Sem Exam
6	Determine the effect of drying time on the moisture content of calcium carbonate slurry.	Practical	3,5	Mid Term-1, Quiz & End Sem Exam
7	Design the drying rate curve for given sample.	Practical	3, 5	Mid Term-1, Quiz & End Sem Exam
8	Determine the effect of surface area on the rate of drying.	Practical	3, 5	Mid Term-2, Quiz & End Sem Exam
9	Determine the humidity of the air by the dew point method	Practical	1, 3, 4, 5	Mid Term-2, Quiz & End Sem Exam
10	Demonstrate the working and construction of tablet punching machine.	Practical	1, 2, 3, 4	Mid Term-2, Quiz & End Sem Exam
11	Analyze the effect of number and size of ball on size reduction of given granular material by using a ball mill.	Practical	1, 2, 3, 4	Mid Term-2, Quiz & End Sem Exam
12	Determine the particle size distribution of a given sample by the sieving method.	Practical	1	Mid Term-2, Quiz & End Sem Exam
13	Determine the particle size distribution of a given sample by the microscopic method.	Practical	1, 3, 4	Mid Term-2, Quiz & End Sem Exam
14	Determine the effect of concentration on the rate of filtration	Practical	3, 5	Mid Term-2, Quiz & End Sem Exam
15	Evaluate the effect of centrifugation speed & time on the rate of sedimentation.	Practical	3, 5	Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	

BP308P.1	Relate theoretical knowledge of equipment's practically, available in the lab	3	-	3	1	-	1	-	-	1	3	2	
BP308P.2.	Understanding of construction, working, applications and principles of various instruments available in lab.	3	2	3	3	-	1	-	-	1	3	2	
BP308P.3.	Study of various factors affecting different unit processes.	3	2	3	-	-	1	-	-	1	3	1	
BP308P.4.	Checking of working efficiency of various instruments available in lab through proper practical approach	3	3	3	3	-	3	1	-	-	1	2	
BP308P.5.	Verification of various theories applicable to different principles of instruments	3	1	2	1	-	1	-	-	-	3	-	

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutics I MID-SEMESTER (SEM –Ist) 2019-20						
Class: B.Pharm, I Semester						
Subject Name: BP308P Pharmaceutical Engineering- Practical		Time: 4 Hrs			Max. Marks: 40	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1a, 1c, 3	1b,		Q.1d, 1e, 2		

The student will be able to

CO.1. Relate theoretical knowledge of the equipment's practically, available in the lab

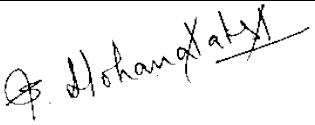
CO.2. Understanding of construction, working, applications, and principles of various instruments available in the lab.

CO.3. Study of various factors affecting different unit processes.

CO.4. Checking of working efficiency of various instruments available in the lab through a proper practical approach

CO.5. Verification of various theories applicable to different principles of instruments

CO Map	Question No.	Question	Marks
CO2	Q.1a	Synopsis- **How** can you define the number of sieves & Nominal size of the aperture?	2
CO2	Q.1b	Synopsis- **Compare** solid & liquid mixing.	2
CO1,2,3	Q.1c	Synopsis- **what** is the principle of the fluidized bed dryer?	2
CO1,2,4	Q.1d	Synopsis- **distinguish** between steam & simple distillation.	2
CO3,5	Q.1e	Synopsis- **Write** the equation for the determination of the rate of filtration.	2
CO1,2, 3,4,5	Q.2	**Experiment** Determine the effect of filter aid on the rate of filtration.	25
CO1,2,3,4,5	Q.3	Viva	5



Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

100.0 % Percentage of students secured more than 60% marks, so this course attained Level -3.

AMITY UNIVERSITY
MADHYA PRADESH
Established vide Government of Madhya Pradesh Act No. 27 of 2010

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharmacy), Academic Year – 2019-20

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11				
IV SEM	BP401T	3	3	2	2	-	-	2	2	1	-	2		-	-	-

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AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICAL CHEMISTRY
Course Handout
Course : PHARMACEUTICAL ORGANIC CHEMISTRY-III (Theory)
Course Code : BP401T, Crédits : 04, Session :2019-20(Even Sem.), Class : B.Pharm. 2nd Year
Faculty Name : Dr. Pawan Kumar Porwal and Dr. Pawan Kumar Gupta

A. Introduction: This subject imparts knowledge on stereo-chemical aspects of organic compounds and organic reactions, important named reactions, chemistry of important hetero cyclic compounds. It also emphasizes on medicinal and other uses of organic compounds.

B. ***Course Outcomes:*** At the end of the course

BP401T.1. Students will be able to **study** optical isomerism of compounds that could help the students to understand the chirality, sequence rules, reacemic modification of organic compounds.

BP401T.2. Students will be able to **acquire** knowledge about geometricsl isomerism of pharmaceutical organic compounds, with emphasis on their synthetic process, physical and chemical properties.

BP401T.3. Students will be able to **write** synthesis, reactions and medicinal uses different heterocyclic compounds.

BP401T.4. Students will be able to **analyze** various reactions for the synthesis of higher organic compounds.

BP401T.5. Students will be able to **apply** reagents and various named reactions for the design of organic medicinal compounds.

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze,

evaluate and apply information systematically and shall make defensible decisions.

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[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well-being.

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[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal	Mid Term 1	CT	15%

Evaluation	Mid Term 2 quiz, assignment, open book test, field work, group discussion and seminar)		
	Seminar/ Assignment/Quiz/ Open book test	S/As/Q/OBT	3%
Interaction	Student-Teacher interaction	ST	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

Unit-1: Stereo isomerism

Optical isomerism–Optical activity, enantiomerism, diastereoisomerism, meso compounds,Elements of symmetry, chiral and achiral molecules DL system of nomenclature of optical isomers, sequence rules, RS system of nomenclature of optical isomers, Reactions of chiral molecules, Racemic modification and resolution of racemic mixture. Asymmetric synthesis: partial and absolute

Unit-2: Geometrical isomerism

Nomenclature of geometrical isomers (Cis Trans, EZ, Syn Anti systems)
Methods of determination of configuration of geometrical isomers.
Conformational isomerism in Ethane, n-Butane and Cyclohexane.
Stereo isomerism in biphenyl compounds (Atropisomerism) and conditions for optical activity.
Stereospecific and stereoselective reactions

Unit-3: Heterocyclic compounds:

Nomenclature and classification,Synthesis, reactions and medicinal uses of following compounds/derivatives Pyrrole, Furan, and Thiophene - Relative aromaticity, reactivity and Basicity of pyrrole

Unit-4: Synthesis, reactions and medicinal uses of following compounds/derivatives

Pyrazole, Imidazole, Oxazole and Thiazole., Pyridine, Quinoline, Isoquinoline, Acridine and Indole. Basicity of pyridine, Synthesis and medicinal uses of Pyrimidine, Purine, azepines and their derivatives

Unit-5: Reactions of synthetic importance

Metal hydride reduction (NaBH4 and LiAlH4), Clemmensen reduction, Birch reduction, Wolff Kishner reduction. Oppenauer-oxidation and Dakin reaction. Beckmanns rearrangement and Schmidt rearrangement. Claisen-Schmidt condensation.

F. Examination Scheme:

Components	A	ST	CT	S/As/Q/OBT	EE
Weightage (%)	4	3	15	3	75

CT: Class Test, As: Assignment, ST: Student teacher interaction, S/A/Q/OBT: Seminar/ Assignment/Quiz/ Open book test, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

- Organic chemistry by I.L. Finar, Volume-I & II.
- A text book of organic chemistry – Arun Bahl, B.S. Bahl.
- Heterocyclic Chemistry by Raj K. Bansal
- Organic Chemistry byMorrison and Boyd

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Optical activity	Lecture	BP401T.1	Mid Term-1, Quiz & End Sem Exam
2	Enantiomerism	Lecture	BP401T.1	Mid Term-1, Quiz & End Sem Exam
3	Meso compounds	Lecture	BP401T.1	Mid Term-1, Quiz & End Sem Exam
4	Tutorial class Optical activity	Lecture	BP401T.1	Mid Term-1, Assignment ,Quiz & End Sem Exam
5	diastereoisomerism	Lecture	BP401T.1	Mid Term-1, Quiz & End Sem Exam
6	Elements of symmetry	Lecture	BP401T.1	Mid Term-1, Quiz & End Sem Exam
7	Chiral and achiral molecules,	Lecture	BP401T.1	Mid Term-1, Quiz & End Sem Exam
8	Tutorial class Elements of symmetry	Lecture	BP401T.1	Mid Term-1, Quiz, Class test & End Sem Exam
9	Resolution	Lecture	BP401T.1	Mid Term-1, Quiz & End Sem Exam
10	DL system of nomenclature of optical isomers	Lecture	BP401T.1	Mid Term-1, Quiz & End Sem Exam
11	Sequence rules	Lecture	BP401T.1	Mid Term-1, Quiz & End Sem Exam
12	*Tutorial class:* R and S	Lecture	BP401T.1	Mid Term-1, Assignment ,Quiz & End Sem Exam

13	Racemic modification	Lecture	BP401T.1	Mid Term-1, Quiz & End Sem Exam
14	Reactions	Lecture	BP401T.1	Mid Term-1, Quiz & End Sem Exam
15	Asymmetric synthesis	Lecture	BP401T.1	Mid Term-1, Quiz & End Sem Exam
16	*Tutorial class* Asymmetric synthesis	Lecture	BP401T.1	Mid Term-1, Class test, Quiz & End Sem Exam
17	Geometrical isomerism	Lecture	BP401T.2	Mid Term-1, Quiz & End Sem Exam
18	Cis-Trans	Lecture	BP401T.2	Mid Term-1, Quiz & End Sem Exam
19	EZ	Lecture	BP401T.2	Mid Term-1, Quiz & End Sem Exam
20	*Tutorial class* Geometrical isomerism	Lecture	BP401T.2	Mid Term-1, Assignment ,Quiz & End Sem Exam
21	Syn Anti systems	Lecture	BP401T.2	Mid Term-1, Quiz & End Sem Exam
22	Methods of determination of configuration of geometrical isomers	Lecture	BP401T.2	Mid Term-1, Quiz & End Sem Exam
23	Conformational isomerism	Lecture	BP401T.2	Mid Term-1, Quiz & End Sem Exam
24	*Tutorial class* Configuration of geometrical isomers	Lecture	BP401T.2	Mid Term-1, Quiz & End Sem Exam
25	Conditions for optical activity.	Lecture	BP401T.2	Mid Term-1, Quiz & End Sem Exam
26	Stereospecific and stereoselective reactions	Lecture	BP401T.2	Mid Term-1, Quiz & End Sem Exam
27	Nomenclature of heterocyclic compounds	Lecture	BP401T.3	Mid Term-1, Quiz & End Sem Exam
28	*Tutorial class* Nomenclature	Lecture	BP401T.3	Mid Term-2, Seminar,Quiz & End Sem

				Exam
29	Classification of heterocyclic compounds	Lecture	BP401T.3	Mid Term-2, Quiz & End Sem Exam
30	Pyrrole	Lecture	BP401T.3 & BP401T.4	Mid Term-2, Quiz & End Sem Exam
31	Furan	Lecture	BP401T.3 & BP401T.4	Mid Term-2, Quiz & End Sem Exam
32	*Tutorial class* Pyrrole	Lecture	BP401T.3	Mid Term-2, Quiz & End Sem Exam
33	Thiophene.	Lecture	BP401T.3 & BP401T.4	Mid Term-2, Quiz & End Sem Exam
34	Relative aromaticity	Lecture	BP401T.3	Mid Term-2, Quiz & End Sem Exam
35	Reactivity	Lecture	BP401T.3	Mid Term-2, Quiz & End Sem Exam
36	*Tutorial class* Relative aromaticity	Lecture	BP401T.3	Mid Term-2, Assignment ,Quiz & End Sem Exam
37	Basicity of pyrrole	Lecture	BP401T.3	Mid Term-2, Quiz & End Sem Exam
38	Pyrazole	Lecture	BP401T.3	Mid Term-2, Quiz & End Sem Exam
39	Imidazole	Lecture	BP401T.3	Mid Term-2, Quiz & End Sem Exam
40	*Tutorial class* Pyrazole	Lecture	BP401T.3	Mid Term-2, Quiz & End Sem Exam
41	Oxazole	Lecture	BP401T.3 & BP401T.4	Mid Term-2, Quiz & End Sem Exam
42	Thiazole	Lecture	BP401T.3 & BP401T.4	Mid Term-2, Quiz & End Sem Exam
43	Pyridine	Lecture	BP401T.3 & BP401T.4	Mid Term-2, Quiz & End Sem Exam
44	*Tutorial class* Thiazole	Lecture	BP401T.3	Mid Term-2, Seminar, Quiz & End

				Sem Exam
45	Quinoline and Isoquinoline	Lecture	BP401T.3 & BP401T.4	Mid Term-2, Quiz & End Sem Exam
46	Acridine and Indole	Lecture	BP401T.3 & BP401T.4	Mid Term-2, Quiz & End Sem Exam
47	Basicity of pyridine	Lecture	BP401T.3 & BP401T.4	Mid Term-2, Quiz & End Sem Exam
48	*Tutorial class* Basicity of pyridine	Lecture	BP401T.3 & BP401T.4	Mid Term-2, Seminar, Quiz & End Sem Exam
49	Synthesis and medicinal uses of Pyrimidine, Purine, azepines	Lecture	BP401T.3 & BP401T.4	Mid Term-2, Quiz & End Sem Exam
50	Metal hydride reduction	Lecture	BP401T.5	Mid Term-2, Quiz & End Sem Exam
51	Clemmensen reduction	Lecture	BP401T.5	Mid Term-2, Quiz & End Sem Exam
52	*Tutorial class* Metal hydride reduction	Lecture	BP401T.5	Mid Term-2, Assignment ,Quiz & End Sem Exam
53	Birch reduction	Lecture	BP401T.5	Mid Term-2, Quiz & End Sem Exam
54	Wolff Kishner reduction	Lecture	BP401T.5	Mid Term-2, Quiz & End Sem Exam
55	Oppenauer-oxidation	Lecture	BP401T.5	Mid Term-2, Quiz & End Sem Exam
56	*Tutorial class* Wolff Kishner reduction	Lecture	BP401T.5	Mid Term-2, Quiz & End Sem Exam
57	Dakin reaction.	Lecture	BP401T.5	Mid Term-2, Quiz & End Sem Exam
58	Beckmanns rearrangement	Lecture	BP401T.5	Mid Term-2, Quiz & End Sem Exam
59	Schmidt rearrangement and Claisen-Schmidt condensation	Lecture	BP401T.5	Mid Term-2, Quiz & End Sem Exam
60	*Tutorial class* Claisen-Schmidt	Lecture	BP401T.5	Mid Term-2, Seminar,Qui

	condensation			z & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP401T.1.	Students will be able to study optical isomerism of compounds that could help the students to understand the chirality, sequence rules, reacemic modification of organic compounds.	3	3	3	2					1		2
BP401T.2.	Students will be able to **acquire** knowledge about geometricsl isomerism of pharmaceutical organic compounds, with emphasis on their synthetic process, physical and chemical properties.	3	3	3	3					2		2
BP401T.3.	Students will be able to **write** synthesis, reactions and medicinal uses different heterocyclic compounds.	3	3	3	3					3		2
BP401T.4.	Students will be able to analyze various reactions for the synthesis of higher organic compounds.	3	3	3	2				2	2		2

BP401T.5.	Students will be able to **apply** reagents and various named reactions for the design of organic medicinal compounds.	3	3	3	3				2	2		3

Sample Question Paper

Amity Institute of pharmacy Department of Pharmaceutical Chemistry II MID-SEMESTER (SEM –IV) 2021-22						
Class: B.Pharmacy IV Semester						
Subject Name: BP401T PHARMACEUTICAL ORGANIC CHEMISTRY-III		Time: 1 Hr		Max. Marks: 30		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.4,5	Q.2,3,6,7,8,9		Q.1		

Student will be

CO.1. Students will be able to **study** optical isomerism of compounds that could help the students to understand the chirality, sequence rules, reacemic modification of organic compounds.

CO.2. Students will be able to **acquire** knowledge about geometricsl isomerism of pharmaceutical organic compounds, with emphasis on their synthetic process, physical and chemical properties.

CO.3. Students will be able to **write** synthesis, reactions and medicinal uses different heterocyclic compounds.

CO.4. Students will be able to **analyze** various reactions for the synthesis of higher organic compounds.

CO.5. Students will be able to **apply** reagents and various named reactions for the design of organic medicinal compounds.

CO Map	Question No.	Question	Marks
CO3	Q.1	Why thiphene is more aromatic than pyrazole	2
CO5	Q.2	Discuss the mechanism of birch reduction	2
	Q.3	Explain the reaction and synthetic applications of Beckmann rearrangement.	2
CO3	Q.4	Draw any three structures of thiophene containing drugs	2
CO5	Q.5	Give a brief account on applications of NaBH4	2

CO4	Q.6	Explain the relative aromaticity of pyrrole, furan and thiphene	10
	Q.7	Discuss the reaction, mechanism and synthetic applications of Schmidt rearrangement	10
CO3	Q 8	Describe aromaticity and chemical reactions of quinoline	5
CO4&CO4	Q.9	Explain the mechanism and synthetic applications of clemmensen reduction	5
CO3&CO4	Q 10	Explain the chemical reactions and medicinal importance of acridine	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

93.3 % Percentage of students secured more than 60% marks, so this course attained Level - 3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2019-2020

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

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[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMMEARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
IVSEM	BP402T	3	-	2	-	1	3	2	1	1	-	2				
	-															
	-															
	-															
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	-															

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICAL CHMISTRY
Course Handout
Course : **MEDICINAL CHEMISTRY – I THEORY**
Course Code : BP402T, Crédits: 04, Session : **2019-2020** (Even Sem.), Class : B.Pharm. 2ndYear
Faculty Name: **Dr. Pawan Kumar Porwal, Dr.Srabanti Jana**

A. Introduction: The course is designed to impart fundamental knowledge on the preparatory pharmacy with arts and science of preparing the different conventional dosage forms.

B. Course Outcomes: At the end of the course, students will be able to:

BP402T.1. Knowledge on Physicochemical properties of drugs in relation to biological action.

BP402T.2. Able to gain knowledge on Autonomic Nervous System like sympathomimetics, and sympahtholytics.

BP402T.3. To gain Knowledge on Cholinergic neurotransmitters like Parasympathomimetic and lytics.

BP402T.4. To gain Knowledge onDrugs acting on Central Nervous System like Benzodiazepines and Barbiturtes.

BP402T.5. To gain Knowledge onDrugs acting on Central Nervous System like General anesthetics, Narcotic and non-narcotic analgesics.

C. Programme Outcomes:

[PO.1].Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2].Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance isrequiredtobemaintainedbyastudentto be qualified for taking up the EndSemester examination. The allowanceof 20%includesalltypesofleaves includingmedicalleaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

UNIT – I

Introduction to Medicinal Chemistry

History and development of medicinal chemistry Physicochemical properties in relation to biological action Ionization, Solubility, Partition Coefficient, Hydrogen bonding, Protein binding, Chelation, Bioisosterism, Optical and Geometrical isomerism. Drug metabolism Drug metabolism principles- Phase I and Phase II. Factors affecting drug metabolism including stereo chemical aspects.

UNIT – II

Drugs acting on Autonomic Nervous System Adrenergic Neurotransmitters: Biosynthesis and catabolism of catecholamine. Adrenergic receptors (Alpha & Beta) and their distribution. Sympathomimetic agents: SAR of Sympathomimetic agents Direct acting: Nor-epinephrine, Epinephrine, Phenylephrine*, Dopamine, Agents with mixed mechanism: Ephedrine, Metaraminol. Indirect acting agents: Hydroxyamphetamine, Pseudoephedrine, Propylhexedrine. Methyldopa, Clonidine, Dobutamine, Isoproterenol, Terbutaline, Salbutamol*, Bitolterol, Naphazoline, Oxymetazoline and Xylometazoline. Adrenergic Antagonists: Alpha adrenergic blockers: Tolazoline*, Phentolamine, Phenoxybenzamine, Prazosin, Dihydroergotamine, Methysergide. Beta adrenergic blockers: SAR of beta blockers, Propranolol*, Metibranolol, Atenolol,Betazolol, Bisoprolol, Esmolol, Metoprolol, Labetolol, Carvedilol.

UNIT – III

Cholinergic neurotransmitters: Biosynthesis and catabolism of acetylcholine. Cholinergic receptors (Muscarinic & Nicotinic) and their distribution. Parasympathomimetic agents: SAR of Parasympathomimetic agents Direct acting agents: Acetylcholine, Carbachol, Bethanechol, Methacholine, Pilocarpine. Indirect acting/ Cholinesterase inhibitors (Reversible & Irreversible): Physostigmine, Neostigmine*, Pyridostigmine, Edrophonium chloride, Tacrine hydrochloride, Ambenonium chloride, Isofluorphate, Echothiophate iodide, Parathione, Malathion. Cholinesterase reactivator: Pralidoxime chloride. Cholinergic Blocking agents: SAR of cholinolytic agents Solanaceous alkaloids and analogues: Atropine sulphate, Hyoscyamine sulphate, Scopolamine hydrobromide, Homatropine hydrobromide, Ipratropium bromide*. Synthetic cholinergic blocking agents: Tropicamide, Cyclopentolate hydrochloride, Clidinium bromide, Dicyclomine hydrochloride*, Glycopyrrolate, Methantheline bromide, Propantheline bromide, Benztropine mesylate, Orphenadrine citrate, Biperidine hydrochloride, Procyclidine hydrochloride*, Tridihexethyl chloride, Isopropamide iodide, Ethopropazine hydrochloride.

UNIT – IV

Drugs acting on Central Nervous System, A. Sedatives and Hypnotics: Benzodiazepines: SAR of Benzodiazepines, Chlordiazepoxide, Diazepam*, Oxazepam, Chlorazepate, Lorazepam, Alprazolam, Zolpidem Barbiturtes: SAR of barbiturates, Barbital*, Phenobarbital, Mephobarbital, Amobarbital, Butabarbital, Pentobarbital, Secobarbital Miscelleneous: Amides & imides: Glutethmide. Alcohol & their carbamate derivatives: Meprobomate, Ethchlorvynol. Aldehyde & their derivatives: Triclofos sodium, Paraldehyde. B. Antipsychotics Phenothiazeines: SAR of Phenothiazeines - Promazine hydrochloride, Chlorpromazine hydrochloride*, Triflupromazine, Thioridazine hydrochloride, Piperacetazine hydrochloride, Prochlorperazine maleate, Trifluoperazine hydrochloride.

UNIV – V

Drugs acting on Central Nervous System

General anesthetics: Inhalation anesthetics: Halothane*, Methoxyflurane, Enflurane, Sevoflurane, Isoflurane, Desflurane. Ultra short acting barbitutrates: Methohexital sodium*, Thiamylal sodium, Thiopental sodium. Dissociative anesthetics: Ketamine hydrochloride.* Narcotic and non-narcotic analgesics Morphine and related drugs: SAR of Morphine analogues, Morphine sulphate, Codeine, Meperidine hydrochloride,

Anilerdine hydrochloride, Diphenoxylate hydrochloride, Loperamide hydrochloride, Fentanyl citrate*, Methadone hydrochloride*, Propoxyphene hydrochloride, Pentazocine, Levorphanol tartarate. Narcotic antagonists: Nalorphine hydrochloride, Levallorphantartarate, Naloxone hydrochloride. Anti-inflammatory agents: Sodium salicylate, Aspirin, Mefenamic acid*, Meclofenamate, Indomethacin, Sulindac, Tolmetin, Zomepriac, Diclofenac, Ketorolac, Ibuprofen*, Naproxen, Piroxicam, Phenacetin, Acetaminophen, Antipyrine, Phenylbutazone.

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. Wilson and Giswold's Organic medicinal and Pharmaceutical Chemistry.
2. Foye's Principles of Medicinal Chemistry.
3. Burger's Medicinal Chemistry, Vol I to IV.
4. Introduction to principles of drug design- Smith and Williams.
5. Remington's Pharmaceutical Sciences.
6. Martindale's extra pharmacopoeia.

Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Introduction to Medicinal Chemistry History and development of medicinal chemistry	Lecture	1	Mid Term-1, Quiz & End Sem Exam
2	Physicochemical properties of drugs	Lecture	1	Mid Term-1, Quiz & End Sem Exam
3	Ionization, Solubility, Partition Coefficient, Hydrogen bonding,	Lecture	2	Mid Term-1, Quiz & End Sem Exam
4	Protein binding, Chelation, Bioisosterism, Optical and Geometrical isomerism	Tutorial	1	Mid Term-1, Quiz & End Sem Exam
5	Drug metabolism Drug metabolism principles-	Lecture	2	Mid Term-1, Quiz & End Sem Exam
6	Phase I and Phase II.	Lecture	2	Mid Term-1, Quiz & End Sem Exam
7	Factors affecting drug metabolism including stereo chemical aspects	Lecture	1	Mid Term-1, Quiz & End Sem Exam
8	Unit test	Tutorial		Mid Term-1, Quiz & End Sem Exam
9	Drugs acting on Autonomic Nervous System Adrenergic Neurotransmitters:**UNIT II**	Lecture	1	Mid Term-1, Quiz & End Sem Exam

10	Biosynthesis and catabolism of catecholamine. Adrenergic receptors (Alpha & Beta) and their distribution.	Lecture	1	Mid Term-1, Quiz & End Sem Exam
11	**Sympathomimetic agents:** SAR of Sympathomimetic agents Direct acting:	Lecture	1	Mid Term-1, Quiz & End Sem Exam
12	Nor-epinephrine, Epinephrine, Phenylephrine*, Dopamine	Lecture	1	Mid Term-1, Quiz & End Sem Exam
13	**Indirect acting agents:**Hydroxyamphetamine, Pseudoephedrine, Propylhexedrine.	Lecture	1	Mid Term-1, Quiz & End Sem Exam
14	Methyldopa, Clonidine, Dobutamine, Isoproterenol, Terbutaline, Salbutamol, Bitolterol, Naphazoline, Oxymetazoline and Xylometazoline.	Lecture	2	Mid Term-1, Quiz & End Sem Exam
15	**Alpha adrenergic blockers:** Tolazoline*, Phentolamine, Phenoxybenzamine, Prazosin, Dihydroergotamine, Methysergide. Beta adrenergic blockers: SAR of beta blockers, Propranolol*, Metibranolol, Atenolol, Betazolol, Bisoprolol, Esmolol, Metoprolol, Labetolol, Carvedilol	Lecture	3	Mid Term-1, Quiz & End Sem Exam
16	Unit test	Tutorial		Mid Term-1, Quiz & End Sem Exam
17	**Cholinergic neurotransmitters:UNIT III** iosynthesis and catabolism of acetylcholine. Cholinergic receptors (Muscarinic & Nicotinic) and their	Lecture	1	Mid Term-1, Quiz & End Sem Exam
18	**Parasympathomimetic agents:** SAR of Parasympathomimetic agents Direct acting agents: Acetylcholine, Carbachol*, Bethanechol, Methacholine, Pilocarpine	Lecture	1	Mid Term-1, Quiz & End Sem Exam
19	**Indirect acting/ Cholinesterase inhibitors (Reversible & Irreversible):** Physostigmine, Neostigmine*, Pyridostigmine, Edrophonium chloride, Tacrine hydrochloride	Lecture	1	Mid Term-1, Quiz & End Sem Exam
20	**Cholinesterase reactivator:** Pralidoxime chloride. Cholinergic Blocking agents: SAR of cholinolytic	Tutorial	2	Mid Term-2, Quiz & End Sem Exam

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	agents Solanaceous alkaloids and analogues: Atropine sulphate, Hyoscyamine sulphate, Scopolamine hydrobromide, Homatropine hydrobromide, Ipratropium bromide*.			
21	Synthetic cholinergic blocking agents: Tropicamide, Cyclopentolate hydrochloride, Clidinium bromide, Dicyclomine hydrochloride*	Lecture	2	Mid Term-2, Quiz & End Sem Exam
22	Glycopyrrolate, Methantheline bromide, Propantheline bromide, Benztropine mesylate, Orphenadrine citrate	Lecture	1	Mid Term-2, Quiz & End Sem Exam
23	Biperidine hydrochloride, Procyclidine hydrochloride*, Tridihexethyl chloride, Isopropamide iodide, Ethopropazine hydrochloride.	Lecture	2	Mid Term-2, Quiz & End Sem Exam
24	Quiz	Tutorial		Mid Term-2, Quiz & End Sem Exam
25	Drugs acting on Central (**UNIT-4**) Nervous System A. Sedatives and Hypnotics: Benzodiazepines: SAR of Benzodiazepines, Chlordiazepoxide, Diazepam*, Oxazepam, Chlorazepate, Lorazepam, Alprazolam, Zolpidem	Lecture	1	Mid Term-2, Quiz & End Sem Exam
26	Barbiturtes: SAR of barbiturates, Barbital*, Phenobarbital, Mephobarbital, Amobarbital, Butabarbital, Pentobarbital, Secobarbital	Lecture	1	Mid Term-2, Quiz & End Sem Exam
27	Miscelleneous: Amides & imides: Glutethmide. Alcohol & their carbamate derivatives: Meprobomate, Ethchlorvynol. Aldehyde & their derivatives: Triclofos sodium, Paraldehyde.	Lecture	1	Mid Term-2, Quiz & End Sem Exam
28	B. Antipsychotics Phenothiazeines: SAR of Phenothiazeines - Promazine hydrochloride, Chlorpromazine hydrochloride*, Triflupromazine, Thioridazine hydrochloride, Piperacetazine hydrochloride,	Lecture	2	Mid Term-2, Quiz & End Sem Exam

Dr. Mohanty

	Prochlorperazine maleate, Trifluoperazine hydrochloride.			
29	C. Anticonvulsants: SAR of Anticonvulsants, mechanism of anticonvulsant action Barbiturates: Phenobarbitone, Methabarbital. Hydantoins: Phenytoin*, Mephenytoin, Ethotoin Oxazolidine diones: Trimethadione, Paramethadione	Lecture	1	Mid Term-2, Quiz & End Sem Exam
30	Succinimides:Phensuximide, Methsuximide, Ethosuximide* Urea and monoacylureas:	Lecture	2	Mid Term-2, Quiz & End Sem Exam
31	Phenacemide, Carbamazepine* Benzodiazepines:Clonazepam Miscellaneous:Primidone, Valproic acid , Gabapentin, Felbamate	Lecture	1	Mid Term-2, Quiz & End Sem Exam
32	**Drugs acting on Central Nervous System: UNIT V** General anesthetics:Inhalation anesthetics: Halothane*, Methoxyflurane, Enflurane, Sevoflurane, Isoflurane, Desflurane.	Lecture	1	Mid Term-2, Quiz & End Sem Exam
33	Ultra short acting barbitutrates:Methohexital sodium*, Thiamylal sodium, Thiopental sodium. Dissociative anesthetics: Ketamine hydrochloride.*	Lecture	1	Mid Term-2, Quiz & End Sem Exam
34	Narcotic and non-narcotic analgesics Morphine and related drugs: SAR of Morphine analogues, Morphine sulphate, Codeine, Meperidine hydrochloride,	Lecture	1	Mid Term-2, Quiz & End Sem Exam
35	Anilerdine hydrochloride, Diphenoxylate hydrochloride, Loperamide hydrochloride, Fentanyl citrate*, Methadone hydrochloride*, Propoxyphene hydrochloride, Pentazocine, Levorphanol tartarate.	Lecture	2	Mid Term-2, Quiz & End Sem Exam
36	Seminar	Tutorial		Mid Term-2, Quiz & End Sem Exam
37	Narcotic antagonists: Nalorphine hydrochloride, Levallorphantartarate,	Lecture	1	Mid Term-2, Quiz & End Sem Exam

	Naloxone hydrochloride.			
38	Anti-inflammatory agents: Sodium salicylate, Aspirin, Mefenamic acid*, Meclofenamate,	Lecture	1	Mid Term-2, Quiz & End Sem Exam
39	Indomethacin, Sulindac, Tolmetin, Zomepriac, Diclofenac, Ketorolac, Ibuprofen*, Naproxen,	Lecture	1	Mid Term-2, Quiz & End Sem Exam
40	Unit test	Tutorial		Mid Term-2, Quiz & End Sem Exam
41	Piroxicam, Phenacetin, Acetaminophen, Antipyrine, Phenylbutazone	Lecture	1	Mid Term-2, Quiz & End Sem Exam
42	Quiz	Tutorial		Quiz & End Sem Exam
43	Unit test	Tutorial		Quiz & End Sem Exam

TOTAL CLASSES REQUIRED: 48
TOTAL CLASSES GIVEN: 45

H. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP*402*T.1	**BP402T.1**. Relate history and study of physicchemical properties in relation to biological action	1	2	-	-	2	3	1	-	1	-	-				
BP*402*T.2.	**BP402T.2**. Classify the different types of Drugs acting on Autonomic Nervous System MOAS, SAR studies	2	-	-	3	-	2	-	-	-	-	3				

BP402T.3.	**BP402T.3**. Classify the different types of Drugs acting on Cholinergic neurotransmitters, MOAS, SAR studies	2	3	-	2	-	3	-	-	-	-	3				
BP402T.4.	**BP402T.4**. Drugs acting on Central Nervous System, Benzodiazepines, Barbiturates, Antipsychotics, SAR, MOAs.	2	3	3	3	-	2	-	-	-	-	3				
BP402T.5.	**BP402T.5**.Drugs acting on Central Nervous System General anesthetics, Narcotic and non-narcotic analgesics, SAR, MOAs.	2	-	2	-	3	-	-	-	-	-	3				

SampleQuestionPaper

Amity Institute of Pharmacy **Department of Pharmaceutical Chemistry** **IMID-SEMESTER(SEM–IV)2019-20**						
Class:B.Pharm, IV Semester						
Subject Name: BP402T-MEDICINAL CHEMISTRY-I Theory		Time:1Hrs		Max.Marks:30		
Levels of thequestions as perBloomsTaxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
QuestionMapping	Q.1,3,4,5	Q.6,8,9	Q.2	Q.7, 10		

The student willbeableto

CO1. Relate history and development of molecules based on study of different physicochemical properties of drugs.

CO2. Classify the different types of Drugs acting on Autonomic Nervous System MOAS, SAR studies.

CO3. Classify the different types of Drugs acting on Cholinergic neurotransmitters, MOAS, SAR studies.

CO4. Able to study of Drugs acting on Central Nervous System, Benzodiazepines, Barbiturates,

Antipsychotics, SAR, MOAs.

CO5. Drugs acting on Central Nervous System General anesthetics, Narcotic and non-narcotic analgesics, SAR, MOAs.

COMap	QuestionNo.	Question	Marks
CO4	Q.1	Enlist the different different physicochemical properties of drugs and its activity.	2
CO5	Q.2	Classify the Drugs acting on Autonomic Nervous SystemMOAS, SAR studies.	2
CO1	Q.3	What is the mode of action of narcotic analgesics?	2
CO2	Q.4	Classify structurally the bzps and discuss the SAR.	2
CO2	Q.5	Classify structurally the General anesthetics.	2
CO1	Q.6	Classify structurally the Antipsychotics and discuss its QSAR.	10
CO4	Q.7	Write the synthesis of Dicyclomine hydrochloride.	10
CO3	Q.8	Discuss the SAR of Narcotic analgesiscs and give its MOAS.	5
CO2	Q.9	Illustrate the classification of Benzodiazepines and SAR.	5
CO4	Q.10	Classify the Anti-inflammatory agents and write synthesis of ibuprofen.	5

Attainments		**Rubric**
Level	1	IF60%ofstudentssecuremorethan60%marksthenlevel1
Level	2	IF70%ofstudentssecuremorethan60%marksthenlevel2
Level	3	IF80%ofstudentssecuremorethan60%marksthenlevel3

Attainment Level 3:

91.1 % Percentage of students secured more than 60% marks, so this course attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
AMITY INSTITUTE OF PHARMACY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2019-20

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge asscoited with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions

[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
VI SEM	BP403T	3	3	3	3	1	2	2	1	3	1	1	-	-	-

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACY
Course Handout
Course : Physcial Pharmacy (Theory)
Course Code : BP403T, Crédits : 04, Session : 2019-20 (Even Sem.), Class : B. Pharm. 6th Year
Faculty Name : Dr. Neeraj Mishra

A. **Introduction:** This course is designed to impart fundamental knowledge on pharmaceutical product development and translation from laboratory to market. Upon completion of the course, the student shall be able to:

1. Know the process of pilot plant and scale up of pharmaceutical dosage forms
2. Understand the process of technology transfer from lab scale to commercial batch
3. Know different Laws and Acts that regulate pharmaceutical industry
4. Understand the approval process and regulatory requirements for drug products

B. **Course Outcomes:** At the end of the course, students will be able to:

BP605T.1. Understand various physicochemical properties of drug molecules in the designing the dosage forms

BP605T.2. Know the principles of chemical kinetics & to use them for stability testing

BP605T.3. Discuss the use of chemical kinetics in determination of expiry date of formulations

BP605T.4. Demonstrate use of physicochemical properties in the formulation development

BP605T.5. Understand the evaluation parameters of dosage form

C. **Programme Outcomes:**

[PO.1].**Pharmacy Knowledge:** Posses knowledge and compression of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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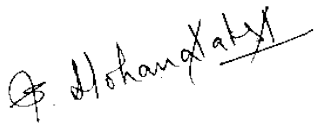
[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.



[PO.11]. **Life-long learning:** Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	10%
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves Including medical leaves.	A	5%
End Semester Examination	End Semester Examination	EE	70%
Total			**100%**

E. Syllabus

Module I

a) Brief introduction to Biotechnology with reference to Pharmaceutical Sciences. b) Enzyme Biotechnology- Methods of enzyme immobilization and applications. c) Biosensors- Working and applications of biosensors in Pharmaceutical Industries. d) Brief introduction to Protein Engineering. e) Use of microbes in industry. Production of Enzymes- General consideration - Amylase, Catalase, Peroxidase, Lipase, Protease, Penicillinase. f) Basic principles of genetic engineering.

Module II

a) Study of cloning vectors, restriction endonucleases and DNA ligase. b) Recombinant DNA technology. Application of genetic engineering in medicine. c) Application of r DNA technology and genetic engineering in the production of: i) Interferon ii) Vaccines-hepatitis- B iii) Hormones-Insulin. d) Brief introduction to PCR

Module III

Types of immunity- humoral immunity, cellular immunity a) Structure of Immunoglobulins b) Structure and Function of MHC c) Hypersensitivity reactions, Immune stimulation and Immune suppressions. d) General method of the preparation of bacterial vaccines, toxoids, viral vaccine, antitoxins, serum-immune blood derivatives and other products relative to immunity. e) Storage conditions and stability of official vaccines f) Hybridoma technology- Production, Purification and Applications g) Blood products and Plasma Substituties.

Module IV

a) Immuno blotting techniques- ELISA, Western blotting, Southern blotting. b) Genetic organization of Eukaryotes and Prokaryotes c) Microbial genetics including transformation, transduction, conjugation, plasmids and transposons. d) Introduction to Microbial biotransformation and applications. e) Mutation: Types of mutation/mutants

Module V

a) Fermentation methods and general requirements, study of media, equipment's, sterilization methods, aeration process, stirring.

b) Large scale production fermenter design and its various controls.

c) Study of the production of - penicillin's, citric acid, Vitamin B12, Glutamic acid, Griseofulvin,

d) Blood Products: Collection, Processing and Storage of whole human blood, dried human plasma, plasma Substitutes.

Examination Scheme:

Components	**A**	**CT**	**S/V/Q/HA**	**EE**
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; A: Attendance

F. Suggested Text/Reference Books:

1. B.R. Glick and J.J. Pasternak: Molecular Biotechnology: Principles and Applications of RecombinantDNA: ASM Press Washington D.C.

2. RA Goldshy et. al., : Kuby Immunology.

3. J.W. Goding: Monoclonal Antibodies.

4. J.M. Walker and E.B. Gingold: Molecular Biology and Biotechnology by Royal7 Society of Chemistry.

5. Zaborsky: Immobilized Enzymes, CRC Press, Degraland, Ohio.

6. S.B. Primrose: Molecular Biotechnology (Second Edition) Blackwell Scientific Publication.

7. Stanbury F., P., Whitakar A., and Hall J., S., Principles of fermentation technology, 2nd edition, Aditya books Ltd., New Delhi

G. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Classification of dispersed systems	Lecture	BP403T.1	Mid Term-1, Quiz & End Sem Exam
2	General characteristics, size & shapes of colloidal particles	Lecture	BP403T.1	Mid Term-1, Quiz & End Sem Exam
3	Classification of colloids & comparative account of their general properties	Lecture	BP403T.1	Mid Term-1, Quiz & End Sem Exam
4	Optical and kinetic properties of colloids	Lecture	BP403T.1	Mid Term-1, Quiz & End Sem Exam
5	Electrical, kinetic properties of colloids	Lecture	BP403T.1	Mid Term-1, Quiz & End Sem Exam
6	Effect of electrolytes, coacervation,	Lecture	BP403T.1	Mid Term-1, Quiz & End Sem Exam
7	Peptization of colloids	Lecture	BP403T.1	Mid Term-1, Quiz & End Sem Exam
8	Protective action	Lecture	BP403T.1	Mid Term-1,

	of colloids			Quiz & End Sem Exam
9	Newtonian systems and law of flow	Lecture	BP403T.2	Mid Term-1, Quiz & End Sem Exam
10	kinematic viscosity, effect of temperature,	Lecture	BP403T.2	Mid Term-1, Quiz & End Sem Exam
11	non-Newtonian systems, Dilatant	Lecture	BP403T.2	Mid Term-1, Quiz & End Sem Exam
12	Plastic and Pseudoplastic	Lecture	BP403T.2	
13	Thixotropy and its importance in pharmacy	Lecture	BP403T.2	Mid Term-1, Quiz & End Sem Exam
14	Thixotropy determination in pharmacy	Lecture	BP403T.2	Mid Term-1, Quiz & End Sem Exam
15	Determination of viscosity by capillary viscometer	Lecture	BP403T.2	Mid Term-1, Quiz & End Sem Exam
16	Determination of viscosity by falling Sphere, rotational viscometers	Lecture	BP403T.2	Mid Term-1, Quiz & End Sem Exam
17	Plastic and elastic deformation	Lecture	BP403T.2	Mid Term-1, Quiz & End Sem Exam
18	Heckel equation	Lecture	BP403T.2	Mid Term-1, Quiz & End Sem Exam
19	Stress, Strain and Elastic Modulus	Lecture	BP403T.2	Mid Term-1, Quiz & End Sem Exam
20	Suspension	Lecture	BP403T.3	Mid Term-2, Quiz & End Sem Exam
21	Interfacial properties of suspended particles	Lecture	BP403T.3	Mid Term-2, Quiz & End Sem Exam
22	Settling in	Lecture	BP403T.3	Mid Term-2,

	suspensions			Quiz & End Sem Exam
23	Flocculated and deflocculated suspensions.	Lecture	BP403T.3	Mid Term-2, Quiz & End Sem Exam
24	Formulation of suspensions	Lecture	BP403T.3	Mid Term-2, Quiz & End Sem Exam
25	Emulsions	Lecture	BP403T.3	Mid Term-2, Quiz & End Sem Exam
26	Theories of emulsification	Lecture	BP403T.3	Mid Term-2, Quiz & End Sem Exam
27	Microemulsion and multiple emulsions,	Lecture	BP403T.3	Mid Term-2, Quiz & End Sem Exam
28	Stability of emulsions	Lecture	BP403T.3	Mid Term-2, Quiz & End Sem Exam
29	Preservation of emulsions	Lecture	BP403T.3	Mid Term-2, Quiz & End Sem Exam
30	Rheological properties of emulsions	Lecture	BP403T.3	Mid Term-2, Quiz & End Sem Exam
31	emulsion formulation by HLB method.	Lecture	BP403T.3	Mid Term-2, Quiz & End Sem Exam
32	Particle size and distribution, mean particle size	Lecture	BP403T.3	Mid Term-2, Quiz & End Sem Exam
33	Number and weight distribution, particle number	Lecture	BP403T.4	Mid Term-2, Quiz & End Sem Exam
35	Methods for determining particle size by different methods, counting and separation method, particle shape, specific	Lecture	BP403T.4	Mid Term-2, Quiz & End Sem Exam

	surface			
36	Methods for determining surface area	Lecture	BP403T.4	Mid Term-2, Quiz & End Sem Exam
37	Methods for determining permeability and absorption	Lecture	BP403T.4	Mid Term-2, Quiz & End Sem Exam
38	Porosity, packing arrangement	Lecture	BP403T.4	Mid Term-2, Quiz & End Sem Exam
39	Densities, bulkiness, and Flow properties	Lecture	BP403T.4	Mid Term-2, Quiz & End Sem Exam
40	Drug Stability and Reaction kinetics: zero, pseudo-zero	Lecture	BP403T.5	Mid Term-2, Quiz & End Sem Exam
41	First & second order, units of basic rate constants	Lecture	BP403T.5	Mid Term-2, Quiz & End Sem Exam
42	Determination of reaction order	Lecture	BP403T.5	Mid Term-2, Quiz & End Sem Exam
43	Physical and chemical factors influencing the chemical degradation of pharmaceutical product: temperature, solvent, ionic strength, dielectric constant	Lecture	BP403T.5	Mid Term-2, Quiz & End Sem Exam
44	specific & general acid base catalysis, Simple numerical problems.	Lecture	BP403T.5	Mid Term-2, Quiz & End Sem Exam
45	Stabilization of medicinal agents against common reactions like	Lecture	BP403T.5	Mid Term-2, Quiz & End Sem Exam

	hydrolysis & oxidation			
46	Accelerated stability testing in expiration dating of pharmaceutical dosage forms. Photolytic degradation and its prevention	Lecture	BP403T.5	Mid Term-2, Quiz & End Sem Exam

H. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP403T.1	*Understand various physicochemical properties of drug molecules in the designing the dosage forms*	3	3	3	1	-	1	2	1	-	-	1
BP403T.2	Know the principles of chemical kinetics & to use them for stability testing	2	2	2	3	-	1	1	1	-	-	1
BP403T.3	*Discuss the use of chemical kinetics in determination of expiry date of formulations*	2	1	1	-	-	1	3	2	-	-	-
BP403T.4	*Demonstrate use of physicochemical properties in the formulation development*	2	2	2	1	-	1	-	-	-	-	-
BP403T.5	Understand the evaluation parameters of dosage form	2	1	-	-	-	2	1	1	-	-	1

Amity Institute of Pharmacy
Department of Pharmaceutics
I MID-SEMESTER (SEM –VIII) 2022-23

Class: B.Pharm, IV Semester

Subject Name: BP704T.Novel Drug Delivery System (Theory)	Time: 1 Hr	Max. Marks: 30

Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3,4	Q. 5, 6,8,9	Q.2	Q.7, 10		

The student will be able to

CO1. ***Understand various physicochemical properties of drug molecules in the designing the dosage forms***

CO2. Know the principles of chemical kinetics & to use them for stability testing

CO3. ***Discuss the use of chemical kinetics in determination of expiry date of formulations***

CO.4. ***Demonstrate use of physicochemical properties in the formulation development***

CO.5. Understand the evaluation parameters of dosage form

CO Map	Question No.	Question	Marks
CO3	Q.1	How the zeta potential system effects the stability of dispersed system?	2
CO5	Q.2	Explain the ICH guidelines of stability testing.	2
CO4	Q.3	Define methods of determining surface area of powder.	2
CO5	Q.4	What is first order rate of reaction and give formula of the same.	2
CO2	Q.5	Define dilatant flow and give examples.	2
CO1 & 2	Q.6	Define optical properties of colloids and explain shear thickening systems with suitable example.	10
CO5	Q.7	Discuss the importance of stability testing and zero, pseudo-zero, first & second order of reaction.	10
CO2	Q.8	Define the term Stress, Strain, Elastic Modulus.	5
CO3	Q.9	Define the methods of preparation of flocculated suspensions.	5

CO1	Q.10	Discuss the importance of thixotropy in pharmacy.	5

Attainment Level 3:

91.1 % Percentage of students secured more than 60% marks, so this course Level -1.

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MADHYA PRADESH
Established vide Government of Madhya Pradesh Act No. 27 of 2010

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOLOGY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2019-20

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Programme Specific Outcomes:

PSO 1: This subject is designed to understand what drugs do to the living organisms and how their effects can be applied to therapeutics.

PSO 2: The subject covers the information about the drugs like, mechanism of action, physiological and biochemical effects (pharmacodynamics)

PSO 3: This subject also cover the information about absorption, distribution, metabolism and excretion (pharmacokinetics) along with the adverse effects, clinical uses, interactions, doses, contraindications and routes of administration of different classes of drugs.

PSO 4: The subject provides the basic knowledge required to understand the various disciplines of pharmacy

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
IV SEM	BP404T	-	3	2	1	-	1	3	2	1	3	2	2			
	-															
	-															
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	-															
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	-															

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DEPARTMENT OF PHARMACOLOGY
Course Handout
Course : PHARMACOLOGY – I THEORY
Course Code : BP404T, Crédits : 04, Session :2019-20 (Even Sem.), Class : B.Pharm. 2nd Year
Faculty Name: Dr. Shvetank Bhatt

A. Introduction: This course is designed to impart fundamental knowledge on the structure and functions of the various systems of the human body. It also helps in understanding both homeostatic mechanisms. The subject provides the basic knowledge required to understand the various disciplines of pharmacy.

B. Course Outcomes: At the end of the course, students will be able to:

BP404T.CO1. a. Introduction to Pharmacology.
BP404T.CO2. Pharmacodynamics- Principles and mechanisms of drug action.
BP404T.CO3. Pharmacology of drugs acting on peripheral nervous system
BP404T.CO4. *Pharmacology of drugs acting on central nervous system*
BP404T.CO5. Pharmacology of drugs acting on central nervous system

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

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[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Programme Specific Outcomes:

PSO 1: Will be able to understand anatomy and physiology of human body system and how the human body maintain internal environment so that different organs perform work properly.

PSO 2: Will be able to give the information about how the cell communicate and maintain their functions and various disorders of different human organs so that we can give the appropriate therapy.

PSO 3: Will be able to understand organization at the different level of human body.

Assessment Plan:

Component of Evaluation	Description	Code	Weightage

			%
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

Unit I

Introduction to Pharmacology- Definition, historical landmarks and scope of pharmacology, nature and source of drugs, essential drugs concept and routes of drug administration, Agonists, antagonists(competitive and non competitive), spare receptors, addiction, tolerance, dependence, tachyphylaxis, idiosyncrasy, allergy. b. Pharmacokinetics- Membrane transport, absorption, distribution, metabolism and excretion of drugs .Enzyme induction, enzyme inhibition, kinetics of elimination.

Unit II

Pharmacodynamics- Principles and mechanisms of drug action. Receptor theories and classification of receptors, regulation of receptors. drug receptors interactions signal transduction mechanisms, G-protein–coupled receptors, ion channel receptor, transmembrane enzyme linked receptors, transmembrane JAK-STAT binding receptor and receptors that regulate transcription factors, dose response relationship, therapeutic index, combined effects of drugs and factors modifying drug action. b. Adverse drug reactions. c. Drug interactions (pharmacokinetic and pharmacodynamic) d. Drug discovery and clinical evaluation of new drugs -Drug discovery phase, preclinical evaluation phase, clinical trial phase, phases of clinical trials and pharmacovigilance.

Unit III

Pharmacology of drugs acting on peripheral nervous system a. Organization and function of ANS. b.Neurohumoral transmission,co-transmission and classification of neurotransmitters. c. Parasympathomimetics, Parasympatholytics, Sympathomimetics, sympatholytics. d. Neuromuscular blocking agents and skeletal muscle relaxants (peripheral). e. Local anesthetic agents. f. Drugs used in myasthenia gravis and glaucoma

Unit IV

Pharmacology of drugs acting on central nervous system a. Neurohumoral transmission in the C.N.S.special emphasis on importance of various neurotransmitters like with GABA, Glutamate, Glycine, serotonin, dopamine. b. General anesthetics and pre-anesthetics. c. Sedatives, hypnotics and centrally acting muscle relaxants. d. Anti-epileptics e. Alcohols and disulfiram

Unit V

Pharmacology of drugs acting on central nervous system a. Psychopharmacological agents: Antipsychotics, antidepressants, anti-anxiety agents, anti-manics and hallucinogens. b. Drugs used in Parkinsons disease and Alzheimer's disease. c. CNS stimulants and nootropics. d. Opioid analgesics and antagonists e. Drug addiction, drug abuse, tolerance and dependence.

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1.Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology,.Churchil Livingstone Elsevier

2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill

3. Goodman and Gilman's, The Pharmacological Basis of Therapeutics

4. Marry Anne K. K., Lloyd Yee Y., Brian K. A., Robbin L.C., Joseph G. B., Wayne A. K., Bradley R.W., Applied Therapeutics, The Clinical use of Drugs, The Point Lippincott Williams & Wilkins

5. Mycek M.J, Gelnet S.B and Perper M.M. Lippincott's Illustrated Reviews- Pharmacology

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Introduction to Pharmacology- Definition, historical landmarks and scope of pharmacology,	Lecture	Unit-1 CO1	Mid Term-1, Quiz & End Sem Exam
2	Nature and source of drugs, essential drugs concept and routes of drug administration,	Lecture	CO1	Mid Term-1, Quiz & End Sem Exam
3	Agonists, antagonists(competitive and non competitive),	Lecture	CO1	Mid Term-1, Quiz & End Sem Exam
4	spare receptors, addiction, tolerance, dependence, tachyphylaxis, idiosyncrasy, allergy.	Tutorial	CO1	Mid Term-1, Quiz & End Sem Exam
5	Pharmacokinetics- Membrane transport, absorption, distribution, metabolism and excretion of drugs .	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
6	Pharmacokinetics- Membrane transport, absorption, distribution, metabolism and excretion of drugs	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
7	Enzyme induction, enzyme inhibition, kinetics of elimination	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
8	Quiz	Tutorial		Mid Term-1, Quiz & End Sem Exam
9	Pharmacodynamics- Principles and mechanisms of drug action.	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
10	Receptor theories and classification of receptors, regulation of receptors. drug receptors interactions signal transduction mechanisms	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
11	Receptor theories and classification of receptors, regulation of receptors.	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
12	Revision	Tutorial		Mid Term-1, Quiz & End Sem Exam
13	transmembrane enzyme linked receptors, transmembrane JAK-STAT	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam

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	binding receptor and receptors that regulate transcription factors, dose response relationship			
14	therapeutic index, combined effects of drugs and factors modifying drug action.	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
15	therapeutic index, combined effects of drugs and factors modifying drug action.	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
16	Unit test	Tutorial		Mid Term-1, Quiz & End Sem Exam
17	Adverse drug reactions. c. Drug interactions (pharmacokinetic and pharmacodynamic)	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
18	Adverse drug reactions. c. Drug interactions (pharmacokinetic and pharmacodynamic)	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
19	Drug discovery and clinical evaluation of new drugs -Drug discovery phase,	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
20	preclinical evaluation phase, clinical trial phase, phases of clinical trials and pharmacovigilance.	Tutorial	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
21	Organization and function of ANS. b.Neurohumoral transmission,co-transmission and classification of neurotransmitters.	Lecture	Unit-2 CO3	Mid Term-1, Quiz & End Sem Exam
22	Organization and function of ANS. b.Neurohumoral transmission,co-transmission and classification of neurotransmitters.	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
23	. Parasympathomimetics,	Lecture	CO1	Mid Term-1, Quiz

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	Parasympatholytics, Sympathomimetics, sympatholytics. d. Neuromuscular blocking agents and skeletal muscle relaxants (peripheral).		CO3	& End Sem Exam
24	Quiz	Tutorial		Mid Term-1, Quiz & End Sem Exam
25	. Parasympathomimetics, Parasympatholytics, Sympathomimetics, sympatholytics. d.	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
26	Neuromuscular blocking agents and skeletal muscle relaxants (peripheral).	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
27	Neuromuscular blocking agents and skeletal muscle relaxants (peripheral).	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
28	Local anesthetic agents. f. Drugs used in myasthenia gravis and glaucoma	Tutorial		Mid Term-1, Quiz & End Sem Exam
29	Local anesthetic agents. f. Drugs used in myasthenia gravis and glaucoma	Lecture	CO1	Mid Term-1, Quiz & End Sem Exam
30	Local anesthetic agents. f. Drugs used in myasthenia gravis and glaucoma	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
31	Local anesthetic agents. f. Drugs used in myasthenia gravis and glaucoma	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
32	Neurohumoral transmission in the C.N.S.special emphasis on importance of various neurotransmitters like with GABA, Glutamate, Glycine, serotonin, dopamine	Tutorial	Unit-3 CO4	Mid Term-2, Quiz & End Sem Exam
33	Neurohumoral transmission in the C.N.S.special emphasis on importance of various neurotransmitters like with GABA, Glutamate, Glycine, serotonin, dopamine	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
34	Neurohumoral transmission in the	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam

	C.N.S.special emphasis on importance of various neurotransmitters like with GABA, Glutamate, Glycine, serotonin, dopamine			
35	General anesthetics and pre-anesthetics. c. Sedatives, hypnotics and centrally acting muscle relaxants.	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
36	Seminar	Tutorial		Mid Term-2, Quiz & End Sem Exam
37	General anesthetics and pre-anesthetics. c. Sedatives, hypnotics and centrally acting muscle relaxants.	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
38	General anesthetics and pre-anesthetics. c. Sedatives, hypnotics and centrally acting muscle relaxants.	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
39	Anti-epileptics e. Alcohols and disulfiram	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
40	Unit test	Tutorial		Mid Term-2, Quiz & End Sem Exam
41	Anti-epileptics e. Alcohols and disulfiram	Lecture	Unit-4	Mid Term-2, Quiz & End Sem Exam
42	Psychopharmacological agents: Antipsychotics, antidepressants,	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
43	Psychopharmacological agents: Antipsychotics, antidepressants,	Lecture	CO1	Mid Term-2, Quiz & End Sem Exam
44	Seminar	Tutorial		Mid Term-2, Quiz & End Sem Exam
45	anti-anxiety agents, anti-manics and hallucinogens.	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
46	anti-anxiety agents, anti-manics and hallucinogens.	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
47	anti-anxiety agents, anti-manics and hallucinogens.	Lecture	CO1	Quiz & End Sem Exam
48	anti-anxiety agents, anti-manics and hallucinogens.	Tutorial		Quiz & End Sem Exam

49	Drugs used in Parkinsons disease and Alzheimer's disease.	Lecture	Unit-5	Quiz & End Sem Exam
50	Drugs used in Parkinsons disease and Alzheimer's disease.	Lecture	CO1 CO5	Quiz & End Sem Exam
51	*Drugs used in Parkinsons disease and Alzheimer's disease.*	Lecture	CO1 CO5	Quiz & End Sem Exam
52	*Drugs used in Parkinsons disease and Alzheimer's disease.*	Tutorial	CO1 CO5	Quiz & End Sem Exam
53	*CNS stimulants and nootropics.*	Lecture	CO1 CO5	Quiz & End Sem Exam
54	CNS stimulants and nootropics.	Lecture	CO1 CO5	Quiz & End Sem Exam
55	Opioid analgesics and antagonists	Lecture	CO1 CO5	Quiz & End Sem Exam
56	Unit test	Tutorial		Quiz & End Sem Exam
57	Opioid analgesics and antagonists	Lecture	CO1 CO5	Quiz & End Sem Exam
58	Drug addiction, drug abuse, tolerance and dependence	Lecture	CO1 CO5	Quiz & End Sem Exam
59	Drug addiction, drug abuse, tolerance and dependence	Lecture	CO1 CO5	Quiz & End Sem Exam
60	Unit test	Tutorial		Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3

BP404T.1	Understand the pharmacological actions of different categories of drugs	3	-	-	-	2	2	1	-	-	-	-		3	2	1
BP404T.2.	Explain the mechanism of drug action at organ system/sub cellular/ macromolecular levels.	3	-	-	1	-	2	-	-	-	-	3		2	3	1
BP404T.3.	Apply the basic pharmacological knowledge in the prevention and treatment of various diseases.	3	2	-	3	-	2	-	-	-	-	3		1	2	3
BP404T.4.	Observe the effect of drugs on animals by simulated experiments	2	2	3	3	-	1	-	-	-	-	3		2	3	2
BP404T.5.	Appreciate correlation of pharmacology with other bio medical science	3	-	2	-	2	-	-	-	-	-	3		2	3	3

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacology I MID-SEMESTER (SEM –IVth) 2019-20						
Class: B.Pharm, IV Semester						
Subject Name: BP404T Pharmacology-I Theory		Time: 1 Hrs			Max. Marks: 30	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,2,4,10	Q.8,9,6	Q.5,3	Q.7		

Student will be able to

CO1.

Understand the pharmacological actions of different categories of drugs. Explain the mechanism of drug action at organ system/sub cellular/ macromolecular levels

CO2.

Apply the basic pharmacological knowledge in the prevention and treatment of various diseases.

CO3.

Observe the effect of drugs on animals by simulated experiments 5. Appreciate correlation of pharmacology with other bio medical sciences

CO Map	Question No.	Question	Marks
CO1	Q.1	What is agonist and antagonist.	2
CO1	Q.2	Define tachyphylaxis and idiosyncrasy.	2
CO1	Q.3	Make use of clinical pharmacology.	2
CO2	Q.4	Define therapeutic index.	2
CO2	Q.5	What is drug tolerance.	2
CO3	Q.6	Explain Neurohumoral transmission.	10
CO2	Q.7	Write combined effects of drugs and factors modifying drug action.	10
CO2	Q.8	Give Drug discovery and clinical evaluation of new drugs	5
CO3	Q.9	Give the Neuromuscular blocking agents and skeletal muscle relaxants	5

CO1 CO2	Q.10	What is Adverse drug reactions.	5

Attainment Level 3:

86.7 % Percentage of students secured more than 60% marks, so this course Pharmaceutics I- Theory (BP101T) attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUE OF PHARMACY
DEPARTMENT OF PHARMACOGNOSY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharmacy), Academic Year – 2019-20

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11				
IV SEM	BP405 T	3	2	2	1	-	-	2	-	2	2	1		-	-	-

Mohanty

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACOGNOSY
Course Handout
Course : PHARMACOGNOSY & PHYTOCHEMISTRY I (Theory)
Course Code : BP 405T, Crédits : 04, Session : 2019-20(Even Sem.), Class : B.Pharm. II Year
Faculty Name : Dr. Ajay Mishra, Dr. Jovita Kanoujia, Mrs. Monika Kaushik

A. Introduction: This course deals with the fundamentals of analytical chemistry and principles of electrochemical analysis of drugs. It aims to understand the principles of volumetric and electro chemical analysis and carryout various volumetric and electrochemical titrations.

B. Course Outcomes: At the end of the course, students will be:

BP405T.1. Define Pharmacognosy, classify the crude drugs and explain methods of drug evaluation

BP405T.2. Explain the techniques and methods involved in cultivation and collection production of crude drug. Illustrate the plant tissue culture and its applications. Brief note on edible vaccines.

BP405T.3. Explain role of Pharmacognosy in allopathy & traditional system of medicine (Ayurveda, Siddha, Unani & Homeopathy)

BP405T.4. Study of primary & secondary metabolites from natural sources-carbohydrates, proteins, lipids, Alkaloids, Glycosides, steroids, volatile oils, tannins, resins and plant fibre products like Cotton, Jute & Hemp & Hallucinogens, Teratogens, Natural allergens

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

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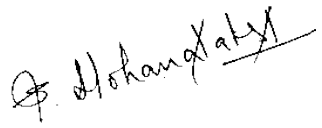
[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.



[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2 quiz, assignment, open book test, field work, group discussion and seminar)		
	Seminar/ Assignment/Quiz/ Open book test	S/As/Q/OBT	3%
Interaction	Student-Teacher interaction	ST	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

UNIT-I 10 Hours

Introduction to Pharmacognosy:

(a) Definition, history, scope and development of Pharmacognosy
(b) Sources of Drugs – Plants, Animals, Marine & Tissue culture
(c) Organized drugs, unorganized drugs (dried latex, dried juices, dried extracts, gums and mucilage, oleoresins and oleo- gum -resins).

Classification of drugs:

Alphabetical, morphological, taxonomical, chemical, pharmacological, chemo and serotaxonomical classification of drugs

Quality control of Drugs of Natural Origin:

Adulteration of drugs of natural origin. Evaluation by organoleptic, microscopic, physical, chemical and biological methods and properties.

Quantitative microscopy of crude drugs including lycopodium spore method, leaf constants, camera lucida and diagrams of microscopic objects to scale with camera lucida.

UNIT-II 10 Hours

Cultivation, Collection, Processing and storage of drugs of natural origin:

Cultivation and Collection of drugs of natural origin Factors influencing cultivation of medicinal plants. Plant hormones and their applications.

Polyploidy, mutation and hybridization with reference to medicinal plants

Conservation of medicinal plants

UNIT-III 07 Hours

Plant tissue culture:

Historical development of plant tissue culture, types of cultures, Nutritional requirements, growth and their maintenance.

Applications of plant tissue culture in Pharmacognosy. Edible vaccines

UNIT-IV 10 Hours

Pharmacognosy in various systems of medicine:

Role of Pharmacognosy in allopathy and traditional systems of medicine namely, Ayurveda, Unani, Siddha, Homeopathy and Chinese systems of medicine.

Introduction to secondary metabolites:

Definition, classification, properties and test for identification of Alkaloids, Glycosides, Flavonoids, Tannins, Volatile oil and Resins

UNIT V 8 Hours

Study of biological source, chemical nature and uses of drugs of natural origin containing following drugs

Plant Products:

Fibers - Cotton, Jute, Hemp

Hallucinogens, Teratogens, Natural allergens

Primary metabolites:

General introduction, detailed study with respect to chemistry, sources, preparation, evaluation, preservation, storage, therapeutic used and commercial utility as Pharmaceutical Aids and/or Medicines for the following Primary metabolites:

Carbohydrates: Acacia, Agar, Tragacanth, Honey

Proteins and Enzymes: Gelatin, casein, proteolytic enzymes (Papain, bromelain, serratiopeptidase, urokinase, streptokinase, pepsin).

Lipids (Waxes, fats, fixed oils) : Castor oil, Chaulmoogra oil, Wool Fat, Bees Wax

Marine Drugs:

Novel medicinal agents from marine sources

F. Examination Scheme:

Components	A	ST	CT	S/As/Q/OBT	EE
Weightage (%)	4	3	15	3	75

CT: Class Test, As: Assignment, ST: Student teacher interaction, S/A/Q/OBT: Seminar/ Assignment/Quiz/ Open book test, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. W.C.Evans, Trease and Evans Pharmacognosy, 16th edition, W.B. Sounders & Co., London, 2009.

2. Mohammad Ali. Pharmacognosy and Phytochemistry, CBS Publishers & Distribution, New Delhi.

3. Text book of Pharmacognosy by C.K. Kokate, Purohit, Gokhlae (2007), 37th Edition, Nirali Prakashan, New Delhi.

4. Herbal drug industry by R.D. Choudhary (1996), Ist Edn, Eastern Publisher, New Delhi.

5. Essentials of Pharmacognosy, Dr.SH.Ansari, IInd edition, Birla publications, New Delhi, 2007

6. Herbal Cosmetics by H.Pande, Asia Pacific Business press, Inc, New Delhi.

7. A.N. Kalia, Textbook of Industrial Pharmacognosy, CBS Publishers, New Delhi, 2005.

8. R Endress, Plant cell Biotechnology, Springer-Verlag, Berlin, 1994.

9. Pharmacognosy & Pharmacobiotechnology. James Bobbers, Marilyn KS, VE Tylor.

10. The formulation and preparation of cosmetic, fragrances and flavours.

11. Remington's Pharmaceutical sciences.

12. Text Book of Biotechnology by Vyas and Dixit.

13. Text Book of Biotechnology by R.C. Dubey

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Definition, history, scope and development of Pharmacognosy	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
2	Definition, history, scope and development of Pharmacognosy	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
3	Sources of Drugs – Plants, Animals	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
4	Marine & Tissue culture	Lecture	BP405T.1	Mid Term-1, Assignment ,Quiz & End Sem Exam
5	Organized drugs, unorganized drugs	Tutorial	BP405T.1	Mid Term-1, Quiz & End Sem Exam
6	Practical demonstration of Organized drugs & unorganized drugs differences	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
7	**Classification of drugs: introduction** :	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
8	Alphabetical, morphological	Lecture	BP405T.1	Mid Term-1, Quiz, Class test & End Sem Exam
9	taxonomical, chemical, pharmacological	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
10	chemo and serotaxonomical classification of drugs	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
11	**Quality control of Drugs of Natural Origin: introduction**	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam

12	Adulteration of drugs of natural origin	Lecture	BP405T.1	Mid Term-1, Assignment ,Quiz & End Sem Exam
13	Types of adulteration with examples	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
14	Evaluation by organoleptic, microscopic evaluation	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
15	Physical, chemical and biological methods of evaluation	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
16	Quantitative microscopy of crude drugs	Lecture	BP405T.1	Mid Term-1, Class test, Quiz & End Sem Exam
17	Lycopodium spore method, leaf constants, camera lucida and diagrams of microscopic objects to scale with camera lucida.	Lecture	**BP405T.1**	Mid Term-1, Quiz & End Sem Exam
18	**Cultivation, Collection, Processing and storage of drugs of natural origin – introduction**	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
19	Cultivation and Collection of drugs of natural origin	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
20	Factors influencing cultivation of medicinal plants	Lecture	BP405T.1	Mid Term-1, Assignment,Quiz & End Sem Exam
21	Plant hormones and their applications.	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
22	Polyploidy, mutation	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
23	hybridization with reference to medicinal plants	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
24	Conservation of medicinal plants	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
25	**Plant tissue culture: History and introduction**	Lecture	BP405T.2	Mid Term-1, Quiz & End Sem Exam
26	types of cultures, Nutritional requirements,	Lecture	BP405T.2	Mid Term-1, Quiz &

				End Sem Exam
27	growth and their maintenance of tissue cultured cells	Lecture	BP405T.2	Mid Term-1, Quiz & End Sem Exam
28	Applications of plant tissue culture in Pharmacognosy.	Lecture	BP405T.2	Mid Term-1, Seminar,Quiz & End Sem Exam
29	Edible vaccines 1	Lecture	BP405T.2	Mid Term-1, Quiz & End Sem Exam
30	Edible vaccines 2	Lecture	**BP405T.2**	Mid Term-1, Quiz & End Sem Exam
31	**Pharmacognosy in various systems of medicine:**	Lecture	BP405T.3	Mid Term-2, Quiz & End Sem Exam
32	Role of Pharmacognosy in allopathy	Lecture	BP405T.3	Mid Term-2, Quiz & End Sem Exam
33	UNIT test – Discussion	Tutorial	BP405T.3	Mid Term-2, Quiz & End Sem Exam
34	Role of Pharmacognosy in Ayurveda	Lecture	BP405T.3	Mid Term-2, Quiz & End Sem Exam
35	Role of Pharmacognosy in SIDDHA	Lecture	BP405T.3	Mid Term-2, Quiz & End Sem Exam
36	Role of Pharmacognosy in HOMEOPATHY	Lecture	BP405T.3	Mid Term-2, Assignment ,Quiz & End Sem Exam
37	Role of Pharmacognosy in UNANI	Lecture	BP405T.3	Mid Term-2, Quiz & End Sem Exam
38	**Introduction to plant secondary metabolites**	Lecture	BP405T.3	Mid Term-2, Quiz & End Sem Exam
39	Definition, classification, properties and test for identification of Alkaloids, Glycosides,	Lecture	BP405T.3	Mid Term-2, Quiz & End Sem Exam
40	Quiz	Tutorial		Mid Term-2, Quiz & End Sem Exam
41	Flavonoids, Tannins, Volatile oil and Resins	Lecture	BP405T.3	Mid Term-2, Quiz & End Sem Exam

42	Study of biological source, chemical nature and uses of drugs of natural origin containing following drugs - introduction	Lecture	BP405T.4	Mid Term-2, Quiz & End Sem Exam
43	**Plant Products:** Fibers - Cotton, Jute, Hemp Hallucinogens, Teratogens,	Lecture	BP504T.4	Mid Term-2, Quiz & End Sem Exam
44	Natural allergens	Lecture	BP405T.1	Mid Term-2, Seminar, Quiz & End Sem Exam
45	**Primary metabolites: introduction**	Lecture	BP405T.1	Mid Term-2, Quiz & End Sem Exam
46	General introduction, detailed study with respect to chemistry, sources, preparation, evaluation, preservation, storage, therapeutic used and commercial utility as Pharmaceutical Aids and/or Medicines for the following Primary metabolites:	Lecture	BP405T.1	Mid Term-2, Quiz & End Sem Exam
47	**Carbohydrates:** Acacia, Agar	Tutorial		Mid Term-2, Quiz & End Sem Exam
48	Tragacanth, Honey	Lecture	BP405T.1	Mid Term-2, Seminar, Quiz & End Sem Exam
49	**Proteins and Enzymes**	Lecture	BP405T.1	Mid Term-2, Quiz & End Sem Exam
50	Gelatin,	Lecture	BP405T.1	Mid Term-2, Quiz & End Sem Exam
51	casein, proteolytic enzymes	Lecture	BP405T.1	Mid Term-2, Quiz & End Sem Exam
52	Papain, bromelain, serratiopeptidase, urokinase,	Lecture	BP405T.1	Mid Term-2, Assignment ,Quiz & End Sem Exam
53	Streptokinase, pepsin.	Lecture	BP405T.1	Mid Term-2, Quiz & End Sem Exam
54	**Lipids(Waxes, fats, fixed oils)** :	Tutorial	BP405T.1	Mid Term-2, Quiz & End Sem Exam
55	Castor oil, Chaulmoogra oil Spectroscopic studies, Electrophoresis	Lecture	BP405T.1	Mid Term-2, Quiz & End Sem Exam
56	Wool Fat, Bees Wax	Lecture	BP405T.1	Mid Term-2, Quiz &

				End Sem Exam
57	**Marine Drugs:**	Lecture	BP405T.1	Mid Term-2, Quiz & End Sem Exam
58	Novel medicinal agents from marine sources	Lecture	BP405T.1	Mid Term-2, Quiz & End Sem Exam
59	Revision 1	Lecture	BP405T.1	Mid Term-2, Quiz & End Sem Exam
60	Revision 2	Lecture	BP405T.1	Mid Term-2, Seminar,Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP405T.1.	Define Pharmacognosy, classify the crude drugs and explain methods of drug evaluation	3	2	1	2	1				1		2
BP405T.2.	Explain the techniques and methods involved in cultivation and collection production of crude drug. Illustrate the plant tissue culture and its applications. Brief note on edible vaccines.	3	1	1	1	2				2		2
BP405T.3.	Explain role of Pharmacognosy in allopathy & traditional system of medicine (Ayurveda, Siddha, Unani & Homeopathy)	3	3	2	2	2			2	2		2

BP405T.4	Study of primary & secondary metabolites from natural sources- carbohydrates, proteins, lipids, Alkaloids, Glycosides, steroids, volatile oils, tannins, resins and plant fibre products like Cotton, Jute & Hemp & Hallucinogens, Teratogens, Natural allergens	3	3	2	2	1			2	2		3

Sample Question Paper

Amity Institute of pharmacy Department of Pharmacognosy II MID-SEMESTER (SEM –IV) 2019-20						
Class: B Pharmacy IV Semester						
Subject Name: BP405T PHARMACOGNOSY & PHYTOCHEMISTRY I		Time: 1 Hr			Max. Marks: 30	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping						

Student will be

BP405 CO 1. Define Pharmacognosy, classify the crude drugs and explain methods of drug evaluation

BP 405 CO.2. Explain the techniques and methods involved in cultivation and collection production of crude drug. Illustrate the p*lant tissue culture and its* applications. Brief note on edible vaccines.

BP 405 CO.3. Explain role of Pharmacognosy in allopathy & traditional system of medicine (Ayurveda, Siddha, Unani & Homeopathy)

BP 405 CO.4. Study of primary & secondary metabolites from natural sources-carbohydrates, proteins, lipids, Alkaloids, Glycosides, steroids, volatile oils, tannins, resins and plant fiber products like Cotton, Jute & Hemp & Hallucinogens, Teratogens, Natural allergens

CO Map	Question No.	Question	Marks
	Q.1		
	Q.2		
	Q.3		
	Q.4		
	Q.5		
	Q.6		
	Q.7		
	Q 8		
	Q.9		
	Q 10		

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

88.9 % Percentage of students secured more than 60% marks, so this course attained Level-3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.),Academic Year – 2019-20

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

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Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMMEARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
IVSEM	-															
	-															
	-															
	-															
	BP406P	3	1	2	1	1	2		2		3	2				
	-															
	-															
	-															

DEPARTMENT OF PHARMACEUTICAL CHEMISTRY
Course Handout
Course : MEDICINAL CHEMISTRY– I PRACTICAL
Course Code : B406P, Crédits : 02, Session :2019-20 (Odd Sem.), Class : B.Pharm. IIndYear
Faculty Name: Dr. Srabanti Jana

A. **Scope:** This subject is designed to impart fundamental knowledge on the structure, chemistry and therapeutic value of drugs. The subject on synthetic methods of some drugs and assay of some selective drugs.

B. Course Outcomes: At the end of the course, students will be able to:

BP406P.1. Preparation of drugs/ intermediates like 1,3-pyrazole, 1,3-oxazole, Benzimidazole, Benztriazole, 2,3- diphenyl quinoxaline, Benzocaine, Phenytoin, Phenothiazine and Barbiturate.

BP406P.2. Assay of Chlorpromazine, Phenobarbitone, Atropine, Ibuprofen, Aspirin and Furosemide.

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2].Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values,

communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

C. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance isrequiredtobemaintainedbyastudentto be qualified for taking up the EndSemester examination. The allowanceof 20%includesalltypesofleaves includingmedicalleaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

D. Syllabus

BP406P.1. Preparation of drugs/ intermediates

1. 1,3-pyrazole
2. 1,3-oxazole
3. Benzimidazole
4. Benztriazole
5. 2,3- diphenyl quinoxaline
6. Benzocaine
7. Phenytoin
8. Phenothiazine
9. Barbiturate.

BP406P.2. Assay of Following drugs

1. Chlorpromazine
2. Phenobarbitone
3. Atropine
4. Ibuprofen
5. Aspirin
6. Furosemide.

BP406P.3. Determination of Partition coefficient for any two drugs

E. Examination Scheme:

Components	A	CT	LR	V	EE
Weightage (%)	2	10	1	2	35

CT: Class Test, LR: Lab Record, V: Viva,EE: End Semester Examination; A: Attendance

F. Suggested Text/Reference Books:

1. Wilson and Giswold's Organic medicinal and Pharmaceutical Chemistry.
2. Foye's Principles of Medicinal Chemistry.
3. Burger's Medicinal Chemistry, Vol I to IV.
4. Introduction to principles of drug design- Smith and Williams.
5. Remington's Pharmaceutical Sciences.
6. Martindale's extra pharmacopoeia.
7.Organic Chemistry by I.L. Finar, Vol. II.
8. The Organic Chemistry of Drug Synthesis by Lednicer, Vol. 1-5.
9. Indian Pharmacopoeia.
10. Text book of practical organic chemistry- A.I.Vogel.

G. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	To Synthesize, submit & report %yield of 1,3-pyrazole.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
2	To Synthesize, submit & report %yield of 1,3-oxazole.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
3	To Synthesize, submit & report	Practical	CO1, 2, 4,	Mid Term-1, Quiz

	%yield of Benzimidazole.		5	& End Sem Exam
4	To Synthesize, submit & report %yield Benztriazole.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
5	To Synthesize, submit & report %yield of 2,3- diphenyl quinoxaline.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
6	To Synthesize, submit & report %yield of Benzocaine.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
7	To Synthesize, submit & report %yield of phenytoin.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
8	To Synthesize, submit & report %yield of Phenothiazine.	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
9	To Synthesize, submit & report %yield of Barbiturate.	Practical	CO1, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
10	To perform the assay and report the % purity of Chlorpromazine.	Practical	CO1, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
11	To perform the assay and report the % purity of Phenobarbitone.	Practical	CO1, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
12	To perform the assay and report the % purity of atropine.	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
13	To perform the assay and report the % purity of ibuprofen.	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
14	To perform the assay and report the % purity of Aspirin.	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
15	To perform the assay and report the % purity of 6 Furosemide	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam

H. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	
BP406P.1	Preparation of drugs/ intermediates like 1,3-pyrazole, 1,3-oxazole, Benzimidazole, Benztriazole, 2,3-diphenyl	3		2	1	2	1	-	2	1	2	1	

Dr. Mohan Yadav

	quinoxaline, Benzocaine, Phenytoin, Phenothiazine and Barbiturate.												
BP406P.2.	Assay of Chlorpromazine, Phenobarbitone, Atropine, Ibuprofen, Aspirin and Furosemide.	2	-	-	1	-	1	-	-	-	-	3	

SampleQuestionPaper

Amity Institute of Pharmacy

Departmentof Pharmaceutical Chemistry

I MID-SEMESTER(SEM–IV)2019-20

Class:B.Pharm, IV-Semester

SubjectName: BP406PMedical Chemistry-I Practical	Time:4Hrs	Max.Marks:40

Levels of thequestions as perBloomsTaxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
QuestionMapping	Q.1,4	Q.2,3	Q.4	Q.2,5,6		

Student willbeableto

CO.1. To recall the principles used synthesis of different medicinal compounds

CO.2. Operate equipment used in the preparation of compounds.

CO.3. Estimation of different medicinal compounds by titrimetry.

CO.4. Assay and reporting the percentage purity of compounds.

CO.5. Determination of Partition coefficient for any two drugs.

COMap	QuestionNo.	Question	Marks
CO1,2,4	Q.1a	Synopsis-principles in synthesis of benzimidazole.	2
CO1,2,4	Q.1b	Synopsis- principle for assay of ibuprofen.	2
CO1,2,4	Q.1c	Synopsis- principle in preparation of benzocaine.	2
CO1,2,4	Q.1d	Synopsis- principle in preparation of phenetoin.	2
CO1,2,4	Q.1e	Synopsis- Principle in determination of partition-coefficient (logP)	2
CO1,2, 4,5	Q.2	Experiment	25

		To Assay and report the percentage purity of Ibuprofen	
CO1,2,3,4,5	Q.3	Viva	5

Attainments		Rubric
Level	1	IF60%ofstudentssecuremorethan60%marksthenlevel1
Level	2	IF70%ofstudentssecuremorethan60%marksthenlevel2
Level	3	IF80%ofstudentssecuremorethan60%marksthenlevel3

Attainment Level 3:

100 % Percentage of students secured more than 60% marks, so this course attained Level -3.

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACY
Course Handout
Course : PHYSICAL PHARMACEUTICS II
Course Code : BP407 P, Programme : II.B. Pharmacy IV-Semester **Crédits : 02, Session :2019-20 (Even Sem.)**
Faculty Name : Dr. Neeraj Mishra

A. Scope: The course deals with the various physical and physicochemical properties, and principle involved in dosage forms/formulations. Theory and practical components of the subject help the student to get a better insight into various areas of formulation research and development, and stability studies of pharmaceutical dosage forms.

B. Course Outcome: ***At the end of each course, the student will be able to:***

C407.1	To ddetermine the particle size, particle size distribution using sieving method or microscopic method
C407.2	To uunderstand various physicochemical properties of drug molecules in the designing the dosage forms
C407.3	To know the principles of chemical kinetics & to use them for stability testing and determination of expiry date of formulations
C407.4	To Determine the angle of repose and influence of lubricant on angle of repose
C407.5	To ddetermine of reaction rate constant
C407.6	To demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms.

C. 1.Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices**.**

2. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

3. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice.

Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

4. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

5. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well-being.

6. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

7. Pharmaceutical Ethics: Honor personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

8. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

9. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional Pharmacy Practice

10. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

11. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively

D.Programme specific outcomes:

1. Scientific Thinking: Enable student's knowledge in scientific perception to understand the concepts and to solve the problems positively while making pharmaceutical formulations.
2. Analytical Skills: Assimilate and develop analytical skills using advanced equipment to design and evaluate pharmaceutical products, also to assess their quality.
3. Resource Management: Utilize and manage resources from natural, semi synthetic and synthetic origin to develop real time products with utmost benefit and safety.
4.Public Health Care: Promote and empower the healthy living in the community by various means of awareness and health strategies.
5. Entrepreneurship: Acquire and develop entrepreneurship and administration skills to establish community pharmacy, learning and training centers for the long term wellbeing of society.

E. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	LT	10%
	Mid Term 2		
	Practical Records/ Regular viva voce	PR/RVV	1% / 2%
Attendance	A minimum of 80% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

F. Syllabus

1. Determination of particle size, particle size distribution using sieving method
2. Determination of particle size, particle size distribution using microscopic method
3. Determination of bulk density, true density and porosity
4. Determine the angle of repose and influence of lubricant on angle of repose
5. Determination of viscosity of liquid using Ostwald's viscometer
6. Determination sedimentation volume with effect of different suspending agent
7. Determination sedimentation volume with effect of different concentration of single suspending agent
8. Determination of viscosity of semisolid by using Brookfield viscometer
9. Determination of reaction rate constant first order.
10. Determination of reaction rate constant second order
11. Accelerated stability studies

G. Examination Scheme:

Components	**A**	**LT**	**PR/RVV**	**EE**
Weightage (%)	2	10	½	35

LT: Lab Test, PR/RVV: Practical Records/ Regular viva voce, EE: End Semester Examination; A: Attendance

H. Suggested Text/Reference Books:

1. Physical Pharmacy by Alfred Martin
2. Experimental Pharmaceutics by Eugene, Parott.
3. Tutorial Pharmacy by Cooper and Gunn.
4. Stocklosam J. Pharmaceutical Calculations, Lea &Febiger, Philadelphia.
5. Liberman H.A, Lachman C., Pharmaceutical Dosage forms, Tablets, Volume-1 to 3, MarcelDekkar Inc.
6. Liberman H.A, Lachman C, Pharmaceutical Dosage forms. Disperse systems, volume 1, 2, 3. Marcel Dekkar Inc.
7. Physical Pharmaceutics by Ramasamy C and ManavalanR.
8. Laboratory Manual of Physical Pharmaceutics, C.V.S. Subramanian, J. Thimma settee
9. Physical Pharmaceutics by C.V.S. Subramanyam

I. Lecture Plan

Lecture	**Topics**	**Mode of Delivery**	**Corresponding CO**	**Mode of Assessing CO**
1	Determination of particle size, particle size distribution using sieving method	Practical	C407.1	Mid Term-1, PR/RVV & End Sem Exam
2	Determination of particle size, particle size distribution using Microscopic method	Practical	C407.1, C407.6	Mid Term-1, PR/RVV & End Sem Exam
3	Determination of bulk density, true density and porosity	Practical	C407.2	Mid Term-1, PR/RVV & End Sem Exam
4	Determine the angle of repose and influence of lubricant on angle of repose	Practical	C407.4	Mid Term-1, PR/RVV & End Sem Exam

5	Determination of viscosity of liquid using Ostwald's viscometer	Practical	C407.2& C407.3	Mid Term-1, PR/RVV & End Sem Exam
6	Determination sedimentation volume with effect of different suspending agent	Practical	C407.2& C407.3	Mid Term-1, PR/RVV & End Sem Exam
7	Determination sedimentation volume with effect of different concentration of single suspending agent	Practical	C407.2& C407.3	Mid Term-1, PR/RVV & End Sem Exam
8	Determination of viscosity of semisolid by using Brookfield viscometer	Practical	C407.2& C407.3	Mid Term-1, PR/RVV & End Sem Exam
9	Determination of reaction rate constant first order.	Practical	C407.5	Mid Term-2, PR/RVV & End Sem Exam
10	Determination of reaction rate constant second order	Practical	C407.5& C407.3	Mid Term-2, PR/RVV & End Sem Exam
11	To perform Accelerated stability studies	Practical	C407.3& C407.6	Mid Term-2, PR/RVV & End Sem Exam
12	To classify dispersed systems & their general characteristics, size & shapes of colloidal particles	Practical	C407.2 & C407.3	Mid Term-2, PR/RVV & End Sem Exam
13	To classify of colloids & comparative account of their general properties. Optical, kinetic & electrical properties	Practical	C407.2 & C407.3	Mid Term-2, PR/RVV & End Sem Exam
14	To know newtonian systems, law of flow, kinematic viscosity,	Practical	C407.2& C407.3	Mid Term-2, PR/RVV & End Sem Exam
15	To determine rheological properties of emulsions and emulsion formulation by HLB method.	Practical	C407.2& C407.3	Mid Term-2, PR/RVV & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
C407.1	3	1	2	2	3	2	1	-	-	1	-
C407.2	1	-	3	1	-	-	1	-	2	1	1
C407.3	1	2	-	1	2	-	2	1	-	-	1
C407.4	2	1	1	1	-	1	2	-	1	-	2
C407.5	1	2	2	-	1	-	1	1	1	2	3
C407.6	3	1	1	1	-	1	2	-	1	-	2
Average	1.8	1.16	1.5	1	1.0	0.66	1.3	0.3	0.83	0.66	1.5

Sample Question Paper

Amity Institute of Pharmacy
Department of Pharmaceutics
I MID-SEMESTER (SEM –IV) 2019-20

Class: B.Pharm, IV Semester

Subject Name: BP407P Physical Pharmaceutics-II Practical	Time: 4 Hrs	Max. Marks: 40

Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,4	Q.2,3	Q.4	Q.2,5,6		

Student will be able to

C407.1	To determine the particle size, particle size distribution using sieving method or microscopic method
C407.2	To understand various physicochemical properties of drug molecules in the designing the dosage forms
C407.3	To know the principles of chemical kinetics & to use them for stability testing and determination of expiry date of formulations
C407.4	To Determine the angle of repose and influence of lubricant on angle of repose
C407.5	To ddetermine of reaction rate constant
C407.6	To demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms.

CO Map	Question No.	Question	Marks
C407.1,2, 3	Q.1a	Synopsis- Write the methods of determination of particle size	5
C407.1,2, 3	Q.1b	Synopsis- What is reaction rate constant.	5
C407.1,2, 4,6	Q.2	Experiment To determine the particle size by sieving method.	25
C407.1,2,3,4, 5,6	Q.3	Viva	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

100 % Percentage of students secured more than 60% marks, so this course attained Level -3.

AMITY UNIVERSITY
MADHYA PRADESH
Established vide Government of Madhya Pradesh Act No. 27 of 2010

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOLOGY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2019-20

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Programme Specific Outcomes:

Programme Specific Outcomes:

PSO 1: This subject is designed to understand what drugs do to the living organisms and how their effects can be applied to therapeutics.

PSO 2: The subject covers the information about the drugs like, mechanism of action, physiological and biochemical effects (pharmacodynamics)

PSO 3: This subject also cover the information about absorption, distribution, metabolism and excretion (pharmacokinetics) along with the adverse effects, clinical uses, interactions, doses, contraindications and routes of administration of different classes of drugs.

PSO 4: The subject provides the basic knowledge required to understand the various disciplines of pharmacy

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
IV SEM	BP408P	3	1	2	-	1	3	2	1	3	2	2				
	-															
	-															
	-															
	-															
	-															
	-															
	-															

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACOLOGY
Course Handout
Course : PHARMACOLOGY – I PRACTICAL
Course Code : BP408P, Crédits : 02, Session :2019-20 (IVth SEM), Class : B.Pharm. 2nd Year
Faculty Name: Dr. Shvetank Bhatt

A. Introduction: This course is designed to impart fundamental knowledge on the structure and functions of the various systems of the human body. It also helps in understanding both homeostatic mechanisms. The subject provides the basic knowledge required to understand the various disciplines of pharmacy.

B. Course Outcomes: At the end of the course, students will be able to:

BP408P.CO1. Introduction to experimental pharmacology.
BP408P.CO2. Study of different routes of drugs administration in mice/rats.
BP408P.CO3. Study of effect of hepatic microsomal enzyme inducers on the phenobarbitone sleeping time in mice.
BP408P.CO4. Effects of skeletal muscle relaxants using rota-rod apparatus.
BP408P.CO5. Study of stereotype and anti-catatonic activity of drugs on rats/mice.
BP408P.CO6. Study of local anesthetics by different methods

Programme Outcomes:

[PO.1]. Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

C. Programme Specific Outcomes:

PSO 1: Understand the pharmacological actions of different categories of drugs. Explain the mechanism of drug action at organ system/sub cellular/ macromolecular levels.

PSO 2: Apply the basic pharmacological knowledge in the prevention and treatment of various diseases.

PSO 3: Observe the effect of drugs on animals by simulated experiments

PSO 4: Appreciate correlation of pharmacology with other bio medical sciences

Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves	A	2%

	including medical leaves.		
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

D. Syllabus

1. Introduction to experimental pharmacology.
2. Commonly used instruments in experimental pharmacology.
3. Study of common laboratory animals.
4. Maintenance of laboratory animals as per CPCSEA guidelines.
5. Common laboratory techniques. Blood withdrawal, serum and plasma separation, anesthetics and euthanasia used for animal studies.
6. Study of different routes of drugs administration in mice/rats.
7. Study of effect of hepatic microsomal enzyme inducers on the phenobarbitone sleeping time in mice.
8. Effect of drugs on ciliary motility of frog oesophagus
9. Effect of drugs on rabbit eye.
10. Effects of skeletal muscle relaxants using rota-rod apparatus.
11. Effect of drugs on locomotor activity using actophotometer.
12. Anticonvulsant effect of drugs by MES and PTZ method.
13. Study of stereotype and anti-catatonic activity of drugs on rats/mice.
14. Study of anxiolytic activity of drugs using rats/mice.
15. Study of local anesthetics by different method

Examination Scheme:

Components	**A**	**CT**	**LR**	**V**	**EE**
Weightage (%)	2	10	1	2	35

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

E. **Suggested Text/Reference Books:**

1.Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology,.Churchil Livingstone Elsevier
2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill
3. Goodman and Gilman's, The Pharmacological Basis of Therapeutics
4. Marry Anne K. K., Lloyd Yee Y., Brian K. A., Robbin L.C., Joseph G. B., Wayne A. K., Bradley R.W., Applied Therapeutics, The Clinical use of Drugs, The Point Lippincott Williams & Wilkins
5. Mycek M.J, Gelnet S.B and Perper M.M. Lippincott's Illustrated Reviews- Pharmacology
6. SK Kulkarni.

Lecture Plan

Lecture	**Topics**	**Mode of Delivery**	**Corresponding CO**	**Mode of Assessing CO**
1	Introduction to experimental pharmacology.	Lecture	Unit-1 CO1	Mid Term-1 and 2, Quiz & End Sem Exam
2	Introduction to experimental	Lecture	CO4	Mid Term-1 and 2, Quiz & End

	pharmacology.			Sem Exam
3	Commonly used instruments in experimental pharmacology.	Lecture	CO4	Mid Term-1 and 2, Quiz & End Sem Exam
4	Commonly used instruments in experimental pharmacology.	Tutorial	CO3	Mid Term-1 and 2, Quiz & End Sem Exam
5	Study of common laboratory animals	Lecture	CO3	Mid Term-1 and 2, Quiz & End Sem Exam
6	Maintenance of laboratory animals as per CPCSEA guidelines	Lecture	CO2	Mid Term-1 and 2, Quiz & End Sem Exam
7	Common laboratory techniques. Blood withdrawal, serum and plasma separation, anesthetics and euthanasia used for animal studies.	Lecture	CO5	Mid Term-1 and 2, Quiz & End Sem Exam
8	Study of different routes of drugs administration in mice/rats	Tutorial		Mid Term-1 and 2, Quiz & End Sem Exam
9	Study of effect of hepatic microsomal enzyme inducers on the phenobarbitone sleeping time in mice.	Lecture	CO5	Mid Term-1 and 2, Quiz & End Sem Exam
10	Effect of drugs on ciliary motility of frog oesophagus	Lecture	CO5	Mid Term-1 and 2, Quiz & End Sem Exam
11	Effect of drugs on rabbit	Lecture	CO5	Mid Term-1 and 2, Quiz & End Sem Exam
12	Effects of skeletal muscle relaxants using rota-rod apparatus	Tutorial		Mid Term-1 and 2, Quiz & End Sem Exam
13	Effect of drugs on locomotor activity using actophotometer.	Lecture	CO5	Mid Term-1 and 2, Quiz & End Sem Exam
14	Anticonvulsant effect of drugs by MES and PTZ metho	Lecture	CO5	Mid Term-1 and 2, Quiz & End Sem Exam
15	Study of stereotype and anti-catatonic activity of drugs on rats/mice.	Lecture	CO5	Mid Term-1 and 2, Quiz & End Sem Exam
16	Unit test	Tutorial		Mid Term-1 and 2, Quiz & End Sem Exam

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17	Study of anxiolytic activity of drugs using rats/mice.	Lecture	CO6	Mid Term-1 and 2, Quiz & End Sem Exam
18	Study of local anesthetics by different methods	Lecture	CO6	Mid Term-1 and 2, Quiz & End Sem Exam

F. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP408P.1	1 Introduction to experimental pharmacology. 2. Commonly used instruments in experimental pharmacology. 3. Study of common laboratory animals. 4. Maintenance of laboratory animals as per CPCSEA guidelines.	3	-	-	-	1	2	1	-	-	-	-		3	2	1

BP408P.2.	Common laboratory techniques. Blood withdrawal, serum and plasma separation, anesthetics and euthanasia used for animal studies. 6. Study of different routes of drugs administration in mice/rats. 7. Study of effect of hepatic microsomal enzyme inducers on the phenobarbitone sleeping time in mice.	3	-	-	1	-	1	-	-	-	-	2		2	3	1
BP408P.3.	Effect of drugs on ciliary motility of frog oesophagus 9. Effect of drugs on rabbit eye. 10. Effects of skeletal muscle relaxants using rota-rod apparatus.	3	2	-	3	-	2	-	-	-	-	3		1	2	3
BP408P.4.	Effect of drugs on locomotor activity using actophotometer. 12. Anticonvulsant effect of drugs by MES and PTZ method.	2	2	1	3	-	1	-	-	-	-	2		2	3	2
BP408P.5.	Study of stereotype and anti-catatonic activity of drugs on	3	-	1	-	2	-	-	-	-	-	2		2	3	3

	rats/mice. 14. Study of anxiolytic activity of drugs using rats/mice.															
BP408P.6	Study of local anesthetics by different methods.	3			1							1		3	1	2

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacology I MID-SEMESTER (SEM –IV) 2019-20						
Class: B.Pharm, IV Semester						
Subject Name: BP408P Pharmacology-I		Time: 4 Hrs			Max. Marks: 40	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,2,	Q.3,4	Q.5,6	Q.7		

Student will be able to

CO1.

1. Introduction to experimental pharmacology.
2. Commonly used instruments in experimental pharmacology.
3. Study of common laboratory animals.

CO 2

4. Maintenance of laboratory animals as per CPCSEA guidelines.
5. Common laboratory techniques. Blood withdrawal, serum and plasma separation, anesthetics and euthanasia used for animal studies.
6. Study of different routes of drugs administration in mice/rats.

CO 3

7. Study of effect of hepatic microsomal enzyme inducers on the phenobarbitone sleeping time in mice.
8. Effect of drugs on ciliary motility of frog oesophagus
9. Effect of drugs on rabbit eye.

CO 4

10. Effects of skeletal muscle relaxants using rota-rod apparatus.

11. Effect of drugs on locomotor activity using actophotometer.
12. Anticonvulsant effect of drugs by MES and PTZ method.

CO5

13. Study of stereotype and anti-catatonic activity of drugs on rats/mice.
14. Study of anxiolytic activity of drugs using rats/mice.

CO6

15. Study of local anesthetics by different method

Demonstration of total blood count by cell analyser

Permanent slides of vital organs and gonads

CO Map	Question No.	Question	Marks
CO4	Q.1a	*What is CPCSEA*	2
CO2	Q.1b	Define Pharmacokintics.	2
CO2	Q.1c	Make use of animal anaesthetics.	2
CO3	Q.1d	What are different routes of blood withdrawal.	2
CO2 CO3	Q.1e	Give the use of rotarod.	2
	Q.2	Experiment: Commonly used instruments in experimental pharmacology.	25
	Q.3	Viva	5

Attainment Level 3:

97.8 % Percentage of students secured more than 60% marks, so this course attained Level -3.

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AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOGNOSY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2019-20

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
IV SEM	-	3	1	3	2	1	2	2	2	2	2	3				
	-															
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	-															
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AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACOGNOSY
Course Handout
Course : PHARMACOGNOSY AND PHYTOCHEMISTRY – I PRACTICAL
Course Code : BP409P, Crédits : 02, Session :2019-20 (Even Sem.), Class : B.Pharm. 2nd Year
Faculty Name: Dr. Ajay Sharma,Dr Jovita Kanoujia,Mrs Monika Kaushik

A. Introduction: The subject involves the fundamentals of Pharmacognosy like scope, classification of crude drugs, their identification and evaluation, phytochemicals present in them and their medicinal properties

B. Course Outcomes: At the end of the course, students will be able to:

BP409P.1. To know the techniques in the cultivation and production of crude drugs

BP409P.2. To know the crude drugs, their uses and chemical nature

BP409P.3. To know the evaluation techniques for the herbal drugs

BP409P.4. To carry out the microscopic and morphological evaluation of crude drugs

BP409P.5. To know the classification ,identification and medicinal properties of herbal drugs

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

E. Syllabus

1. Analysis of crude drugs by chemical tests: **(**i)Tragaccanth (ii) Acacia (iii)Agar (iv)

Gelatin (v) starch (vi) Honey (vii) Castor oil
2. Determination of stomatal number and index
3. Determination of vein islet number, vein islet termination and paliside ratio.
4. Determination of size of starch grains, calcium oxalate crystals by eye piece micrometer
5. Determination of Fiber length and width
6. Determination of number of starch grains by Lycopodium spore method
7. Determination of Ash value
8. Determination of Extractive values of crude drugs
9. Determination of moisture content of crude drugs
10. Determination of swelling index and foaming

F. Examination Scheme:

Components	A	CT	LR	V	EE
Weightage (%)	2	10	1	2	35

CT: Class Test, LR: Lab Record, V: Viva, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

- W.C.Evans, Trease and Evans Pharmacognosy, 16th edition, W.B. Sounders & Co., London, 2009.
- 2. Tyler, V.E., Brady, L.R. and Robbers, J.E., Pharmacognosy, 9th Edn., Lea and Febiger, Philadelphia, 1988.
- 3. Text Book of Pharmacognosy by T.E. Wallis
- 4. Mohammad Ali. Pharmacognosy and Phytochemistry, CBS Publishers & Distribution, New Delhi.
- 5. Text book of Pharmacognosy by C.K. Kokate, Purohit, Gokhlae (2007), 37th Edition, Nirali Prakashan, New Delhi.
- 6. Herbal drug industry by R.D. Choudhary (1996), Ist Edn, Eastern Publisher, New Delhi.
- 7. Essentials of Pharmacognosy, Dr.SH.Ansari, IInd edition, Birla publications, New Delhi, 2007
- 8. Practical Pharmacognosy: C.K. Kokate, Purohit, Gokhlae
- 9. Anatomy of Crude Drugs by M.A. Iyengar

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	To Perform Morphological study and Chemical Identification test for Tragaccanth , Acacia and Benzoin	Practical	CO 1,2, 3,4, 5	Mid Term-1, Quiz & End Sem Exam
2	To Perform Morphological study and Chemical Identification test for Agar , Gelatin and Starch	Practical	CO1, 2,3, 4, 5	Mid Term-1, Quiz & End Sem Exam
3	To Perform Morphological	Practical	CO1, 2,3,	Mid Term-1, Quiz

	study and Chemical Identification test for Castor oil , Asafoetida and Honey		4, 5	& End Sem Exam
4	Determination of stomatal number and index	Practical	CO1, 2, 3,4, 5	Mid Term-1, Quiz & End Sem Exam
5	Determination of vein islet number, vein islet termination and paliside ratio	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
6	Determination of size of starch grains, calcium oxalate crystals by eye piece Micrometer	Practical	CO, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
7	Determination of Fiber length and width	Practical	CO, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
8	Determination of number of starch grains by Lycopodium spore method	Practical	CO, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
9	Determination of total Ash value for given crude drug	Practical	CO, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
10	Determination of acid insoluble Ash value for given crude drug	Practical	CO, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
11	Determination of Extractive values of crude drugs	Practical	CO, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
12	Determination of moisture content of crude drugs	Practical	CO, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
13	Determination of swelling index and foaming index of crude drug	Practical	CO, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
14	To perform morphological and microscopical evaluation of given crude drug	Practical	CO1, 2,3 4, 5	Mid Term-2, Quiz & End Sem Exam
15	To perform morphological and microscopical evaluation of given crude drug	Practical	CO1, 2,3 4, 5	Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	

BP409P.1	To know the techniques in the cultivation and production of crude drugs	3		2	3	-	1	-	2	1	1	1	
BP409P.2.	To know the crude drugs, their uses and chemical nature	2	-	-	1	-	1	-	-	-	-	3	
BP409P.3.	To know the evaluation techniques for the herbal drugs	3	-	2	3	-	2	1	2	1	1	3	
BP409P.4.	To carry out the microscopic and morphological evaluation of crude drugs	2	-	2	1	-	2	1	2	-	1	3	
BP409P.5.	To know the classification ,identification and medicinal properties of herbal drugs	1	-	1	-	-	1	-	2	-	-	3	

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacognosy I MID-SEMESTER (SEM –IVth) 2019-20						
Class: B.Pharm, IVth Semester						
Subject Name: BP409P Pharmacognosy and phytochemistry-I Practical		Time: 4 Hrs		Max. Marks: 40		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,4	Q.2,3	Q.4	Q.2,5,6		
Student will be able to						

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CO.1. . To know the techniques in the cultivation and production of crude drugs
CO.2. To know the crude drugs, their uses and chemical nature
CO.3. . To know the evaluation techniques for the herbal drugs
CO.4. To carry out the microscopic and morphological evaluation of crude drugs
CO.5. To know the classification ,identification and medicinal properties of herbal drugs

CO Map	Question No.	Question	Marks
CO1,2,4	Q.1a	Synopsis- What are difference between organized and un organized drugs?	2
CO1,2,4	Q.1b	Synopsis- What is crude drug adulteration?	2
CO1,2,4	Q.1c	Synopsis- Define Resins?	2
CO1,2,4	Q.1d	Synopsis- Give biological source of Agar,Acacia,Tragacanth and Honey?	2
CO1,2,4	Q.1e	Synopsis- What is the classification of terpenesS?	2
CO1,2, 4,5	Q.2	Experiment Determination of stomatal number and index	25
CO1,2,3,4,5	Q.3	Viva	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

97.8 % Percentage of students secured more than 60% marks, so this course attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOLOGY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-21

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

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[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Programme Specific Outcomes:

PSO 1: Will be able to design, develop and implement efficient software for a given real life problem.

PSO 2: Will be able to apply knowledge of AI, Machine Learning and Data Mining in analyzing big data forextracting useful information from it and for performing predictive analysis.

PSO 3: Will be able to design, manage and secure wired/ wireless computer networks for transfer and sharing ofinformation.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I SEM																
	BP101T	3	1	2	-	1	3	2	1	3	2	2				

Dr. Mohanlal Jat

Mohanty

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DEPARTMENT OF PHARMACOLOGY
Course Handout
Course : HUMAN ANATOMY AND PHYSIOLOGY – I THEORY
Course Code : BP101T, Crédits : 04, Session :2020-21 (Odd Sem.), Class : B.Pharm. 1st Year
Faculty Name: Dr. A.N. Nagappa, Dr. Shvetank Bhatt, Dr. Naveen Sharma

A. **Introduction:** This course is designed to impart fundamental knowledge on the structure and functions of the various systems of the human body. It also helps in understanding both homeostatic mechanisms. The subject provides the basic knowledge required to understand the various disciplines of pharmacy

B. **Course Outcomes:** At the end of the course, students will be able to:

BP101T.CO1. Explain the gross morphology, structure and functions of various organs of the human body. *Define and explain the anatomy and physiology, various levels of organizations basic homeostatic mechanism.*

BP101T.CO2. Describe the various process of cell communication and homeostatic mechanisms and their imbalances. *Explain the morphology, physiology of skeletal system along with the physiology of muscle contraction in co-ordination with the joints, their articulation and skin.*

BP101T.CO3. Identify the various tissues and organs of different systems of human body and give the protection to human body as integument, support as skeleton system. *Explain and describe the composition, function of various body fluids like blood and lymph, their significance and related disorders.*

BP101T.CO4. Perform the various experiments related to special senses and nervous system. *Classify the peripheral nervous system, nerves and morphology of special senses.*

BP101T.CO5. Appreciate coordinated working pattern of some vital organs of specific system. *Explain the anatomy and physiology and parameters related to CVS and related disorders.*

C. **Programme Outcomes:**

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Programme Specific Outcomes:

PSO 1: Will be able to understand anatomy and physiology of human body system and how the human body maintain internal environment so that different organs perform work properly.

PSO 2: Will be able to give the information about how the cell communicate and maintain their functions and various disorders of

different human organs so that we can give the appropriate therapy.

PSO 3: Will be able to understand organization at the different level of human body.

Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

Unit I

- Introduction to human body Definition and scope of anatomy and physiology, levels of structural organization and body systems, basic life processes, homeostasis, basic anatomical terminology.
- Cellular level of organization Structure and functions of cell, transport across cell membrane, cell division, cell junctions. General principles of cell communication, intracellular signaling pathway activation by extracellular signal molecule, Forms of intracellular signaling: a) Contact-dependent b) Paracrine c) Synaptic d) Endocrine
- Tissue level of organization Classification of tissues, structure, location and functions of epithelial, muscular and nervous and connective tissues.

Unit II

- Integumentary system Structure and functions of skin
- Skeletal system Divisions of skeletal system, types of bone, salient features and functions of bones of axial and appendicular skeletal system Organization of skeletal muscle, physiology of muscle contraction, neuromuscular junction
- Joints Structural and functional classification, types of joints movements and its articulation

Unit III

- Body fluids and blood
- Body fluids, composition and functions of blood, hemopoeisis, formation of hemoglobin, anemia, mechanisms of coagulation, blood grouping, Rh factors, transfusion, its significance and disorders of blood, Reticulo endothelial system.
- Lymphatic system Lymphatic organs and tissues, lymphatic vessels, lymph circulation and functions of lymphatic system

Unit IV

- Peripheral nervous system: Classification of peripheral nervous system: Structure and functions of sympathetic and parasympathetic nervous system. Origin and functions of spinal and cranial nerves.
- Special senses Structure and functions of eye, ear, nose and tongue and their disorders.
-

Unit V

- Cardiovascular system Heart – anatomy of heart, blood circulation, blood vessels, structure and functions of artery, vein and capillaries, elements of conduction system of heart and heart beat, its regulation by autonomic nervous system, cardiac output, cardiac cycle. Regulation of blood pressure, pulse, electrocardiogram and disorders of heart.

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypee brothers medical publishers, New Delhi.
2. Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York
3. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co,Riverview,MI USA
4. Text book of Medical Physiology- Arthur C,Guyton andJohn.E. Hall. Miamisburg, OH, U.S.A.
5. Principles of Anatomy and Physiology by Tortora Grabowski. Palmetto, GA, U.S.A.

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Definition and scope of anatomy and physiology, levels of structural organization and body system.	Lecture	Unit-1 CO1	Mid Term-1, Quiz & End Sem Exam
2	Definition and scope of anatomy and physiology, levels of structural organization and body system.	Lecture	CO1	Mid Term-1, Quiz & End Sem Exam
3	Definition and scope of anatomy and physiology, levels of structural organization and body system.	Lecture	CO1	Mid Term-1, Quiz & End Sem Exam
4	Revision of Definition and scope of anatomy and physiology, levels of structural organization and body system.	Tutorial	CO1	Mid Term-1, Quiz & End Sem Exam
5	basic life processes, homeostasis, basic anatomical terminology.	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
6	basic life processes, homeostasis, basic anatomical terminology.	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
7	basic life processes, homeostasis, basic anatomical terminology.	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
8	Quiz	Tutorial		Mid Term-1, Quiz

				& End Sem Exam
9	Structure and functions of cell, transport across cell membrane, cell division, cell junctions.	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
10	Structure and functions of cell, transport across cell membrane, cell division, cell junctions.	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
11	Structure and functions of cell, transport across cell membrane, cell division, cell junctions.	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
12	Revision----Structure and functions of cell, transport across cell membrane, cell division, cell junctions.	Tutorial		Mid Term-1, Quiz & End Sem Exam
13	General principles of cell communication, intracellular signaling pathway activation by extracellular signal molecule, Forms of intracellular signaling: a) Contact-dependent b) Paracrine c) Synaptic d) Endocrine	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
14	General principles of cell communication, intracellular signaling pathway activation by extracellular signal molecule,	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
15	Forms of intracellular signaling: a) Contact-dependent b) Paracrine c) Synaptic d) Endocrine	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
16	Unit test	Tutorial		Mid Term-1, Quiz & End Sem Exam
17	Classification of tissues, structure, location and functions of epithelial	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
18	Classification of tissues, structure, location and functions of epithelial	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam

19	Classification of tissues, structure, location and functions of muscular and nervous.	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
20	Classification of tissues, structure, location and functions of connective tissues.	Tutorial	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
21	Structure and functions of skin	Lecture	Unit-2 CO3	Mid Term-1, Quiz & End Sem Exam
22	Divisions of skeletal system, types of bone	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
23	Divisions of skeletal system, types of bone	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
24	Quiz	Tutorial		Mid Term-1, Quiz & End Sem Exam
25	salient features and functions of bones of axial and appendicular skeletal system	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
26	Salient features and functions of bones of axial and appendicular skeletal system	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
27	Organization of skeletal muscle, physiology of muscle contraction	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
28	Revision of Bones	Tutorial		Mid Term-1, Quiz & End Sem Exam
29	Neuromuscular junction	Lecture	CO1	Mid Term-1, Quiz & End Sem Exam
30	Structural and functional classification, types of joints movements and its articulation	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
31	Structural and functional classification, types of joints movements and its articulation	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
32	Body fluids, composition and functions of blood	Tutorial	Unit-3 CO4	Mid Term-2, Quiz & End Sem Exam
33	Hemopoeisis, formation of hemoglobin, anemia,	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
34	Mechanisms of coagulation	Lecture	CO1	Mid Term-2, Quiz

			CO4	& End Sem Exam
35	Blood grouping, Rh factors	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
36	Seminar	Tutorial		Mid Term-2, Quiz & End Sem Exam
37	Transfusion, its significance and disorders of blood	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
38	Reticulo endothelial system	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
39	Lymphatic organs and tissues, lymphatic vessels, lymph circulation and functions of lymphatic system	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
40	Unit test	Tutorial		Mid Term-2, Quiz & End Sem Exam
41	Classification of peripheral nervous	Lecture	Unit-4	Mid Term-2, Quiz & End Sem Exam
42	Structure and functions of sympathetic and parasympathetic nervous system	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
43	Origin and functions of spinal and cranial nerves	Lecture	CO1	Mid Term-2, Quiz & End Sem Exam
44	Seminar	Tutorial		Mid Term-2, Quiz & End Sem Exam
45	Structure and functions of eye its their disorders.	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
46	Structure and functions of ear its disorders.	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
47	Structure and functions of tongue and its disorders.	Lecture	CO1	Quiz & End Sem Exam
48	Quiz	Tutorial		Quiz & End Sem Exam
49	Heart – anatomy	Lecture	Unit-5	Quiz & End Sem Exam
50	Heart blood circulation	Lecture	CO1 CO5	Quiz & End Sem Exam
51	Blood vessels, structure and functions of artery, vein and capillaries	Lecture	CO1 CO5	Quiz & End Sem Exam
52	Blood vessels, structure and functions of artery, vein and capillaries	Tutorial	CO1 CO5	Quiz & End Sem Exam

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53	elements of conduction system of heart and heart beat	Lecture	CO1 CO5	Quiz & End Sem Exam
54	Elements of conduction system of heart and heart beat	Lecture	CO1 CO5	Quiz & End Sem Exam
55	Regulation by autonomic nervous system, cardiac output	Lecture	CO1 CO5	Quiz & End Sem Exam
56	Unit test	Tutorial		Quiz & End Sem Exam
57	Cardiac cycle	Lecture	CO1 CO5	Quiz & End Sem Exam
58	Regulation of blood pressure, pulse, electrocardiogram and disorders of heart.	Lecture	CO1 CO5	Quiz & End Sem Exam
59	Regulation of blood pressure, pulse, electrocardiogram and disorders of heart.	Lecture	CO1 CO5	Quiz & End Sem Exam
60	Unit test	Tutorial		Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3

BP101T.1	Explain the gross morphology, structure and functions of various organs of the human body.	3	-	-	-	2	2	1	-	-	-	-		3	2	1
BP101T.2.	Describe the various process of cell communication and homeostatic mechanisms and their imbalances.	3	-	-	1	-	2	-	-	-	-	3		2	3	1
BP101T.3.	Identify the various tissues and organs of different systems of human body and give the protection to human body as integument, support as skeleton system.	3	2	-	3	-	2	-	-	-	-	3		1	2	3
BP101T.4.	Perform the various experiments related to special senses and nervous system.	2	2	3	3	-	1	-	-	-	-	3		2	3	2
BP101T.5.	Appreciate coordinated working pattern of some vital organs of specific system.	3	-	2	-	2	-	-	-	-	-	3		2	3	3

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Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacology I MID-SEMESTER (SEM –Ist) 2020-21						
Class: B.Pharm, I Semester						
Subject Name: BP101T Human Anatomy and Physiology-I Theory		Time: 1 Hrs			Max. Marks: 30	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,2,4,10	Q.8,9,6	Q.5,3	Q.7		

Student will be able to

CO1. Explain the gross morphology, structure and functions of various organs of the human body.

CO2. Describe the various process of cell communication and homeostatic mechanisms and their imbalances.

CO3. Identify the various tissues and organs of different systems of human body and give the protection to human body as integument, support as skeleton system.

CO Map	Question No.	Question	Marks
CO1	Q.1	*What is* structural and functional unit of all living beings	2
CO1	Q.2	Define homeostasis.	2
CO1	Q.3	Make use of cell junctions for the cell.	2
CO2	Q.4	Why is cell communication important for cell.	2
CO2	Q.5	Identify correct location of carpal bones.	2
CO3	Q.6	Explain mechanism of the skeletal muscles contraction.	10
CO2	Q.7	Distinguish different layers of skin.	10
CO1 CO2	Q.8	Compare plant cell and animal cell.	5
CO1 CO3	Q.9	Classify upper and lower limb bones	5
CO1 CO2	Q.10	What are the basic life processes	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 1:

63.5 % Percentage of students secured more than 60% marks, so this course Human Anatomy And Physiology I- Theory (BP101T) attained Level -1.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharmacy), Academic Year – 2020-21

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11				
I SEM	BP102T	3	3	3	2	-	1	2	2	1	-	1		-	-	-

Dr. Mohanty

DEPARTMENT OF PHARMACEUTICAL CHEMISTRY
Course Handout
Course : PHARMACEUTICAL ANALYSIS (Theory)
Course Code : BP102T , Crédits : 04, Session :2020-21(Odd Sem.), Class : B.Pharm. 1st Year
Faculty Name : Dr. Pawan Kumar Gupta

A. **Introduction:** This course deals with the fundamentals of analytical chemistry and principles of electrochemical analysis of drugs. It aims to understand the principles of volumetric and electro chemical analysis and carryout various volumetric and electrochemical titrations.

B. **Course Outcomes:** At the end of the course, students will be:

BP102T.1. Able to **discuss** principles of volumetric analysis

BP102T.2. Able to **explain** the basics of different titration methodologies

BP102T.3. Able to **compare** various electrochemical methods of analysis

BP102T.4. Able to **ensure** quality of product by titrations

BP102T.5. Able to **develop** methods for the estimation and determination of drugs and pharmaceuticals

C. **Programme Outcomes:**

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

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[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis**.**

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2 quiz, assignment, open book test, field work, group discussion and seminar)		
	Seminar/ Assignment/Quiz/ Open book test	S/As/Q/OBT	3%

Interaction	Student-Teacher interaction	ST	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

UNIT I

a) Pharmaceutical analysis- Definition and scope

i. Different techniques of analysis
ii. Methods of expressing concentration
iii. Primary and secondary standards.
iv. Preparation and standardization of various molar and normal solutions-Oxalic acid, sodium hydroxide, hydrochloric acid, sodium thiosulphate, sulphuric acid, potassium permanganate and ceric ammonium sulphate

b) **Errors:** Sources of errors, types of errors, methods of minimizing errors, accuracy, precision and significant figures

c) Pharmacopoeia, Sources of impurities in medicinal agents,limit tests.

UNIT-II

- **Acid base titration**: Theories of acid base indicators, classification of acid base titrations and theory involved in titrations of strong, weak, and very weak acids and bases, neutralization curves
- **Non aqueous titration**: Solvents, acidimetry and alkalimetry titration and estimation of Sodium benzoate and Ephedrine HCl

UNIT-III

- **Precipitation titrations**: Mohr's method, Volhard's, Modified Volhard's, Fajans method, estimation of sodium chloride
- **Complexometric titration**: Classification, metal ion indicators, masking and demasking reagents, estimation of Magnesium sulphate, and calcium gluconate.
- **Gravimetry**: Principle and steps involved in gravimetric analysis. Purity of the precipitate: co-precipitation and post precipitation, Estimation of barium sulphate.

UNIT -IV

Redox titrations

(a) Concepts of oxidation and reduction
(b) Types of redox titrations (Principles and applications)

Cerimetry, Iodimetry, Iodometry, Bromatometry, Dichrometry, Titration with potassium iodate

UNIT-V

Electrochemical methods of analysis

- Conductometry- Introduction, Conductivity cell, Conductometric titrations, applications.
- Potentiometry - Electrochemical cell, construction and working of reference (Standard hydrogen, silver chloride electrode and calomel electrode) and indicator electrodes (metal electrodes and glass electrode), methods to determine end point of potentiometric titration and applications.
- Polarography - Principle, Ilkovic equation, construction and working of dropping mercury electrode and rotating platinum electrode, applications

F. Examination Scheme:

Components	A	ST	CT	S/As/Q/OBT	EE
Weightage (%)	4	3	15	3	75

CT: Class Test, As: Assignment, ST: Student teacher interaction, S/A/Q/OBT: Seminar/ Assignment/Quiz/ Open book test, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

- AA Napoleon, Pharmaceutical Titrimetric Analysis,
- Skoog-Instrumental Analysis and Skoog fundamentals of analytical chemistry.
- AH Beckett & Stenlake Vol. I & II practical pharmaceutical chemistry, Continuum International Publishing Group, Althone.
- Connors, A Textbook of Pharmaceutical Analysis.
- Chatwal & anand, Instrumental methods of Analysis.

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Pharmaceutical analysis- Definition and scope	Lecture	BP102T.1	Mid Term-1, Quiz & End Sem Exam
2	Methods of expressing concentration	Lecture	BP102T.4	Mid Term-1, Quiz & End Sem Exam
3	Primary and secondary standards.	Lecture	BP102T.4	Mid Term-1, Quiz & End Sem Exam
4	Tutorial class Methods of expressing concentration	Lecture	BP102T.4	Mid Term-1, Assignment ,Quiz & End Sem Exam
5	Preparation and standardization of various molar and normal solutions	Lecture	BP102T.4	Mid Term-1, Quiz & End Sem Exam
6	Sources of errors and Types of errors	Lecture	BP102T.4	Mid Term-1, Quiz & End Sem Exam
7	Methods of minimizing errors	Lecture	BP102T.4	Mid Term-1, Quiz & End Sem Exam
8	Tutorial class Sources of errors	Lecture	BP102T.4	Mid Term-1, Quiz, Class test & End Sem Exam
9	Accuracy, precision and significant figures	Lecture	BP102T.4	Mid Term-1, Quiz & End

				Sem Exam
10	Pharmacopoeia	Lecture	BP102T.5	Mid Term-1, Quiz & End Sem Exam
11	Sources of impurities in medicinal agents	Lecture	BP102T.4	Mid Term-1, Quiz & End Sem Exam
12	*Tutorial class:* Pharmacopoeia	Lecture	BP102T.5	Mid Term-1, Assignment ,Quiz & End Sem Exam
13	Limit tests	Lecture	BP102T.4	Mid Term-1, Quiz & End Sem Exam
14	Theories of acid base indicators	Lecture	BP102T.1 & BP102T.2	Mid Term-1, Quiz & End Sem Exam
15	Classification of acid base titrations	Lecture	BP102T.2	Mid Term-1, Quiz & End Sem Exam
16	*Tutorial class Acid and base*	Lecture	BP102T.1	Mid Term-1, Class test, Quiz & End Sem Exam
17	Theory involved in titrations of strong, weak, and very weak acids and bases,	Lecture	BP102T.1	Mid Term-1, Quiz & End Sem Exam
18	Neutralization curves	Lecture	BP102T.2	Mid Term-1, Quiz & End Sem Exam
19	Non aqueous titration: Solvents	Lecture	BP102T.2	Mid Term-1, Quiz & End Sem Exam
20	*Tutorial class* Neutralization curves	Lecture	BP102T.2	Mid Term-1, Assignment ,Quiz & End Sem Exam
21	Acidimetry and alkalimetry titration	Lecture	BP102T.2	Mid Term-1, Quiz & End Sem Exam
22	Estimation of Sodium benzoate	Lecture	BP102T.5	Mid Term-1, Quiz & End Sem Exam
23	Estimation of Ephedrine HCl	Lecture	BP102T.5	Mid Term-1, Quiz & End Sem Exam
24	*Tutorial class* Acidimetry	Lecture	BP102T.2	Mid Term-1, Quiz & End Sem Exam
25	Mohr's and Volhards method	Lecture	BP102T.1	Mid Term-1,

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				Quiz & End Sem Exam
26	Fajans method	Lecture	BP102T.5	Mid Term-1, Quiz & End Sem Exam
27	Estimation of sodium chloride.	Lecture	BP102T.5	Mid Term-1, Quiz & End Sem Exam
28	*Tutorial class* Volhards method	Lecture	BP102T.5	Mid Term-2, Seminar,Quiz & End Sem Exam
29	Complexometric titration: Classification	Lecture	BP102T.2	Mid Term-2, Quiz & End Sem Exam
30	Metal ion indicators, masking and demasking reagents,	Lecture	BP102T.2	Mid Term-2, Quiz & End Sem Exam
31	Estimation of Magnesium sulphate, and calcium gluconate.	Lecture	BP102T.5	Mid Term-2, Quiz & End Sem Exam
32	*Tutorial class* Estimation of Magnesium sulphate	Lecture	BP102T.5	Mid Term-2, Quiz & End Sem Exam
33	**Gravimetry**: Principle and steps involved in gravimetric analysis.	Lecture	BP102T.1	Mid Term-2, Quiz & End Sem Exam
34	Purity of the precipitate: co-precipitation and post precipitation	Lecture	BP102T.1	Mid Term-2, Quiz & End Sem Exam
35	Estimation of barium sulphate	Lecture	BP102T.5	Mid Term-2, Quiz & End Sem Exam
36	*Tutorial class* Gravimetric analysis.	Lecture	BP102T.1	Mid Term-2, Assignment ,Quiz & End Sem Exam
37	Basic Principles, methods and application of diazotisation titration.	Lecture	BP102T.1	Mid Term-2, Quiz & End Sem Exam
38	Concepts of oxidation	Lecture	BP102T.2	Mid Term-2, Quiz & End Sem Exam
39	Concepts of reduction	Lecture	BP102T.2	Mid Term-2, Quiz & End Sem Exam
40	*Tutorial class* Oxidation and reduction	Lecture	BP102T.2	Mid Term-2, Quiz & End

				Sem Exam
41	Types of redox titrations (Principles and applications)	Lecture	BP102T.2	Mid Term-2, Quiz & End Sem Exam
42	Cerimetry	Lecture	BP102T.1& BP102T.5	Mid Term-2, Quiz & End Sem Exam
43	Iodimetry	Lecture	BP102T.1& BP102T.5	Mid Term-2, Quiz & End Sem Exam
44	*Tutorial class* *Redox reactions*	Lecture	BP102T.1& BP102T.5	Mid Term-2, Seminar, Quiz & End Sem Exam
45	Iodometry	Lecture	BP102T.1& BP102T.5	Mid Term-2, Quiz & End Sem Exam
46	Bromatometry	Lecture	BP102T.1& BP102T.5	Mid Term-2, Quiz & End Sem Exam
47	Dichrometry	Lecture	BP102T.1& BP102T.5	Mid Term-2, Quiz & End Sem Exam
48	*Tutorial class* Iodometry	Lecture	BP102T.1& BP102T.5	Mid Term-2, Seminar, Quiz & End Sem Exam
49	Titration with potassium iodate	Lecture	BP102T.1& BP102T.5	Mid Term-2, Quiz & End Sem Exam
50	Conductivity cell	Lecture	BP102T.3	Mid Term-2, Quiz & End Sem Exam
51	Conductometric Titrations and applications.	Lecture	BP102T.3	Mid Term-2, Quiz & End Sem Exam
52	*Tutorial class*: Conductometric methods	Lecture	BP102T.3	Mid Term-2, Assignment ,Quiz & End Sem Exam
53	Electrochemical cell	Lecture	BP102T.3	Mid Term-2, Quiz & End Sem Exam
54	Construction and working of reference (Standard hydrogen, silver chloride electrode and calomel electrode)	Lecture	BP102T.3	Mid Term-2, Quiz & End Sem Exam
55	Indicator electrodes (metal electrodes and glass electrode)	Lecture	BP102T.3	Mid Term-2, Quiz & End Sem Exam

56	*Tutorial class* Standard hydrogen, silver chloride electrode	Lecture	BP102T.3	Mid Term-2, Quiz & End Sem Exam
57	Methods to determine end point of potentiometric titration and applications	Lecture	BP102T.3 and BP102T.5	Mid Term-2, Quiz & End Sem Exam
58	Ilkovic equation	Lecture	BP102T.3	Mid Term-2, Quiz & End Sem Exam
59	Construction and working of dropping mercury electrode and rotating platinum electrode and applications	Lecture	BP102T.3	Mid Term-2, Quiz & End Sem Exam
60	*Tutorial class* End point of potentiometric titration	Lecture	BP102T.3 and BP102T.5	Mid Term-2, Seminar,Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP102T.1.	Able to discuss principles of volumetric analysis	3	3	1	2	1				1		2
BP102T.2.	Able to explain the basics of different titration methodologies	3	3	1	3	2				2		2
BP102T.3.	Able to compare various electrochemical methods of analysis	3	3	2	3	2				3		2
BP102T.4.	Able to ensure quality of product by titrations	3	3	2	2	2			2	2		2
BP102T.5.	Able to develop methods for the estimation and determination of drugs and pharmaceuticals	3	3	2	3	3			2	2		3

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Sample Question Paper

Amity Institute of pharmacy Department of Pharmaceutical Chemistry II MID-SEMESTER (SEM –I) 2020-21						
Class: B.Pharmacy I Semester						
Subject Name: BP102T PHARMACEUTICAL ANALYSIS		Time: 1 Hr		Max. Marks: 30		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3,4	Q.2,5,9,10	Q.6	Q.8		Q.7

Student will be

CO1. Able to **discuss** principles of volumetric analysis

CO.2. Able to **explain** the basics of different titration methodologies

CO.3. Able to **compare** various electrochemical methods of analysis

CO.4. Able to **ensure** quality of product by titrations

CO.5. Able to **develop** methods for the estimation and determination of drugs and Pharmaceuticals

CO Map	Question No.	Question	Marks
CO2	Q.1	Define precipitation titrations	2
CO1	Q.2	Write a note on estimation of barium sulphate	2
	Q.3	Define oxidation and reduction	2
CO1	Q.4	What is co-precipitation and post precipitation with examples	2
CO2	Q.5	Explain the principle of Bromatometry	2
CO4	Q.6	Enuumarate construction and working of dropping mercury electrode.	10
	Q.7	Discuss various steps involved in Gravimetric analysis	10
CO2	Q 8	Describe the principle involved in potassium iodate titration.	5
CO5	Q.9	Write a note on Fajan's method.	5
CO3	Q 10	Explain the methods to determine end point of	5

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		potentiometric titration.	

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 0:

55.58 % Percentage of students secured more than 60% marks, so this course not attained any Level.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICS

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-21

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I SEM																
	BP103T	3	-	2	-	1	3	2	1	1	-	2				

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MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICS
Course Handout
Course : PHARMACEUTICS – I THEORY
Course Code : BP103T, Crédits : 04, Session :2020-21 (Odd Sem.), Class : B.Pharm. 1st Year
Faculty Name: Dr. Neeraj Mishra and Dr. Jovita Kanoujia

A. Introduction: The course is designed to impart fundamental knowledge on the preparatory
pharmacy with arts and science of preparing the different conventional dosage forms.

B. Course Outcomes: At the end of the course, students will be able to:

BP103T.1. Relate pharmacy education, and pharmacy history with pharmacy career options.

BP103T.2. Classify the different types of dosage forms based on uses, physical form, and pharmaceutical incompatibilities.

BP103T.3. Experiment in the development of various conventional dosage forms such as solid, liquid, and semisolid dosage forms.

BP103T.4. Able to analyze the prescription, stability issues in emulsion and suspension.

BP103T.5. Solve the dose calculation, pharmaceutical calculations.

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to

identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

UNIT – I

Historical background and development of profession of pharmacy: History of profession of Pharmacy in India in relation to pharmacy education, industry and organization, Pharmacy as a career, Pharmacopoeias: Introduction to IP, BP, USP and Extra Pharmacopoeia. **Dosage forms:** Introduction to dosage forms, classification and definitions, **Prescription:** Definition, Parts of prescription, handling of Prescription and Errors in prescription. **Posology:** Definition, Factors affecting posology. Pediatric dose calculations based on age, body weight and body surface area.

UNIT – II

Pharmaceutical calculations: Weights and measures – Imperial & Metric system, Calculations involving percentage solutions, alligation, proof spirit and isotonic solutions based on freezing point and molecular weight. **Powders:** Definition, classification, advantages and disadvantages, Simple & compound powders – official preparations, dusting powders, effervescent, efflorescent and hygroscopic powders, eutectic mixtures.

Geometric dilutions. **Liquid dosage forms:** Advantages and disadvantages of liquid dosage forms. Excipients used in formulation of liquid dosage forms. Solubility enhancement techniques.

UNIT – III

Monophasic liquids: Definitions and preparations of Gargles, Mouthwashes, Throat Paint, Eardrops, Nasal drops, Enemas, Syrups, Elixirs, Liniments and Lotions.**Biphasic liquids: Suspensions:** Definition, advantages and disadvantages, classifications, Preparation of suspensions; Flocculated and Deflocculated suspension & stability problems and methods to overcome. **Emulsions:** Definition, classification, emulsifying agent, test for the identification of type of Emulsion, Methods of preparation & stability problems and methods to overcome.

UNIT – IV

Suppositories: Definition, types, advantages and disadvantages, types of bases, methods of preparations. Displacement value & its calculations, evaluation of suppositories. **Pharmaceutical incompatibilities**: Definition, classification, physical, chemical and therapeutic incompatibilities with examples.

UNIV – V

Semisolid dosage forms: Definitions, classification, mechanisms and factors influencing dermal penetration of drugs. Preparation of ointments, pastes, creams and gels. Excipients used in semi solid dosage forms. Evaluation of semi solid dosages forms

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

- H.C. Ansel et al., Pharmaceutical Dosage Form and Drug Delivery System, Lippincott Williams and Walkins, New Delhi.
- Carter S.J., Cooper and Gunn's-Dispensing for Pharmaceutical Students, CBS publishers, New Delhi.
- M.E. Aulton, Pharmaceutics, The Science& Dosage Form Design, Churchill Livingstone, Edinburgh.
- Indian pharmacopoeia.
- British pharmacopoeia.

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO

1	History of profession of Pharmacy in India in relation to pharmacy education	Lecture	1	Mid Term-1, Quiz & End Sem Exam
2	History of profession of Pharmacy in India in relation to pharmacy industry and organization	Lecture	1	Mid Term-1, Quiz & End Sem Exam
3	Pharmacy as a career	Lecture		Mid Term-1, Quiz & End Sem Exam
4	Revision of history of pharmacy	Tutorial	1	Mid Term-1, Quiz & End Sem Exam
5	Introduction to dosage forms	Lecture	2	Mid Term-1, Quiz & End Sem Exam
6	classification and definitions	Lecture	2	Mid Term-1, Quiz & End Sem Exam
7	classification and definitions	Lecture	2	Mid Term-1, Quiz & End Sem Exam
8	Quiz	Tutorial		Mid Term-1, Quiz & End Sem Exam
9	Definition, Parts of prescription,	Lecture	4	Mid Term-1, Quiz & End Sem Exam
10	Handling of Prescription and Errors in prescription.	Lecture	4	Mid Term-1, Quiz & End Sem Exam
11	Definition, Factors affecting posology.	Lecture	5	Mid Term-1, Quiz & End Sem Exam
12	Discussion about posology	Tutorial		Mid Term-1, Quiz & End Sem Exam
13	Pediatric dose calculations based on age, body weight and body surface area.	Lecture	5	Mid Term-1, Quiz & End Sem Exam
14	Weights and measures – Imperial & Metric system,	Lecture	5	Mid Term-1, Quiz & End Sem Exam
15	Calculations involving percentage solutions, alligation, proof spirit	Lecture	5	Mid Term-1, Quiz & End Sem Exam
16	Unit test	Tutorial		Mid Term-1, Quiz & End Sem Exam
17	Calculations involving isotonic solutions based on freezing point and molecular weight.	Lecture	5	Mid Term-1, Quiz & End Sem Exam
18	**Powders:** Definition, classification, advantages and	Lecture	2,3	Mid Term-1, Quiz & End Sem Exam

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	disadvantages, Simple & compound powders			
19	Official preparations, dusting powders, effervescent, efflorescent and hygroscopic powders,	Lecture	2,3	Mid Term-1, Quiz & End Sem Exam
20	Group discussion on different topics	Tutorial		Mid Term-1, Quiz & End Sem Exam
21	Eutectic mixtures. Geometric dilutions. Liquid dosage forms	Lecture	2,3	Mid Term-1, Quiz & End Sem Exam
22	Advantages and disadvantages of liquid dosage forms.	Lecture	2,3	Mid Term-1, Quiz & End Sem Exam
23	Excipients used in formulation of liquid dosage forms.	Lecture	2,3	Mid Term-1, Quiz & End Sem Exam
24	Quiz	Tutorial		Mid Term-1, Quiz & End Sem Exam
25	Solubility enhancement techniques.	Lecture	2,3	Mid Term-1, Quiz & End Sem Exam
26	Definitions and preparations of Gargles	Lecture	Unit-3	Mid Term-1, Quiz & End Sem Exam
27	Mouthwashes, Throat Paint	Lecture	2,3	Mid Term-1, Quiz & End Sem Exam
28	Revision of solubility enhancement technique	Tutorial		Mid Term-1, Quiz & End Sem Exam
29	Eardrops, Nasal drops, Enemas	Lecture	2,3	Mid Term-1, Quiz & End Sem Exam
30	Syrups, Elixirs,	Lecture	2,3	Mid Term-1, Quiz & End Sem Exam
31	Liniments and Lotions	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
32	Group discussion on liquid dosage form	Tutorial		Mid Term-2, Quiz & End Sem Exam
33	Definition, advantages and disadvantages, classifications, Preparation of suspensions	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
34	Flocculated and Deflocculated suspension	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
35	Stability problems and methods to overcome	Lecture	4	Mid Term-2, Quiz & End Sem Exam
36	Seminar	Tutorial		Mid Term-2, Quiz & End Sem Exam
37	Definition, classification, emulsifying agent	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam

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38	Test for identification, type of Emulsion,	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
39	Methods of preparation	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
40	Unit test	Tutorial		Mid Term-2, Quiz & End Sem Exam
41	Stability problems and methods to overcome	Lecture	4	Mid Term-2, Quiz & End Sem Exam
42	Semisolid dosage forms: Definitions, classification	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
43	Mechanisms and factors influencing dermal penetration of drugs	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
44	Seminar	Tutorial		Mid Term-2, Quiz & End Sem Exam
45	Preparation of ointments	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
46	Preparation of paste	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
47	Preparation of cream & gel	Lecture	2,3	Quiz & End Sem Exam
48	Quiz	Tutorial		Quiz & End Sem Exam
49	Excipients used in semi solid dosage forms	Lecture	2,3	Quiz & End Sem Exam
50	Evaluation of semi solid dosages forms	Lecture	2,3	Quiz & End Sem Exam
51	Semisolid dosage forms: Definitions, classification	Lecture	2,3	Quiz & End Sem Exam
52	Group discussion on semisolid dosage form	Tutorial		Quiz & End Sem Exam
53	Mechanisms and factors influencing dermal penetration of drugs	Lecture	2,3	Quiz & End Sem Exam
54	Preparation of ointments	Lecture	2,3	Quiz & End Sem Exam
55	Preparation of paste	Lecture	2,3	Quiz & End Sem Exam
56	Unit test	Tutorial		Quiz & End Sem Exam
57	Preparation of cream & gel	Lecture	2,3	Quiz & End Sem Exam
58	Excipients used in semi solid dosage forms	Lecture	2,3	Quiz & End Sem Exam
59	Evaluation of semi solid dosages	Lecture	2,3	Quiz & End Sem

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	forms			Exam
60	Unit test	Tutorial		Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP103T.1	**BP103T.1**. Relate pharmacy education, and pharmacy history with pharmacy career options.	3	-	-	-	2	2	1	-	1	-	-				
BP103T.2.	**BP103T.2**. Classify the different types of dosage forms based on uses, physical form, and pharmaceutical incompatibilities.	3	-	-	1	-	2	-	-	-	-	3				
BP103T.3.	**BP103T.3**. Experiment in the development of various conventional dosage forms such as solid, liquid, and semisolid dosage forms.	3	2	-	3	-	2	-	-	-	-	3				
BP103T.4.	**BP103T.4**. Able to analyze the prescription, stability issues in	2	2	3	3	-	1	-	-	-	-	3				

	emulsion and suspension.															
BP103T.5.	**BP103T.5**. Solve the dose calculation, pharmaceutical calculations.	1	-	3	-	-	-	-	-	-	-	3				

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutics I MID-SEMESTER (SEM –Ist) 2020-21						
Class: B.Pharm, I Semester						
Subject Name: BP103T Pharmaceutics-I Theory		Time: 1 Hrs		Max. Marks: 30		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3,4,5	Q.6,8,9	Q.2	Q.7, 10		

The student will be able to

CO1. Relate pharmacy education, and pharmacy history with pharmacy career options.

CO2. Classify the different types of dosage forms based on uses, physical form, and pharmaceutical incompatibilities.

CO3. Experiment in the development of various conventional dosage forms such as solid, liquid, and semisolid dosage forms.

CO4. Able to analyze the prescription, stability issues in emulsion and suspension.

CO5. Solve the dose calculation, pharmaceutical calculations.

CO Map	Question No.	Question	Marks
CO4	Q.1	Enlist the factor affecting posology	2
CO5	Q.2	Apply any formula to calculate the pediatric dose for a 20-year-old child. The adult dose for the same drug is 400mg. What dose should the child be given?	2

CO1	Q.3	Who is the first pharmacy graduate in India?	2
CO2	Q.4	Define dusting powder.	2
CO2	Q.5	Write the name of two solid dosage forms.	2
CO1	Q.6	Summarize the different career options available in the field of pharmacy	10
CO4	Q.7	Assume the drug is having a problem of poor solubility, how will you solve this issue?	10
CO3	Q.8	Compare monophasic and biphasic liquid dosage form	5
CO2	Q.9	Illustrate the classification of different dosage forms on the basis of route of administration.	5
CO4	Q.10	How to solve the stability issues in suspension?	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 1:

65.4 % Percentage of students secured more than 60% marks, so this course Pharmaceutics I- Theory (BP103T) attained Level -1.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharmacy), Academic Year – 2020-21

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11				
I SEM	BP104T	3	3	3	3	2		1	2	2	-	2		-	-	-

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DEPARTMENT OF PHARMACEUTICAL CHEMISTRY
Course Handout
Course : PHARMACEUTICAL INORGANIC CHEMISTRY (Theory)
Course Code : BP104T , Crédits : 04, Session :2020-21 (Odd Sem.), Class : B.Pharm. 1st Year
Faculty Name : Dr. Srabanti Jana

A. **Introduction:** This course deals with the fundamentals of inorganic chemistry and monograph of inorganic drugs and pharmaceuticals. It aims to understand the preparation assay, properties and medicinal uses of inorganic compounds.

B. **Course Outcomes:** At the end of the course, students will be:

BP104T.1. Able to discuss the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals.

BP104T.2. Able to Study the monographs of inorganic drugs and pharmaceuticals.

BP104T.3. Able to understand the medicinal and pharmaceutical importance of inorganic compounds.

BP104T.4. Able to learn about preparations, properties, chemical reactions and assay of inorganic compounds

BP104T.5. Able to discuss radio activity, measurement of radioactivity, properties and pharmaceutical applications of radiopharmaceuticals.

C. **Programme Outcomes:**

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the

limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2 quiz, assignment, open book test, field work, group discussion and seminar)		

	Seminar/ Assignment/Quiz/ Open book test	S/As/Q/OBT	3%
Interaction	Student-Teacher interaction	ST	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

UNIT I

- **Impurities in pharmaceutical substances:** History of Pharmacopoeia, Sources and types of impurities, principle involved in the limit test for Chloride, Sulphate, Iron, Arsenic, Lead and Heavy metals, modified limit test for Chloride and Sulphate
- **General methods of preparation**, assay for the compounds superscripted with **asterisk (*),** properties and medicinal uses of inorganic compounds belonging to the following classes

UNIT II

- **Acids, Bases and Buffers:** Buffer equations and buffer capacity in general, buffers in pharmaceutical systems, preparation, stability, buffered isotonic solutions, measurements of tonicity, calculations and methods of adjusting isotonicity.
- **Major extra and intracellular electrolytes**: Functions of major physiological ions, Electrolytes used in the replacement therapy: Sodium chloride*, Potassium chloride, Calcium gluconate* and Oral Rehydration Salt (ORS), Physiological acid base balance.
- **Dental products**: Dentifrices, role of fluoride in the treatment of dental caries, Desensitizing agents, Calcium carbonate, Sodium fluoride, and Zinc eugenol cement.

UNIT III

- **Gastrointestinal agents**
  Acidifiers: Ammonium chloride* and Dil. HCl
  Antacid: Ideal properties of antacids, combinations of antacids, Sodium Bicarbonate*, Aluminum hydroxide gel, Magnesium hydroxide mixture
  Cathartics: Magnesium sulphate, Sodium orthophosphate, Kaolin and Bentonite
  Antimicrobials: Mechanism, classification, Potassium permanganate, Boric acid, Hydrogen peroxide*, Chlorinated lime*, Iodine and its preparations

UNIT IV

- **Miscellaneous compounds**
  Expectorants: Potassium iodide, Ammonium chloride*.
  Emetics: Copper sulphate*, Sodium potassium tartarate
  Haematinics: Ferrous sulphate*, Ferrous gluconate
  Poison and Antidote: Sodium thiosulphate*, Activated charcoal, Sodium nitrite333
  Astringents: Zinc Sulphate, Potash Alum

UNIT V

- **Radiopharmaceuticals**: Radio activity, Measurement of radioactivity, Properties of α, β, γ radiations, Half-life, radio isotopes and study of radio isotopes - Sodium iodide I^{131}, Storage

conditions, precautions & pharmaceutical application of radioactive substances.

F. Examination Scheme:

Components	A	ST	CT	S/As/Q/OBT	EE
Weightage (%)	4	3	15	3	75

CT: Class Test, As: Assignment, ST: Student teacher interaction, S/A/Q/OBT: Seminar/ Assignment/Quiz/ Open book test, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. E A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, Stahlone Press of University of London, 4th edition
2. A.I. Vogel, Text Book of Quantitative Inorganic analysis
3. P. Gundu Rao, Inorganic Pharmaceutical Chemistry, 3rd Edition
4. M.L Schroff, Inorganic Pharmaceutical Chemistry
5. Bentley and Driver's Textbook of Pharmaceutical Chemistry
6. Anand & Chatwal, Inorganic Pharmaceutical Chemistry
7. Indian Pharmacopoeia

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	History of Pharmacopoeia	Lecture	BP104T.1 & BP104T.2	Mid Term-1, Quiz & End Sem Exam
2	Sources and types of impurities	Lecture	BP104T.1	Mid Term-1, Quiz & End Sem Exam
3	Principle involved in the limit test for Chloride,	Lecture	BP104T.1	Mid Term-1, Quiz & End Sem Exam
4	Tutorial class History of Pharmacopoeia	Lecture	BP104T.1	Mid Term-1, Assignment ,Quiz & End Sem Exam
5	Principle involved in the limit test for Sulphate	Lecture	BP104T.1	Mid Term-1, Quiz & End Sem Exam
6	Principle involved in the limit test for Iron	Lecture	BP104T.1	Mid Term-1, Quiz & End Sem Exam
7	Principle involved in the limit test for Arsenic	Lecture	BP104T.1	Mid Term-1, Quiz & End Sem Exam

8	Tutorial class limit test for Arsenic	Lecture	BP104T.1	Mid Term-1, Quiz, Class test & End Sem Exam
9	Principle involved in the limit test for Lead	Lecture	BP104T.1	Mid Term-1, Quiz & End Sem Exam
10	Heavy metals	Lecture	BP104T.1	Mid Term-1, Quiz & End Sem Exam
11	Modified limit test for Chloride and Sulphate	Lecture	BP104T.1	Mid Term-1, Quiz & End Sem Exam
12	*Tutorial class:* Modified limit test for Chloride	Lecture	BP104T.1	Mid Term-1, Assignment ,Quiz & End Sem Exam
13	Buffer equations and buffer capacity in general	Lecture	BP104T.2& BP104T.4	Mid Term-1, Quiz & End Sem Exam
14	Buffers in pharmaceutical systems, preparation, stability,	Lecture	BP104T.2& BP104T.4	Mid Term-1, Quiz & End Sem Exam
15	Buffered isotonic solutions, measurements of tonicity, calculations	Lecture	BP104T.2& BP104T.4	Mid Term-1, Quiz & End Sem Exam
16	*Tutorial class* Buffered isotonic solutions	Lecture	BP104T.4	Mid Term-1, Class test, Quiz & End Sem Exam
17	Methods of adjusting isotonicity.	Lecture	BP104T.2& BP104T.4	Mid Term-1, Quiz & End Sem Exam
18	Functions of major physiological ions	Lecture	BP104T.2& BP104T.4	Mid Term-1, Quiz & End Sem Exam
19	Electrolytes used in the replacement therapy: Sodium chloride*, Potassium chloride, Calcium gluconate	Lecture	BP104T.2& BP104T.3	Mid Term-1, Quiz & End Sem Exam
20	*Tutorial class* Electrolytes used in the replacement therapy	Lecture	BP104T.2& BP104T.3	Mid Term-1, Assignment ,Quiz & End Sem Exam
21	Oral Rehydration Salt (ORS), Physiological acid base balance.	Lecture	BP104T.2& BP104T.3	Mid Term-1, Quiz & End Sem Exam
22	Dentifrices, role of fluoride in the treatment of dental caries	Lecture	BP104T.2& BP104T.3	Mid Term-1, Quiz & End Sem Exam

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23	Desensitizing agents	Lecture	BP104T.2& BP104T.3	Mid Term-1, Quiz & End Sem Exam
24	*Tutorial class* Desensitizing agents	Lecture	BP104T.2& BP104T.3	Mid Term-1, Quiz & End Sem Exam
25	Calcium carbonate, Sodium fluoride, and Zinc eugenol cement.	Lecture	BP104T.2& BP104T.3	Mid Term-1, Quiz & End Sem Exam
26	**Acidifiers:** Ammonium chloride	Lecture	BP104T.2& BP104T.3	Mid Term-1, Quiz & End Sem Exam
27	Dil. HCl	Lecture	BP104T.2& BP104T.3	Mid Term-1, Quiz & End Sem Exam
28	*Tutorial class* Acidifiers	Lecture	BP104T.2& BP104T.3	Mid Term-1, Seminar,Quiz & End Sem Exam
29	**Antacid:** Ideal properties of antacids, combinations of antacids	Lecture	BP104T.2& BP104T.3	Mid Term-1, Quiz & End Sem Exam
30	Sodium Bicarbonate*, Aluminum hydroxide gel	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
31	Magnesium hydroxide mixture	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
32	*Tutorial class* Magnesium hydroxide mixture	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
33	**Cathartics:** Magnesium sulphate	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
34	Sodium orthophosphate,	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
35	Kaolin and Bentonite	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
36	*Tutorial class* Bentonite	Lecture	BP104T.2& BP104T.3	Mid Term-2, Assignment ,Quiz & End Sem Exam
37	**Antimicrobials**: Mechanism, classification, Potassium permanganate	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
38	Boric acid, Hydrogen peroxide*	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam

39	Chlorinated lime*, Iodine and its preparations	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
40	*Tutorial class* Iodine	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
41	**Expectorants:** Potassium iodide	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
42	Ammonium chloride	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
43	**Emetics**: Copper sulphate*, Sodium potassium tartarate	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
44	*Tutorial class* Copper sulphate	Lecture	BP104T.2& BP104T.3	Mid Term-2, Seminar, Quiz & End Sem Exam
45	**Haematinics:** Ferrous sulphate*, Ferrous gluconate	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
46	**Poison and Antidote:** Sodium thiosulphate*	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
47	Activated charcoal, Sodium nitrite	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
48	*Tutorial class* Activated charcoal	Lecture	BP104T.2& BP104T.3	Mid Term-2, Seminar, Quiz & End Sem Exam
49	**Astringents**: Zinc Sulphate, Potash Alum	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
50	**Radiopharmaceuticals**: Radio activity	Lecture	BP104T.5	Mid Term-2, Quiz & End Sem Exam
51	Measurement of radioactivity.	Lecture	BP104T.5	Mid Term-2, Quiz & End Sem Exam
52	*Tutorial class*: Measurement of radioactivity.	Lecture	BP104T.5	Mid Term-2, Assignment ,Quiz & End Sem Exam
53	Properties of α, β, γ radiations, Half-life	Lecture	BP104T.5	Mid Term-2, Quiz & End Sem Exam
54	Radio isotopes	Lecture	BP104T.5	Mid Term-2, Quiz & End

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				Sem Exam
55	study of radio isotopes - Sodium iodide I^{131}	Lecture	BP104T.5	Mid Term-2, Quiz & End Sem Exam
56	*Tutorial class* Sodium iodide I^{131}	Lecture	BP104T.5	Mid Term-2, Quiz & End Sem Exam
57	Storage conditions	Lecture	BP104T.5	Mid Term-2, Quiz & End Sem Exam
58	Precautions of radioactive substances.	Lecture	BP104T.5	Mid Term-2, Quiz & End Sem Exam
59	Pharmaceutical application of radioactive substances.	Lecture	BP104T.5& BP104T.3	Mid Term-2, Quiz & End Sem Exam
60	*Tutorial class* Precautions of radioactive substances.	Lecture	BP104T.5	Mid Term-2, Seminar,Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP104T.1.	Able to discuss the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals	3	3	2	2	2				2		2
BP104T.2.	Able to Study the monographs of inorganic drugs and pharmaceuticals.	3	3	2	3	3				2		3
BP104T.3.	Able to understand the medicinal and pharmaceutical importance of inorganic compounds	3	3	2	3	2				3		2

BP104T.4.	Able to learn about preparations, properties, chemical reactions and assay of inorganic compounds	3	3	2	2	2			2	2		2
BP104T.5.	Able to discuss radio activity, measurement of radioactivity, properties and pharmaceutical applications of radiopharmaceuticals.	3	3	2	3	3			2	2		3

Sample Question Paper

Amity Institute of pharmacy Department of Pharmaceutical Chemistry I MID-SEMESTER (SEM –I) 2020-21						
Class: B.Pharmacy I Semester						
Subject Name: BP104T PHARMACEUTICAL INORGANIC CHEMISTRY		Time: 1 Hr		Max. Marks: 30		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q3,5,7,9	Q1,2,6,8,10				Q4

Student will be

CO.1. Able to discuss the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals.

CO.2. Able to Study the monographs of inorganic drugs and pharmaceuticals.

CO.3. Able to understand the medicinal and pharmaceutical importance of inorganic compounds.

CO.4. Able to learn about preparations, properties, chemical reactions and assay of inorganic compounds

CO.5. Able to discuss radio activity, measurement of radioactivity, properties and pharmaceutical applications of radiopharmaceuticals.

CO Map	Question No.	Question	Marks
CO1	Q.1	History of Pharmacopoeia	2
CO1	Q.2	Explain the principle involved in the limit test for Arsenic	2
CO2	Q.3	Define electrolytes	2
CO4	Q.4	Write assay reaction of sodium bicarbonate	2
CO2	Q.5	What are antacid	2
CO1	Q.6	Explain the principle and procedure involved in the limit test for iron	10
CO2	Q.7	What are Acidifiers and write a note on Aluminum hydroxide gel	10
CO2	Q 8	Discuss the role of fluoride in the treatment of Sodium fluoride	5

CO1 &CO2	Q.9	Write a note on types of impurities	5
CO2	Q 10	Explain the physiological acid base balance.	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 0:

59.6% % Percentage of students secured more than 60% marks, so this course not attained any Level.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICS

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-21

Programme Outcomes:

[PO.1]. Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

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[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3: Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I SEM																
	BP105T	3	1	2	1	1	3	2	3	1	1	3				

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AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICS
Course Handout
Course : Communication skills – Theory
Course Code: BP105T, Credits: 02, Session:2020-21 (Odd Sem.), Class: B.Pharm - 1st Year
Faculty Name: Dr. Sudhir Kumar Agrawal

A. Introduction: This course will prepare the young pharmacy student to interact effectively with doctors, nurses, dentists, physiotherapists and other health workers. At the end of this course the student will get the soft skills set to work cohesively with the team as a team player and will add value to the pharmaceutical business.

B. Course Outcomes: At the end of the course, students will be able to:

BP105T: 1. Understand the behavioral needs for a Pharmacist to function effectively in the areas of pharmaceutical operation

BP105T: 2. Communicate effectively (Verbal and Non Verbal)

BP105T: 3. Effectively manage the team as a team player

BP105T: 4. Develop interview skills.

BP105T:5. Develop Leadership qualities and essentials.

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

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[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

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D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	1.5%
	Student – Teacher interaction	S-T I	1.5%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

E. Syllabus

UNIT – I 07 Hours

 Communication Skills: Introduction, Definition, The Importance of Communication, The Communication Process – Source, Message, Encoding, Channel, Decoding, Receiver, Feedback, Context

 Barriers to communication: Physiological Barriers, Physical Barriers, Cultural Barriers, Language Barriers, Gender Barriers, Interpersonal Barriers, Psychological Barriers, Emotional barriers

 Perspectives in Communication: Introduction, Visual Perception, Language, Other factors affecting our perspective - Past Experiences, Prejudices, Feelings, Environment

UNIT – II 07 Hours

 Elements of Communication: Introduction, Face to Face Communication - Tone of Voice, Body Language (Non-verbal communication), Verbal Communication, Physical Communication

 Communication Styles: Introduction, The Communication Styles Matrix with example for each -Direct Communication Style, Spirited Communication Style, Systematic Communication Style, Considerate Communication Style

43

UNIT – III 07 Hours

 Basic Listening Skills: Introduction, Self-Awareness, Active Listening, Becoming an Active Listener, Listening in Difficult Situations

 Effective Written Communication: Introduction, When and When Not to Use Written Communication - Complexity of the Topic, Amount of Discussion' Required, Shades of Meaning, Formal Communication

 Writing Effectively: Subject Lines, Put the Main Point First, Know Your Audience, Organization of the Message

UNIT – IV 05 Hours

 Interview Skills: Purpose of an interview, Do's and Dont's of an interview

 Giving Presentations: Dealing with Fears, Planning your Presentation, Structuring Your Presentation, Delivering Your Presentation, Techniques of Delivery

UNIT – V 04 Hours

 Group Discussion: Introduction, Communication skills in group discussion, Do's and Dont's of group discussion.

A. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	2	10	1.5	1.5	35

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

B. Suggested Text/Reference Books:

1. Basic communication skills for Technology, Andreja. J. Ruther Ford, 2nd Edition, Pearson Education, 2011
2. Communication skills, Sanjay Kumar, Pushpalata, 1stEdition, Oxford Press, 2011
3. Organizational Behaviour, Stephen .P. Robbins, 1stEdition, Pearson, 2013
4. Brilliant- Communication skills, Gill Hasson, 1stEdition, Pearson Life, 2011
5. The Ace of Soft Skills: Attitude, Communication and Etiquette for success, Gopala Swamy Ramesh, 5thEdition, Pearson, 2013
6. Developing your influencing skills, Deborah Dalley, Lois Burton, Margaret, Green hall, 1st Edition Universe of Learning LTD, 2010
7. Communication skills for professionals, Konar nira, 2ndEdition, New arrivals – PHI, 2011
8. Personality development and soft skills, Barun K Mitra, 1stEdition, Oxford Press,

2011
9. Soft skill for everyone, Butter Field, 1st Edition, Cengage Learning india pvt.ltd, 2011
10. Soft skills and professional communication, Francis Peters SJ, 1stEdition, Mc Graw Hill Education, 2011
11. Effective communication, John Adair, 4thEdition, Pan Mac Millan,2009
12. Bringing out the best in people, Aubrey Daniels, 2ndEdition, Mc Graw Hill, 1999

C. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	**Communication Skills:** Introduction, Definition, The Importance of Communication, The Communication Process – Source, Message,	Lecture	1	Mid Term-1, Quiz & End Sem Exam
2	Encoding, Channel, Decoding, Receiver, Feedback, Context	Lecture	1	Mid Term-1, Quiz & End Sem Exam
3	**Barriers to communication:** Physiological Barriers, Physical Barriers, Cultural Barriers, Language Barriers	Lecture	1	Mid Term-1, Quiz & End Sem Exam
4	Gender Barriers, Interpersonal Barriers, Psychological Barriers, Emotional barriers	Lecture	1	Mid Term-1, Quiz & End Sem Exam
5	**Perspectives in Communication:** Introduction, Visual Perception, Language,	Lecture	1	Mid Term-1, Quiz & End Sem Exam
6	Other factors affecting our perspective - Past Experiences, Prejudices, Feelings, Environment	Lecture	1	Mid Term-1, Quiz & End Sem Exam
7	**Elements of Communication:** Introduction, Face to Face Communication - Tone of Voice,	Lecture	2	Mid Term-1, Quiz & End Sem Exam
8	Body Language (Non-verbal communication), Verbal Communication, Physical Communication	Lecture	2	Mid Term-1, Quiz & End Sem Exam
9	**Communication Styles:** Introduction, The Communication Styles Matrix with example	Lecture	2	Mid Term-1, Quiz & End Sem Exam

	for each			
10	Direct Communication Style, Spirited Communication Style	Lecture	2	Mid Term-1, Quiz & End Sem Exam
11	Systematic Communication Style, Considerate Communication Style	Lecture	2	Mid Term-1, Quiz & End Sem Exam
12	**Basic Listening Skills:** Introduction, Self-Awareness, Active Listening	Lecture	2	Mid Term-1, Quiz & End Sem Exam
13	an Active Listener, Listening in Difficult Situations	Lecture	2	Mid Term-1, Quiz & End Sem Exam
14	**Effective Written Communication:** Introduction, When and When Not to Use Written	Lecture	3	Mid Term-2, Quiz & End Sem Exam
15	Communication - Complexity of the Topic,	Lecture	3	Mid Term-2, Quiz & End Sem Exam
16	Amount of Discussion' Required, Shades of Meaning, Formal Communication	Lecture	3	Mid Term-2, Quiz & End Sem Exam
17	**Writing Effectively:** Subject Lines, Put the Main Point First	Lecture	3	Mid Term-2, Quiz & End Sem Exam
18	Know Your Audience, Organization of the Message	Lecture	3	Mid Term-2, Quiz & End Sem Exam
19	Know Your Audience, Organization of the Message	Lecture	3	Mid Term-2, Quiz & End Sem Exam
20	**Interview Skills:** Purpose of an interview, Do's and Dont's of an interview	Lecture	3	Mid Term-2, Quiz & End Sem Exam
21	**Interview Skills:** Purpose of an interview, Do's and Dont's of an interview	Lecture	3	Mid Term-2, Quiz & End Sem Exam
22	**Giving Presentations:** Dealing with Fears, Planning your Presentation	Lecture	4	Mid Term-2, Quiz & End Sem Exam
23	**Giving Presentations:** Dealing with Fears, Planning your Presentation	Lecture	4	Mid Term-2, Quiz & End Sem Exam
24	Structuring Your Presentation, Delivering Your Presentation,	Lecture	4	Mid Term-2, Quiz & End Sem Exam
25	Techniques of Delivery	Lecture	4	Mid Term-2, Quiz

				& End Sem Exam
26	**Group Discussion:** Introduction, Communication skills in group discussion	Lecture	5	Mid Term-2, Quiz & End Sem Exam
27	**Group Discussion:** Introduction, Communication skills in group discussion	Lecture	5	Mid Term-2, Quiz & End Sem Exam
28	Do's an Dont's of group discussion	Lecture	5	Mid Term-2, Quiz & End Sem Exam
29	Do's and Dont's of group discussion	Lecture	5	Mid Term-2, Quiz & End Sem Exam
30	Do's and Dont's of group discussion	Lecture	5	Mid Term-2, Quiz & End Sem Exam

D. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP105T: 1	**BP105T**: 1. Understand the behavioral needs for a Pharmacist to function effectively in the areas of	0	1	2	1	3	3	-	3	2	-	1				

	pharmaceutical operation															
BP105T: 2	**BP105T:** 2. Communicate effectively (Verbal and Non Verbal)	0	1	2	1	3	3	-	3	2	-	1				
BP105T: 3	**BP105T**: 3. Effectively manage the team as a team player	0	1	2	1	3	3	-	3	2	-	1				
BP105T: 4	**BP105T**: 4. Develop interview skills.	-	-	2	1	3	3	-	3	2	-	1				
BP105T: 5	**BP105T**:5. Develop Leadership qualities and essentials.	2	1	1	1	3	2	1	1	1	1	3				

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutics I MID-SEMESTER (SEM –Ist) 2020-21						
Class: B. Pharm, I Semester						
Subject Name: Communications Skills BP105T-Theory		Time: 1 Hrs			Max. Marks: 30	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating

Question Mapping	Q.1, Q.5, Q.3	Q.2, Q.4				

The student will be able to

BP105T: 1. Understand the behavioral needs for a Pharmacist to function effectively in the areas of pharmaceutical operation

BP105T: 2. Communicate effectively (Verbal and Non Verbal)

BP105T: 3. Effectively manage the team as a team player

CO Map	Question No.	Question	Marks
CO5	Q.1	Importance of communication skills.	5
CO3	Q.2	Write the barriers to communication.	5
CO3	Q.3	Compare verbal and non-verbal communication.	5
CO4	Q.4	What do you understand by communication styles?	5
CO5	Q.5	Write a detailed note on communication style.	10

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 0:

44.2 % Percentage of students secured more than 60% marks, so this course Communication Skill-Theory (BP105T) not attained any Level

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOLOGY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-21

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honor personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3: Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I SEM																
	BP106RBT	3	1	2	3	1	3	2	1	1	3	2				

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AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACOLOGY
Course Handout
Course : REMEDIAL BIOLOGY THEORY
Course Code: BP106RBT, Credits: 02, Session:2020-21 (Odd Sem.), Class: B.Pharm - 1st Year
Faculty Name: Dr. Naveen Sharma

A. **Introduction:** This subject deals with learning and understanding the components of living world, structure and functionalmsystem of plant and animal kingdom.

B. **Course Outcomes:** At the end of the course, students will be able to:
BP106RBT: 1. know the classification and salient features of five kingdoms of life
BP106RBT: 2. understand the basic components of anatomy & physiology of plant
BP106RBT: 3. know the basic components of anatomy & physiology animal with special reference to human
BP106RBT: 4. Know about the Essential mineral, macro and micronutrients.
BP106RBT:5. Understand the basics of plant respiration and requirements and procedures of plant growth.

C. **Programme Outcomes:**
[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of

technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	1.5%
	Student – Teacher interaction	S-T I	1.5%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

E. Syllabus

UNIT I

Living world:

- Definition and characters of living organisms
- Diversity in the living world
- Binomial nomenclature
- Five kingdoms of life and basis of classification. Salient features of Monera, Potista, Fungi, Animalia and Plantae, Virus,

Morphology of Flowering plants

- Morphology of different parts of flowering plants – Root, stem, inflorescence, flower, leaf, fruit, seed.
- General Anatomy of Root, stem, leaf of monocotyledons & Dicotylidones.

UNIT II

Body fluids and circulation

- Composition of blood, blood groups, coagulation of blood
- Composition and functions of lymph
- Human circulatory system
- Structure of human heart and blood vessels
- Cardiac cycle, cardiac output and ECG

Digestion and Absorption

- Human alimentary canal and digestive glands
- Role of digestive enzymes
- Digestion, absorption and assimilation of digested food

Breathing and respiration

- Human respiratory system
- Mechanism of breathing and its regulation
- Exchange of gases, transport of gases and regulation of respiration
- Respiratory volumes

UNIT III

Excretory products and their elimination

- Modes of excretion
- Human excretory system- structure and function
- Urine formation
- Rennin angiotensin system

Neural control and coordination

- Definition and classification of nervous system
- Structure of a neuron
- Generation and conduction of nerve impulse
- Structure of brain and spinal cord
- Functions of cerebrum, cerebellum, hypothalamus and medulla oblongata

Chemical coordination and regulation

- Endocrine glands and their secretions
- Functions of hormones secreted by endocrine glands

Human reproduction

- Parts of female reproductive system
- Parts of male reproductive system
- Spermatogenesis and Oogenesis
- Menstrual cycle

UNIT IV

Plants and mineral nutrition:

- Essential mineral, macro and micronutrients
- Nitrogen metabolism, Nitrogen cycle, biological nitrogen fixation

Photosynthesis

- Autotrophic nutrition, photosynthesis, Photosynthetic pigments, Factors affecting photosynthesis.

UNIT V

Plant respiration: Respiration, glycolysis, fermentation (anaerobic).

Plant growth and development

- Phases and rate of plant growth, Condition of growth, Introduction to plant growth regulators

Cell - The unit of life

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 Structure and functions of cell and cell organelles. Cell division

Tissues

 Definition, types of tissues, location and functions.

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	2	10	1.5	1.5	35

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

a. Text book of Biology by S. B. Gokhale
b. A Text book of Biology by Dr. Thulajappa and Dr. Seetaram.
c. A Text book of Biology by B.V. Sreenivasa Naidu
d. A Text book of Biology by Naidu and Murthy
e. Botany for Degree students By A.C.Dutta.
f. Outlines of Zoology byM. Ekambaranatha ayyer and T. N. Ananthakrishnan.
g. A manual for pharmaceutical biology practical by S.B. Gokhale and C. K. Kokate

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Definition and characters of living organisms	Lecture	1	Mid Term-1, Quiz & End Sem Exam
2	Diversity in the living world Binomial nomenclature	Lecture	1	Mid Term-1, Quiz & End Sem Exam
3	Five kingdoms of life and basis of classification.	Lecture	1	Mid Term-1, Quiz & End Sem Exam
4	Salient features of Monera, Potista, Fungi, Animalia and Plantae, Virus	Lecture	1	Mid Term-1, Quiz & End Sem Exam
5	Morphology of different parts of flowering plants – Root, stem, inflorescence, flower, leaf, fruit, seed.	Lecture	1	Mid Term-1, Quiz & End Sem Exam
6	General Anatomy of Root, stem, leaf of monocotyledons & Dicotylidones	Lecture	1	Mid Term-1, Quiz & End Sem Exam
7	Composition of blood, blood groups, coagulation of blood	Lecture	2	Mid Term-1, Quiz & End Sem Exam
8	Composition and functions of lymph, Human circulatory	Lecture	2	Mid Term-1, Quiz & End Sem Exam

	system			
9	Structure of human heart and blood vessels, Cardiac cycle, cardiac output and ECG	Lecture	2	Mid Term-1, Quiz & End Sem Exam
10	Human alimentary canal and digestive glands	Lecture	2	Mid Term-1, Quiz & End Sem Exam
11	Role of digestive enzymes Digestion, absorption and assimilation of digested food	Lecture	2	Mid Term-1, Quiz & End Sem Exam
12	Human respiratory system, Mechanism of breathing and its regulation	Lecture	2	Mid Term-1, Quiz & End Sem Exam
13	Exchange of gases, transport of gases and regulation of respiration, Respiratory volumes	Lecture	2	Mid Term-1, Quiz & End Sem Exam
14	Modes of excretion, Human excretory system- structure and function,	Lecture	3	Mid Term-2, Quiz & End Sem Exam
15	Urine formation, Rennin angiotensin system	Lecture	3	Mid Term-2, Quiz & End Sem Exam
16	Definition and classification of nervous system, Structure of a neuron, Generation and conduction of nerve impulse	Lecture	3	Mid Term-2, Quiz & End Sem Exam
17	Structure of brain and spinal cord, Functions of cerebrum, cerebellum, hypothalamus and medulla oblongata	Lecture	3	Mid Term-2, Quiz & End Sem Exam
18	Endocrine glands and their secretions	Lecture	3	Mid Term-2, Quiz & End Sem Exam
19	Functions of hormones secreted by endocrine glands	Lecture	3	Mid Term-2, Quiz & End Sem Exam
20	Parts of female reproductive system, Parts of male reproductive system	Lecture	3	Mid Term-2, Quiz & End Sem Exam
21	Spermatogenesis and Oogenesis, Menstrual cycle	Lecture	3	Mid Term-2, Quiz & End Sem Exam
22	Essential mineral, macro and micronutrients	Lecture	4	Mid Term-2, Quiz & End Sem Exam
23	Nitrogen metabolism, Nitrogen cycle, biological nitrogen fixation.	Lecture	4	Mid Term-2, Quiz & End Sem Exam
24	Autotrophic nutrition, photosynthesis,	Lecture	4	Mid Term-2, Quiz & End Sem Exam
25	Photosynthetic pigments,	Lecture	4	Mid Term-2, Quiz

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	Factors affecting photosynthesis			& End Sem Exam
26	Plant respiration: Respiration, glycolysis, fermentation (anaerobic).	Lecture	5	Mid Term-2, Quiz & End Sem Exam
27	Plant growth and development, Phases and rate of plant growth,	Lecture	5	Mid Term-2, Quiz & End Sem Exam
28	Condition of growth, Introduction to plant growth regulators	Lecture	5	Mid Term-2, Quiz & End Sem Exam
29	Structure and functions of cell and cell organelles. Cell division	Lecture	5	Mid Term-2, Quiz & End Sem Exam
30	Tissue Definition, types of tissues, location and functions.	Lecture	5	Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP106RBT: 1	**BP106RBT**: 1. know the classification and salient features of five kingdoms of life	3	1	1	1	1	2	1	-	1	-	2				
BP106RBT: 2	**BP106RBT:** 2. understand the basic components of anatomy & physiology of plants.	2	1	2	1	-	2	1	-	1	-	3				
BP106RBT: 3	**BP106RBT:** 3. know the basic components of anatomy & physiology animal with special reference to human.	2	1	2	2	2	2	2	1	2	1	2				
BP106RBT: 4	**BP106RBT**: 4. Know about the Essential mineral, macro and micronutrients.	3	1	1	1	-	2	1	1	1	1	3				

BP106RBT: 5	**BP106RBT**:5. Understand the basics of plant respiration and requirements and procedures of plant growth.	2	1	1	1	2	2	1	1	1	1	3				

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacology I MID-SEMESTER (SEM –Ist) 2020-21						
Class: B. Pharm, I Semester						
Subject Name: Remedial Biology BP106RBT-Theory		Time: 1 Hrs			Max. Marks: 30	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1, Q.5, Q.3	Q.2, Q.4				
The student will be able to **CO.3**. Discuss about role of endocrine glands and their secretions. **CO.4**. Write about Essential mineral, macro and micronutrients for plants growth.						

CO Map	Question No.	Question	Marks
CO5	Q.1	What is role of plant growth Regulators.	5
CO3	Q.2	Write the structure and functions of brain.	5
CO3	Q.3	Write the functions of hormones secreted by endocrine glands.	5

CO4	Q.4	Discuss Factors affecting photosynthesis.	5
CO5	Q.5	Give a detailed note on structure and functions of cell and cell organelles.	10

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

100 % Percentage of students secured more than 60% marks, so this course attained Level - 3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOLOGY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-21

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

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[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

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[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Programme Specific Outcomes:

PSO 1: Will be able to design, develop and implement efficient software for a given real life problem.

PSO 2: Will be able to apply knowledge of AI, Machine Learning and Data Mining in analyzing big data forextracting useful information from it and for performing predictive analysis.

PSO 3: Will be able to design, manage and secure wired/ wireless computer networks for transfer and sharing ofinformation.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I SEM																
	BP107P	3	1	2	-	1	3	2	1	3	2	2				

AMITY UNIVERSITY
MADHYA PRADESH
Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACOLOGY
Course Handout
Course: HUMAN ANATOMY AND PHYSIOLOGY – I PRACTICAL
Course Code : BP107P, Crédits: 02, Session :2020-21 (Odd Sem.), Class : B.Pharm. 1st Year
Faculty Name: Dr. Shvetank Bhatt, Dr. Naveen Sharma

A. Introduction: This course is designed to impart fundamental knowledge on the structure and functions of the various systems of the human body. It also helps in understanding both homeostatic mechanisms. The subject provides the basic knowledge required to understand the various disciplines of pharmacy.

B. Course Outcomes: At the end of the course, students will be able to:

BP107P.1 Effectively use the microscope for microscopic study of various tissues.

BP107P.2. Identify axial and appendicular bones of human skeleton.

BP107P.3. Explain the gross morphology, structure and functions of various organs of human body.

BP107P.4 Identify different tissues and organs of different systems of human body.

BP107P.5. Perform the haematological test like CT-BT, blood cell count, haemoglobin estimation, bleeding/clotting time, ESR etc.

BP107P.6 Record the blood pressure, heart rate, pulse rate and respiratory volume.

Programme Outcomes:

[PO.1]. Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and

administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and

ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

C. Programme Specific Outcomes:

PSO 1: Practical physiology is complimentary to the theoretical discussions in physiology.

PSO 2: Practical allow the verification of physiological processes discussed in theory classes through experiments on living tissue, intact animals or normal human beings.

PSO 3: This is helpful for developing an insight on the subject.

Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

D. Syllabus

1. Study of compound microscope.
2. Microscopic study of epithelial and connective tissue
3. Microscopic study of muscular and nervous tissue
4. Identification of axial bones
5. Identification of appendicular bones
6. Introduction to hemocytometry.
7. Enumeration of white blood cell (WBC) count
8. Enumeration of total red blood corpuscles (RBC) count
9. Determination of bleeding time
10. Determination of clotting time
11. Estimation of hemoglobin content
12. Determination of blood group.
13. Determination of erythrocyte sedimentation rate (ESR).

14. Determination of heart rate and pulse rate.
15. Recording of blood pressure. Recommended Books (Latest Edition

E. Examination Scheme:

Components	A	CT	LR	V	EE
Weightage (%)	2	10	1	2	35

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

F. Suggested Text/Reference Books:

1. Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypee brothers medical publishers, New Delhi.
2. Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York
3. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co,Riverview,MI USA
4. Text book of Medical Physiology- Arthur C,Guyton andJohn.E. Hall. Miamisburg, OH, U.S.A.
5. Principles of Anatomy and Physiology by Tortora Grabowski. Palmetto, GA, U.S.A.

G. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Study of compound microscope.	Practical	Unit-1 CO1	Mid Term-1 and 2, Quiz & End Sem Exam
2	Microscopic study of epithelial and connective tissue	Practical	CO4	Mid Term-1 and 2, Quiz & End Sem Exam
3	Microscopic study of muscular and nervous tissue	Practical	CO4	Mid Term-1 and 2, Quiz & End Sem Exam
4	*Identification of axial bones*	Practical	CO3	Mid Term-1 and 2, Quiz & End Sem Exam
5	Identification of appendicular boneanatomical terminology.	Practical	CO3	Mid Term-1 and 2, Quiz & End Sem Exam
6	Introduction to hemocytometry	Practical	CO2	Mid Term-1 and 2, Quiz & End Sem Exam
7	Enumeration of white blood cell (WBC) count	Practical	CO5	Mid Term-1 and 2, Quiz & End Sem Exam

8	Quiz	Practical		Mid Term-1 and 2, Quiz & End Sem Exam
9	Enumeration of total red blood corpuscles (RBC)	Practical	CO5	Mid Term-1 and 2, Quiz & End Sem Exam
10	Determination of bleeding time	Practical	CO5	Mid Term-1 and 2, Quiz & End Sem Exam
11	Determination of clotting time	Practical	CO5	Mid Term-1 and 2, Quiz & End Sem Exam
12	Revision--	Practical		Mid Term-1 and 2, Quiz & End Sem Exam
13	Estimation of hemoglobin content	Practical	CO5	Mid Term-1 and 2, Quiz & End Sem Exam
14	Determination of blood group	Practical	CO5	Mid Term-1 and 2, Quiz & End Sem Exam
15	Determination of erythrocyte sedimentation rate (ESR).	Practical	CO5	Mid Term-1 and 2, Quiz & End Sem Exam
16	Unit test	Practical		Mid Term-1 and 2, Quiz & End Sem Exam
17	Determination of heart rate and pulse rate.	Practical	CO6	Mid Term-1 and 2, Quiz & End Sem Exam
18	Recording of blood pressure.	Practical	CO6	Mid Term-1 and 2, Quiz & End Sem Exam

H. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES	CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP107P.1	Effectively use the microscope for microscopic study of various tissues.	3	-	-	-	1	2	2	-	-	-	-				
BP107P.2.	Identify axial and appendicular bones of human skeleton.	3	-	-	1	-	1	-	-	-	-	2				
BP107P.3.	Explain the gross morphology, structure and functions of various organs of human body.	3	2	-	3	-	2	-	-	-	-	3				
BP107P.4.	Identify different tissues and organs of different systems of human body.	2	2	1	3	-	1	-	-	-	-	2				
BP107P.5.	Perform the haematological test like CT-BT, blood cell count, haemoglobin estimation, bleeding/clotting time, ESR etc.	3	-	1	-	2	-	-	-	-	-	2				
BP10P.6	Record the blood pressure, heart rate, pulse rate and respiratory volume.	3			1							1				

Dr. Mohanty

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacology I MID-SEMESTER (SEM –Ist) 2020-21						
Class: B.Pharm, I Semester						
Subject Name: BP107P Human Anatomy and Physiology-I		Time: 4 Hrs			Max. Marks: 40	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,2,4,10	Q.8,9,6	Q.5,3	Q.7		

Student will be able to

CO1. Effectively use the microscope for microscopic study of various tissues.
CO2. Identify axial and appendicular bones of human skeleton.
CO3. Explain the gross morphology, structure and functions of various organs of human body.
CO4. Identify different tissues and organs of different systems of human body.

CO Map	Question No.	Question	Marks
CO1	Q.1a	*What is* different part of microscope	2
CO2	Q.1b	Define facial bones.	2
CO2	Q.1c	Make use of medibular bone.	2
CO4	Q.1d	Why is epithelium tissue work as protective tissue.	2
CO2 CO3	Q.1e	Identify correct location of carpal bones.	2
	Q.2	Experiment: Microscopic study of muscular and nervous tissue	25
	Q.3	Viva	5

Attainment Level 3:

100 % Percentage of students secured more than 60% marks, so this course attained Level - 3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-21

Programme Outcomes:

[PO.1]. Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I SEM	BP108P	3	1	2	1	1	2		2		2	2				

Dr. Mohanty

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICAL CHEMISTRY
Course Handout
Course : PHARMACEUTICAL ANALYSIS – I PRACTICAL
Course Code : BP108P, Crédits : 02, Session :2020-21 (Odd Sem.), Class : B.Pharm. 1st Year
Faculty Name: Dr. Pawan Kumar Gupta

A. Introduction: The course is designed to impart skill development in the arts and science of preparing the different conventional dosage forms.

B. Course Outcomes: At the end of the course, students will be able to:

BP108P.1. Understand the principles of volumetric and electro chemical analysis

BP108P.2. Operate equipment used in electro chemical analysis

BP108P.3. Carryout various volumetric titrations

BP108P.4. Carryout various electrochemical titrations

BP108P.5. Develop analytical skills

Programme Outcomes:

[PO.1]. Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

C. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal	Mid Term 1	CT	10%
	Mid Term 2		

Evaluation	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

D. Syllabus

I Limit Test of the following

(1) Chloride
(2) Sulphate
(3) Iron
(4) Arsenic

II Preparation and standardization of

(1) Sodium hydroxide
(2) Sulphuric acid
(3) Sodium thiosulfate
(4) Potassium permanganate
(5) Ceric ammonium sulphate

III Assay of the following compounds along with Standardization of Titrant

(1) Ammonium chloride by acid base titration
(2) Ferrous sulphate by Cerimetry
(3) Copper sulphate by Iodometry
(4) Calcium gluconate by complexometry
(5) Hydrogen peroxide by Permanganometry
(6) Sodium benzoate by non-aqueous titration
(7) Sodium Chloride by precipitation titration

IV Determination of Normality by electro-analytical methods

(1) Conductometric titration of strong acid against strong base
(2) Conductometric titration of strong acid and weak acid against strong base
(3) Potentiometric titration of strong acid against strong base

E. Examination Scheme:

Components	**A**	**CT**	**LR**	**V**	**EE**
Weightage (%)	2	10	1	2	35

CT: Class Test, LR: Lab Record, V: Viva, EE: End Semester Examination; A: Attendance

F. Suggested Text/Reference Books:

- A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, StahlonePress of University of London
- A.I. Vogel, Text Book of Quantitative Inorganic analysis
- P. Gundu Rao, Inorganic Pharmaceutical Chemistry
- Bentley and Driver's Textbook of Pharmaceutical Chemistry
- John H. Kennedy, Analytical chemistry principles
- Indian Pharmacopoeia.
    - .

G. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	To study various Glassware used in Pharmaceutical Analysis.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
2	To Calibrate various Glassware used in Pharmaceutical Analysis	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
3	To prepare 0.1 N NaOH Solution and standardize it using 0.1 N Oxalic Acid as standard.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
4	To prepare and standardize 0.1 N Sulphuric Acid using Anhydrous Sodium Carbonate as Standard.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
5	To prepare 0.1 N Sodium Thiosulphate Solution and standardize it by using 0.1 N Potassium Iodide Solution Solution as Standard.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
6	To prepare 0.1 Potassium Permanganate (KMnO4) using 0.1 N Solution of Oxalic Acid (COOH)2 as standard.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam

7	To prepare and standardize 0.1 M Ceric Ammonium Sulphate	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
8	To perform assay of the given sample of Sodium Chloride	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
9	To perform assay of the given sample of Ammonium Chloride.	Practical	CO1, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
10	To perform assay of the given sample of copper sulphate	Practical	CO1, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
11	To perform assay of the given sample of Ferrous Sulphate using standard Potassium Permanganate Solution.	Practical	CO1, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
12	To perform assay of the given sample of H_2O_2.	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
13	To perform assay of the given sample of Sodium Bezoate.	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
14	To perform assay of the given sample of Calcium Gluconate.	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
15	To carry out conductometric titration of strong acid (0.1 N HCl) against strong base (0.1 N NaOH).	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam

H. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	
BP108P.1	Understand the principles of volumetric and electro chemical analysis	3		2	1	2	1	-	2	1	2	1	

BP108P.2.	Operate equipment used in electro chemical analysis	2	-	-	1	-	1	-	-	-	-	3	
BP108P.3.	Carryout various volumetric titrations	3	2	2	1	-	2	-	2	-	-	3	
BP108P 4.	Carryout various electrochemical titrations	2	2	2	1	-	2	-	2	-	-	3	
BP108P.5.	Develop analytical skills	1	2	3	-	-	2	-	2	-	-	3	

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutical Chemistry I MID-SEMESTER (SEM –Ist) 2022-23						
Class: B.Pharm, I Semester						
Subject Name: BP108P Pharmaceutical Analysis-I Practical		Time: 4 Hrs		Max. Marks: 40		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,4	Q.2,3	Q.4	Q.2,5,6		
Student will be able to **CO.1**. Understand the principles of volumetric and electro chemical analysis **CO.2**. Operate equipment used in electro chemical analysis **CO.3**. Carryout various volumetric titrations **CO.4**. Carryout various electrochemical titrations **CO.5**. Develop analytical skills						

Dr. Mohanty

CO Map	Question No.	Question	Marks
CO1,2,4	Q.1a	Synopsis- Define Volumetric Analysis.	2
CO1,2,4	Q.1b	Synopsis- Define Redox Titration.	2
CO1,2,4	Q.1c	Synopsis- Illustrate the formula for Assay of NaCl.	2
CO1,2,4	Q.1d	Synopsis- List the any three methods of Instrumental Analysis.	2
CO1,2,4	Q.1e	Synopsis- What Secondary standard Give Example?	2
CO1,2, 4,5	Q.2	Experiment To prepare 0.1 N KmnO4 Solution and standardize it using 0.1 N Oxalic Acid as standard.	25
CO1,2,3,4,5	Q.3	Viva	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

100 % Percentage of students secured more than 60% marks, so this course attained Level:3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICS

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-21

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

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Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I SEM	BP109P	3	1	2	1	1	2		2		3	2				

Dr. Mohanty

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICS
Course Handout
Course : PHARMACEUTICS – I PRACTICAL
Course Code : BP109P, Crédits : 02, Session :2020-21 (Odd Sem.), Class : B.Pharm. 1st Year
Faculty Name: Dr. Neeraj Mishra and Dr. Jovita Kanoujia

A. Introduction: The course is designed to impart skill development in the arts and science of preparing the different conventional dosage forms.

B. Course Outcomes: At the end of the course, students will be able to:

BP109P.1. To recall the principles used in the preparation of solid, liquid, and semi-solid dosage forms.

BP109P.2. Operate equipment used in the manufacturing of different dosage forms

BP109P.3. Formulate various conventional dosage forms such as solid dosage forms.

BP109P.4. Design various liquid dosage forms and semi-solid dosage forms.

BP109P.5. Estimate the ingredients calculation for preparation of dosage form

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

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[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

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[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	Description	Code	Weightage %
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

E. Syllabus

1 . Syrups a) Syrup IP'66**,** b) Compound syrup of Ferrous Phosphate BPC'68
2. Elixirs a) Piperazine citrate elixir, b) Paracetamol pediatric elixir
3.Linctus a) Terpin Hydrate Linctus IP'66
4. Solutions a) Iodine Throat Paint (Mandles Paint)**,** b) Strong solution of ammonium acetate**,**
c) Cresol with soap solution**,** d) Lugol's solution
5. Suspensions a) Calamine lotion**,** b) Magnesium Hydroxide mixture**,** c) Aluminimum Hydroxide gel
6. Emulsions a) Turpentine Liniment, b) Liquid paraffin emulsion
7. Powders and Granules a) ORS powder (WHO)**,** b) Effervescent granules**,** c)Dusting powder**,** d)Divded powders
8. Suppositories a) Glycero gelatin suppository**,** b) Coca butter suppository**,** c) Zinc Oxide suppository
8. Semisolids a) Sulphur ointment**,** b) Non staining-iodine ointment with methyl salicylate**,** c) Carbopal gel
9. Gargles and Mouthwashes a) Iodine gargle**,** b) Chlorhexidine mouthwash

F. Examination Scheme:

Components	A	CT	LR	V	EE
Weightage (%)	2	10	1	2	35

CT: Class Test, LR: Lab Record, V: Viva, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

- H.C. Ansel et al., Pharmaceutical Dosage Form and Drug Delivery System, Lippincott Williams and Walkins, New Delhi.

- Carter S.J., Cooper and Gunn's-Dispensing for Pharmaceutical Students, CBS publishers, New Delhi.
- M.E. Aulton, Pharmaceutics, The Science& Dosage Form Design, Churchill Livingstone, Edinburgh.
- Indian pharmacopoeia.
- British pharmacopoeia.

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	To prepare and submit simple syrup IP.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
2	To prepare and submit simple syrup BP.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
3	To prepare and submit Paracetamol pediatric elixir	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
4	To prepare and submit Iodine Throat Paint.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
5	To prepare and submit Lugol's solution.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
6	To prepare and submit Calamine lotion	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
7	To prepare and submit turpentine liniment	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
8	To prepare and submit liquid paraffin emulsion	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
9	To prepare and submit zinc oxide dusting powder	Practical	CO1, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
10	To prepare and submit ORS powder	Practical	CO1, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
11	To prepare and submit effervescent powder	Practical	CO1, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
12	To prepare and submit Glycero gelatin suppository.	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
13	To prepare and submit Non staining-iodine ointment with methyl salicylate,	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
14	To prepare and submit Carbopol gel	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
15	To prepare and submit iodine gargle	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	
BP109P.1	To recall the principles used in the preparation of solid, liquid, and semi-solid dosage forms.	3		2	1	2	1	-	2	1	2	1	
BP109P.2.	Operate equipment used in the manufacturing of different dosage forms	2	-	-	1	-	1	-	-	-	-	3	
BP109P.3.	Formulate various conventional dosage forms such as solid dosage forms.	3	2	2	1	-	2	-	2	-	-	3	
BP109P.4.	Design various liquid dosage forms and semi-solid dosage forms.	2	2	2	1	-	2	-	2	-	-	3	
BP109P.5.	Estimate the ingredients calculation for preparation of dosage form.	1	2	3	-	-	2	-	2	-	-	3	

Sample Question Paper

Amity Institute of Pharmacy
Department of Pharmaceutics
I MID-SEMESTER (SEM –Ist) 2020-21

Class: B.Pharm, I Semester						
Subject Name: BP109P Pharmaceutics-I Practical		Time: 4 Hrs			Max. Marks: 40	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,4	Q.2,3	Q.4	Q.2,5,6		

Student will be able to

CO.1. To recall the principles used in the preparation of solid, liquid, and semi-solid dosage forms.

CO.2. Operate equipment used in the manufacturing of different dosage forms

CO.3. Formulate various conventional dosage forms such as solid dosage forms.

CO.4. Design various liquid dosage forms and semi-solid dosage forms.

CO.5. Estimate the ingredients calculation for preparation of dosage form

CO Map	Question No.	Question	Marks
CO1,2,4	Q.1a	Synopsis- Compare gargle and mouthwash.	2
CO1,2,4	Q.1b	Synopsis- Define suspending agents.	2
CO1,2,4	Q.1c	Synopsis- Illustrate the formula for turpentine liniments.	2
CO1,2,4	Q.1d	Synopsis- List the ingredients required for the preparation of throat paint.	2
CO1,2,4	Q.1e	Synopsis- What is the concentration of preservative in dosage form?	2
CO1,2, 4,5	Q.2	Experiment To formulate and submit ORS powder.	25
CO1,2,3,4,5	Q.3	Viva	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

90.4 % Percentage of students secured more than 60% marks, so this course attained Level - 3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-2021

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2].Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMMEARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
ISEM	BP110P	3	2	3	1	1	2		3		1	2				
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICAL CHEMISTRY
Course Handout
Course : PHARMACEUTICAL INORGANIC CHEMISTRY (Practical)
Course Code : BP110P, Crédits : 02, Session : 2020-21 (Odd Sem.), Class : B.Pharm. 1st Year
Faculty Name: Dr. Pawan Kumar Gupta, Dr. Srabanti Jana

A. Introduction: This subject deals with the monographs of inorganic drugs and pharmaceuticals.

B. Course Outcomes: At the end of the course, students will be able to:

BP110P.1. To recognize various sources of impurities and carry out limit test of ions in inorganic compounds.

BP110P.2. Describe the effects of impurities in pharmacopoeial substances.

BP110P.3. Perform the identification test of various inorganic compounds as per Indian pharmacopeia.

BP110P.4. Carry out the test for purity of inorganic compounds.

BP110P.5. Prepare various inorganic pharmaceuticals preparation.

C. Programme Outcomes:

[PO.1].Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2].Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance isrequiredtobemaintainedbyastudentto be qualified for taking up the EndSemester examination. The allowanceof 20%includesalltypesofleaves includingmedicalleaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

E. Syllabus;

I **Limit tests for following ions:** Limit test for Chlorides and Sulphates; Modified limit test for Chlorides and Sulphates; Limit test for Iron ;Limit test for Heavy metals; Limit test for Lead ;Limit test for Arsenic.

IIIdentification test: Magnesium hydroxide; ferrous sulphate; Sodium bicarbonate; Calcium gluconate; Copper sulphate.

III Test for purity: Swelling power of Bentonite; Neutralizing capacity of aluminum hydroxide gel; Determination of potassium iodate and iodine in potassium Iodide.

IV Preparation of inorganic pharmaceuticals: Boric acid Potash alum ferrous sulphate

F. Examination Scheme:

Components	A	CT	LR	V	EE
Weightage (%)	2	10	1	2	35

CT: Class Test, LR: Lab Record, V: Viva, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, Stahlone Press of University of London, 4 th edition.
2. A.I. Vogel, Text Book of Quantitative Inorganic analysis
3. P. Gundu Rao, Inorganic Pharmaceutical Chemistry, 3 rd Edition
4. M.L Schroff, Inorganic Pharmaceutical Chemistry
5. Bentley and Driver's Textbook of Pharmaceutical Chemistry
6. Anand & Chatwal, Inorganic Pharmaceutical Chemistry
7. Indian Pharmacopoeia

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	To perform limit test for chloride in given sample.	Practical	CO1, 2, 4	Mid Term-1, Quiz & End Sem Exam
2	To perform limit test for sulphate in given sample.	Practical	CO1, 2, 4	Mid Term-1, Quiz & End Sem Exam
3	To perform limit test for iron in given sample.	Practical	CO1, 2, 4	Mid Term-1, Quiz & End Sem Exam
4	To perform identification test for boric acid.	Practical	CO1,3, 4,	Mid Term-1, Quiz & End Sem Exam
5	To perform the identification test of ammonium chloride.	Practical	CO1, 3, 4,	Mid Term-1, Quiz & End Sem Exam
6	To identify cation & anion in given pharmaceutical compounds.	Practical	CO1,3, 4,	Mid Term-1, Quiz & End Sem Exam
7	To prepare and submit aluminum hydroxide.	Practical	CO1, 4,5,	Mid Term-2, Quiz & End Sem Exam
8	To prepare and submit Boric acid (H3BO3)	Practical	CO1, 4,5,	Mid Term-2, Quiz & End Sem Exam
9	To prepare and submit Potash alum (K2SO4. Al2(SO4)3 .24 H2O)	Practical	CO1, 4,5,	Mid Term-2, Quiz & End Sem Exam
10	To prepare and submit Zinc sulphate (ZnSO4).	Practical	CO1, 4,5,	Mid Term-2, Quiz & End Sem Exam
11	To prepare and submit magnesium carbonate (MgCO3)	Practical	CO1,4,5,	Mid Term-2, Quiz & End Sem Exam
12	To prepare and submit calcium carbonate (CaCO3).	Practical	CO1, 4,5,	Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	
BP110P.1	To recognize various sources of impurities and carry out limit test of ions in inorganic compounds.	3	-	2	1	2	1	-	2	1	2	1	
BP110P.2.	Describe the effects of impurities in pharmacopoeial substances.	2	-	-	1	-	1	-	-	-	-	3	
BP110P.3.	Perform the identification test of various inorganic compounds as per Indian pharmacopeia.	3	2	2	1	-	2	-	2	-	-	3	
BP110P.4.	Carry out the test for purity of inorganic compounds.	2	2	2	1	-	2	-	2	-	-	3	
BP110P.5.	Prepare various inorganic pharmaceutic als preparation.	1	2	3	-	-	2	-	2	-	-	3	

SampleQuestionPaper

Amity Institute of Pharmacy **Department of pharmaceutical chemistry** **I MID-SEMESTER(SEM–I st) 2020-21**						
Class: B.Pharm, I Semester						
Subject Name: BP110P-Pharmaceutical inorganic chemistry -I Practical		Time: 4Hrs		Max.Marks: 40		
Levels of thequestions as perBloomsTaxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
QuestionMapping	Q.1,4,5	Q.4	Q.2,3,5	Q.2,3,5		

Student willbeableto

CO.1. To recall different chemical methods to prepare inorganic pharmaceuticals.
CO.2. To Perform identification tests as per Indian Pharmacopoeia.
CO.3. Determine the impurities qualitatively be performing tests for purity
CO.4. Understand the medicinal and pharmaceutical importance of inorganic compounds
CO.5. Adjudge the level of specific impurities in the given inorganic compounds by performing different limit tests.

COMap	QuestionNo.	Question	Marks
CO1,2,4	Q.1a	Synopsis-define impurities and discuss types of impurities	2
CO1,2,4	Q.1b	Synopsis- Define limit test and uses	2
CO1,2,4	Q.1c	Synopsis- writes the principle of the limit test of sulphate.	2
CO 3, 5	Q.1d	Synopsis- writes the uses and molecular formula of and prepn of potash alum.	2
CO 3, 5	Q.1e	Synopsis- write the molecular formula and uses of boric acid	2
CO1,2, 4,5	Q.2	Experiment To perform the limit test of chloride for given sample.	25
CO1,2,3,4,5	Q.3	Viva	5

Attainments		Rubric
Level	1	IF60%ofstudentssecuremorethan60%marksthenlevel1
Level	2	IF70%ofstudentssecuremorethan60%marksthenlevel2
Level	3	IF80%ofstudentssecuremorethan60%marksthenlevel3

Attainment Level 3:

100 % Percentage of students secured more than 60% marks, so this course attained Level - 3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICS

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-21

Programme Outcomes:

[PO.1]. Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

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[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I SEM																
	BP111P	1	1	3	1	1	3	1	1	2	3	3				

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACOLOGY
Course Handout
Course : Communication Skills- Practicals
Course Code : BP111P, Crédits : 01, Session :2020-21 (Odd Sem.), Class : B.Pharm. 1st Year
Faculty Name: Dr. Sarmishta Pandey

A. Introduction: The course is designed to import knowledge about basic communication.

B. Course Outcomes: At the end of the course, students will be able to:

BP111P: 1. Practice different types of skills such as presentation skills, communications skills, and listening skills.

BP111P: 2. Practice of basic communication.

BP111P: 3. Interview handling skills.

BP111P: 4. Practice of **pronunciations**.

BP111P: 5. Communicate effectively (Verbal and Non Verbal)

C. Programme Outcomes:

[PO.1]. Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills.

Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	Description	Code	Weightage %
Continuous Internal Evaluation	Mid Term 1	CT	5%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	15%
Total			**25%**

E. Syllabus

Basic communication covering the following topics

Meeting People

Asking Questions

Making Friends

What did you do?

Do's and Dont's

Pronunciations covering the following topics

Pronunciation (Consonant Sounds)

Pronunciation and Nouns

Pronunciation (Vowel Sounds)

Advanced Learning

Listening Comprehension / Direct and Indirect Speech

Figures of Speech

Effective Communication

Writing Skills

Effective Writing

Interview Handling Skills

E-Mail etiquette

Presentation Skills

F. Examination Scheme:

Components	A	CT	LR	V	EE

Weightage (%)	2	5	1	2	15

CT: Class Test, LR: Lab Record, V: Viva, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. Basic communication skills for Technology, Andreja. J. Ruther Ford, 2nd Edition, Pearson Education, 2011
2. Communication skills, Sanjay Kumar, Pushpalata, 1stEdition, Oxford Press, 2011
3. Organizational Behaviour, Stephen .P. Robbins, 1stEdition, Pearson, 2013
4. Brilliant- Communication skills, Gill Hasson, 1stEdition, Pearson Life, 2011
5. The Ace of Soft Skills: Attitude, Communication and Etiquette for success, Gopala Swamy Ramesh, 5thEdition, Pearson, 2013
6. Developing your influencing skills, Deborah Dalley, Lois Burton, Margaret, Green hall, 1st Edition Universe of Learning LTD, 2010
7. Communication skills for professionals, Konar nira, 2ndEdition, New arrivals – PHI, 2011
8. Personality development and soft skills, Barun K Mitra, 1stEdition, Oxford Press, 2011
9. Soft skill for everyone, Butter Field, 1st Edition, Cengage Learning india pvt.ltd,

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Meeting People, Asking Questions, Making Friends What did you do?	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
2	Pronunciation (Consonant Sounds) Pronunciation and Nouns Pronunciation (Vowel Sounds)	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
3	Pronunciation (Consonant Sounds) Pronunciation and Nouns Pronunciation (Vowel Sounds)	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
4	Listening Comprehension / Direct and Indirect Speech	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
5	Figures of Speech	Practical	CO2	Mid Term-1, Quiz & End Sem Exam
6	Effective Communication	Practical	CO3	Mid Term-1, Quiz & End Sem Exam
7	Writing Skills Effective Writing	Practical	CO4	Mid Term-2, Quiz & End Sem Exam
8	Interview Handling Skills	Practical	CO3,5	Mid Term-2, Quiz & End Sem Exam
9	Interview Handling Skills	Practical	CO6	Mid Term-2, Quiz

				& End Sem Exam
10	Interview Handling Skills	Practical	CO4	Mid Term-2, Quiz & End Sem Exam
11	E-Mail etiquette	Practical	CO3	Mid Term-2, Quiz & End Sem Exam
12	Presentation Skills	Practical	CO1	Mid Term-2, Quiz & End Sem Exam

A. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	
BP111P: 1.	**BP111P: 1.** Practice different types of skills such as presentation skills, communications skills, and listening skills.	2	2	2	3	2	1	1	3	1	2	3	
BP111P: 2.	**BP111P: 2.** Practice of basic communication	2	1	3	2	1	1	1	3	1	3	2	
BP111P: 3.	**BP111P: 3.** Interview handling skills.	2	2	2	2	1	2	-	3	-	3	2	
BP111P: 4.	**BP111P: 4.** Practice of **pronunciations**.	2	2	2	3	1	2	1	3	1	2	2	
BP111P: 5.	**BP111P: 5.** Communicate effectively (Verbal and Non Verbal)	2	2	2	3	1	2	-	3	-	3	3	

<u>Sample Question Paper</u>

Amity Institute of Pharmacy Department of Pharmaceutics I MID-SEMESTER (SEM –Ist) 2020-21
Class: B.Pharm, I Semester

Dr. Mohanty

Subject Name: Communication Skills-Practical (BP111P)		Time: 2 Hrs			Max. Marks: 40	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1a,b,c,d,e	Q.3	Q.3	Q.2,5,6	Q.3	Q.2

Student will be able to

BP111P: 1. Practice different types of skills such as presentation skills, communications skills, and listening skills.

BP111P: 2. Practice of basic communication.

BP111P: 3. Interview handling skills.

BP111P: 4. Practice of **pronunciations**.

CO Map	Question No.	Question	Marks
CO1	Q.1a	Synopsis- verbal communication	2
CO1	Q.1b	Synopsis- What are the types of communication?	2
CO2	Q.1c	Synopsis- What are Do's of interview.	2
CO3	Q.1d	Synopsis- Discuss group discussion	2
CO3	Q.1e	Synopsis- What is listening skills	2
CO4	Q.2	Experiment Participate in Mock Interview.	25
CO1,2,3,4	Q.3	Viva	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 0:

55.8 % Percentage of students secured more than 60% marks, so this course not attained any Level.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOLOGY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-21

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I SEM																
	BP112RBP	1	1	3	1	1	3	1	1	2	3	3				

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACOLOGY
Course Handout
Course : Remedial Biology- PRACTICAL
Course Code : BP112RBP, Crédits : 01, Session :2020-21 (OddSem.), Class : B.Pharm. 1st Year
Faculty Name: Mrs. Monika Kaushik

A. Introduction: The course is designed to import knowledge about physiology of animals and plants.

B. Course Outcomes: At the end of the course, students will be able to:

BP112RBP: 1. Know about several type of microscopes, staining techniques.

BP112RBP: 2. Study of types and components of cell.

BP112RBP: 3. Study about the modifications of Stem, Root, Leaf, seed, fruit etc.

BP112RBP: 4. Give detailed study of frog by using computer models.

BP112RBP: 5. Microscopic study and identification of tissues pertinent to Stem, Root, Leaf, seed, fruit and flower

BP112RBP: 6. Identify types of bones

BP112RBP: 7. Determination of blood group and blood pressure of human.

C. Programme Outcomes:

[PO.1]. Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

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[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of

technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	5%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	15%
Total			**25%**

E. Syllabus

1. Introduction to experiments in biology

a) Study of Microscope

b) Section cutting techniques

c) Mounting and staining

d) Permanent slide preparation

2. Study of cell and its inclusions

3. Study of Stem, Root, Leaf, seed, fruit, flower and their modifications

4. Detailed study of frog by using computer models

5. Microscopic study and identification of tissues pertinent to Stem, Root, Leaf, seed, fruit and flower

6. Identification of bones

7. Determination of blood group

8. Determination of blood pressure

9. Determination of tidal volume

F. Examination Scheme:

Components	A	CT	LR	V	EE
Weightage (%)	2	5	1	2	15

CT: Class Test, LR: Lab Record, V: Viva, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. Practical human anatomy and physiology. by S.R.Kale and R.R.Kale.

2. A Manual of pharmaceutical biology practical by S.B.Gokhale, C.K.Kokate and S.P.Shriwastava.

3. Biology practical manual according to National core curriculum .Biology forum of Karnataka. Prof. M.J.H.Shafi

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	1. Introduction to experiments in biology a) Study of Microscope	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
2	1. Introduction to experiments in biology b) Section cutting techniques	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
3	1. Introduction to experiments in biology c) Mounting and staining	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
4	1. Introduction to experiments in biology d) Permanent slide preparation	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
5	Study of cell and its inclusions	Practical	CO2	Mid Term-1, Quiz & End Sem Exam
6	Study of Stem, Root, Leaf, seed, fruit, flower and their modifications	Practical	CO3	Mid Term-1, Quiz & End Sem Exam
7	Detailed study of frog by using computer models	Practical	CO4	Mid Term-2, Quiz & End Sem Exam
8	Microscopic study and identification of tissues pertinent to Stem, Root Leaf, seed, fruit and flower	Practical	CO3,5	Mid Term-2, Quiz & End Sem Exam
9	Identification of bones	Practical	CO6	Mid Term-2, Quiz & End Sem Exam
10	Determination of blood group	Practical	CO7	Mid Term-2, Quiz & End Sem Exam

11	Determination of blood pressure	Practical	CO7	Mid Term-2, Quiz & End Sem Exam
12	Determination of tidal volume	Practical	CO7	Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	
BP112RBP: 1.	Know about several type of microscopes, staining techniques.	2	2	2	3	2	1	1	1	1	2	3	
BP112RBP: 2.	Study of types and components of cell.	2	1	3	2	1	1	1	1	1	3	2	
BP112RBP: 3.	Study about the modifications of Stem, Root, Leaf, seed, fruit etc.	2	2	2	2	1	2	-	2	-	3	2	
BP112RBP: 4.	Give detailed study of frog by using computer models.	2	2	2	3	1	2	1	2	1	2	2	
BP112RBP: 5.	Microscopic study and identification of tissues pertinent to Stem, Root, Leaf, seed, fruit and flower	2	2	2	3	1	2	-	2	-	3	3	

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BP112RBP: 6.	Identify types of bones	3	1	2	2	2	1	2	1	1	2	3	
BP112RBP: 7.	Determination of blood group and blood pressure of human.	3	1	2	2	1	1	2	2	1	1	3	

Sample Question Paper

Amity Institute of Pharmacy
Department of Pharmaceutics
I MID-SEMESTER (SEM –Ist) 2020-21

Class: B.Pharm, I Semester

Subject Name: BP112RBP-Practical	Time: 2 Hrs	Max. Marks: 40

Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1a,b,c,d,e	Q.3	Q.3	Q.2,5,6	Q.3	Q.2

Student will be able to

CO: 1. Know about several type of microscopes, staining techniques.

CO: 2. Study of types and components of cell.

CO: 3. Study about the modifications of Stem, Root, Leaf, seed, fruit etc.

CO: 4. Give detailed study of frog by using computer models.

CO Map	Question No.	Question	Marks
CO1	Q.1a	Synopsis- What is the use of culture media.	2
CO1	Q.1b	Synopsis- Write the types of microscopes?	2
CO2	Q.1c	Synopsis- Differentiate human and animal cell.	2
CO3	Q.1d	Synopsis- Discuss the modifications of root.	2
CO3	Q.1e	Synopsis- Discuss about modifications of leaf.	2
CO4	Q.2	Experiment Perform detailed study of frog by using computer models.	25
CO1,2,3,4	Q.3	Viva	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

100 % Percentage of students secured more than 60% marks, so this course attained Level - 3

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOLOGY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-21

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
II SEM	BP201T	3	2	2	1	1	3	2	1	1	1	3				

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MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACOLOGY
Course Handout
Course : HUMAN ANATOMY AND PHYSIOLOGY – II THEORY
Course Code : BP201T, Crédits : 04, Session :2020-21 (Even Sem.), Class : B.Pharm. Ist Year
Faculty Name: Dr. Anantha Naik Nagappa, Dr. Naveen Sharma

A. Introduction: This subject is designed to impart fundamental knowledge on the structure and functions of the various systems of the human body. It also helps in understanding both homeostatic mechanisms.

B. Course Outcomes: At the end of the course, students will be able to:

BP201T.1. Explain the gross morphology, structure and functions of various organs of the human body.

BP201T.2. Describe the various homeostatic mechanisms and their imbalances.

BP201T.3. Identify the various tissues and organs of different systems of human body.

BP201T.4. Perform the hematological tests like blood cell counts, haemoglobin estimation, bleeding/clotting time etc and also record blood pressure, heart rate, pulse and respiratory volume.

BP201T.5. Appreciate coordinated working pattern of different organs of each system

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time

management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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D. Assessment Plan:

Component of Evaluation	Description	Code	Weightage %
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

Unit I

Nervous system

Organization of nervous system, neuron, neuroglia, classification and properties of nerve fibre, electrophysiology, action potential, nerve impulse, receptors, synapse, neurotransmitters.

Central nervous system: Meninges, ventricles of brain and cerebrospinal fluid. structure and functions of brain (cerebrum, brain stem, cerebellum), spinal cord (gross structure, functions of afferent and efferent nerve tracts, reflex activity)

Unit II

Digestive system

Anatomy of GI Tract with special reference to anatomy and functions of stomach, Acid production in the stomach, regulation of acid production through parasympathetic nervous system, pepsin role in protein digestion) small intestine and large intestine, anatomy and functions of salivary glands, pancreas and liver, movements of GIT, digestion and absorption of nutrients and disorders of GIT.

Energetics

Formation and role of ATP, Creatinine Phosphate and BMR.

Unit III

Respiratory system

Anatomy of respiratory system with special reference to anatomy of lungs, mechanism of respiration, regulation of respiration Lung Volumes and capacities transport of respiratory gases, artificial respiration, and resuscitation methods.

Urinary system

Anatomy of urinary tract with special reference to anatomy of kidney and nephrons, functions of kidney and urinary tract, physiology of urine formation, micturition reflex and role of kidneys in acid base balance, role of RAS in kidney and disorders of kidney.

Unit IV

Endocrine system

Classification of hormones, mechanism of hormone action, structure and functions of pituitary gland, thyroid gland, parathyroid gland, adrenal gland, pancreas, pineal gland, thymus and their disorders.

Unit V

Reproductive system

Anatomy of male and female reproductive system, Functions of male and female reproductive system, sex hormones, physiology of menstruation, fertilization, spermatogenesis, oogenesis, pregnancy and parturition

Introduction to genetics

Chromosomes, genes and DNA, protein synthesis, genetic pattern of inheritance

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypee brothers medical publishers, New Delhi.

2. Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York

3. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co,Riverview,MI USA

4. Text book of Medical Physiology- Arthur C,Guyton andJohn.E. Hall. Miamisburg, OH, U.S.A.

5. Principles of Anatomy and Physiology by Tortora Grabowski. Palmetto, GA, U.S.A.

6. Textbook of Human Histology by Inderbir Singh, Jaypee brothers medical publishers, New Delhi.

7. Textbook of Practical Physiology by C.L. Ghai, Jaypee brothers medical publishers, New Delhi.

8. Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee brother's medical publishers, New Delhi.

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Organization of nervous system	Lecture	1	Mid Term-1, Quiz & End Sem Exam
2	neuron, neuroglia, classification and properties of nerve fibre,	Lecture	1	Mid Term-1, Quiz & End Sem Exam
3	electrophysiology, action potential,	Lecture	1	Mid Term-1, Quiz & End Sem Exam
4	nerve impulse, receptors, synapse, neurotransmitters.	Tutorial	1	Mid Term-1, Quiz & End Sem Exam
5	Central nervous system: Meninges, ventricles of brain	Lecture	1	Mid Term-1, Quiz & End Sem Exam
6	cerebrospinal fluid. structure and functions of brain	Lecture	1,4	Mid Term-1, Quiz & End Sem Exam
7	structure and functions of cerebrum,	Lecture	1	Mid Term-1, Quiz & End Sem Exam
8	structure and functions of brain stem, cerebellum	Lecture	1	Mid Term-1, Quiz & End Sem Exam
9	spinal cord: gross structure,	Lecture	4	Mid Term-1, Quiz & End Sem Exam
10	functions of afferent and efferent nerve tracts, reflex activity	Lecture	4	Mid Term-1, Quiz & End Sem Exam
11	Unit-1	Tutorial		Mid Term-1, Quiz

				& End Sem Exam
12	Anatomy of GI Tract with special reference to anatomy and functions of stomach	Lecture	1	Mid Term-1, Quiz & End Sem Exam
13	Acid production in the stomach, regulation of acid production through parasympathetic nervous system,	Lecture	5	Mid Term-1, Quiz & End Sem Exam
14	pepsin role in protein digestion small intestine and large intestine,	Lecture	5	Mid Term-1, Quiz & End Sem Exam
15	anatomy and functions of salivary glands, pancreas and liver,	Lecture	5	Mid Term-1, Quiz & End Sem Exam
16	movements of GIT, digestion and absorption of nutrients and disorders of GIT.	Lecture	2,3	Mid Term-1, Quiz & End Sem Exam
17	Formation and role of ATP, Creatinine Phosphate and BMR.	Lecture	1	Mid Term-1, Quiz & End Sem Exam
18	Unit-2	Tutorial		Mid Term-1, Quiz & End Sem Exam
19	Anatomy of respiratory system with special reference to anatomy of lungs	Lecture	2,3	Mid Term-1, Quiz & End Sem Exam
20	mechanism of respiration,	Lecture		Mid Term-1, Quiz & End Sem Exam
21	regulation of respiration Lung Volumes and capacities	Lecture	1	Mid Term-1, Quiz & End Sem Exam
22	transport of respiratory gases,	Lecture	4	Mid Term-1, Quiz & End Sem Exam
23	artificial respiration, and resuscitation methods.	Lecture	4	Mid Term-1, Quiz & End Sem Exam
24	Anatomy of urinary tract with special reference to anatomy of kidney and nephrons	Lecture	1	Mid Term-1, Quiz & End Sem Exam
25	functions of kidney and urinary tract,	Lecture	4	Mid Term-1, Quiz & End Sem Exam
26	physiology of urine formation,	Lecture	1	Mid Term-1, Quiz & End Sem Exam
27	micturition reflex and role	Lecture	1	Mid Term-1, Quiz

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	of kidneys in acid base balance,			& End Sem Exam
28	role of RAS in kidney and disorders of kidney.	Lecture	4	Mid Term-1, Quiz & End Sem Exam
29	Unit 3	Tutorial		Mid Term-1, Quiz & End Sem Exam
30	Classification of hormones,	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
31	mechanism of hormone action,	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
32	structure and functions of pituitary gland,	Lecture	1	Mid Term-2, Quiz & End Sem Exam
33	structure and functions of thyroid gland,	Lecture	1,4	Mid Term-2, Quiz & End Sem Exam
34	structure and functions of parathyroid gland,	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
35	Structure and functions of Adrenal gland,	Lecture	4	Mid Term-2, Quiz & End Sem Exam
36	Structure and functions of pancreas, pineal gland,	Lecture	1	Mid Term-2, Quiz & End Sem Exam
37	Structure and functions of thymus and their disorders.	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
38	Anatomy of male and female reproductive system	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
39	Functions of male and female reproductive system,	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
40	sex hormones	Lecture	1	Mid Term-2, Quiz & End Sem Exam
41	physiology of menstruation, fertilization,	Lecture	4	Mid Term-2, Quiz & End Sem Exam
42	spermatogenesis, oogenesis,	Lecture	5,45	Mid Term-2, Quiz & End Sem Exam
43	pregnancy and parturition,	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
44	Chromosomes, genes and DNA,	Lecture	4	Mid Term-2, Quiz & End Sem Exam
45	protein synthesis, genetic pattern of inheritance	Lecture	1,4	Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP201T.1	**BP201T.1**. Explain the gross morphology, structure and functions of various organs of the human body.	3	1	1	1	2	3	1	1	1	1	3				
BP201T.2	**BP201T.2**. Describe the various homeostatic mechanisms and their imbalances.	2	1	2	1	2	2	1	1	1	1	3				
BP201T.3	**BP201T.3**. Identify the various tissues and organs of different systems of human body.	2	1	1	1	2	3	1	1	1	1	3				
BP201T.4	**BP201T.4**. Perform the hematological tests like blood cell counts, haemoglobin estimation,	2	1	1	1	2	3	1	1	1	1	3				

	bleeding/clotting time etc and also record blood pressure, heart rate, pulse and respiratory volume.															
BP201T.5	**BP201T.5**. Appreciate coordinated working pattern of different organs of each system	3	1	2	1	2	3	1	1	1	1	3				

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacology I MID-SEMESTER (SEM –IInd) 2020-21						
Class: B.Pharm, II Semester						
Subject Name: BP201T Human Anatomy and Physiology-II Theory		Time: 1 Hrs			Max. Marks: 30	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3,4,5,7	Q.6,8,9	Q.2			Q2

The student will be able to

CO.1. Explain the gross morphology, structure and functions of various organs of the human body.

CO.2. Describe the various homeostatic mechanisms and their imbalances.

CO.3. Identify the various tissues and organs of different systems of human body.

CO Map	Question No.	Question	Marks
CO1	Q.1	Write in short about organization of nervous system.	2
CO1	Q.2	Discuss about neuron.	2
CO1	Q.3	What do you mean by neurotransmitters?	2

CO2	Q.4	Discuss the functions of salivary glands	2
CO2	Q.5	What is the role of pepsin in protein digestion?	2
CO3	Q.6	Discuss the Anatomy of GI Tract with special reference to functions of stomach	10
CO2	Q.7	Explain the process of Acid production in the stomach and regulation of acid production through parasympathetic nervous system	10
CO1	Q.8	Write the classification and properties of nerve fibre	5
CO2	Q.9	Discuss the Formation and role of ATP.	5
CO2	Q.10	Write the Anatomy of respiratory system with special reference to anatomy of lungs	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

100 % Percentage of students secured more than 60% marks, so this course human anatomy and physiology II– theory (BP201T) attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-21

Programme Outcomes:

[PO.1]. Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Programme Specific Outcomes:

PSO 1: Will be able to design, develop and implement efficient software for a given real life problem.

PSO 2: Will be able to apply knowledge of AI, Machine Learning and Data Mining in analyzing big data forextracting useful information from it and for performing predictive analysis.

PSO 3: Will be able to design, manage and secure wired/ wireless computer networks for transfer and sharing ofinformation.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
II SEM																
	BP202T	2	-	2	-	1	2	2	1	1	-					

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICAL CHEMISTRY
Course Handout
Course : PHARMACEUTICAL ORGANIC CHEMISTRY – I THEORY
Course Code : BP 202T, Crédits : 04, Session : 2020-21 (Even Sem.), Class : B.Pharm. I st Year
Faculty Name: Dr. Pawan Kumar Gupta

A. **Introduction:** The course is designed to impart fundamental knowledge on the preparatory Pharmacy with arts and science of preparing the different conventional dosage forms.

B. **Course Outcomes:** At the end of the course, students will be able to:

BP202 T.1. Relate pharmacy education with pharmacy career options.

BP202 T.2. Classify the different types of *organic compounds* based on medicinal use.

BP*202* T.3. Experiment in the preparation of various types organic compounds and their derivatives.

BP202 T.4. Able to analyse and also to *write the structure, name and the type of isomerism of the organic compound*.

BP202 T.5. Able to Solve and write *the reaction, name the reaction and also orientation of reactions* in different types of *organic compounds*

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

P. Mohanty

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well-being.

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C. Programme Specific Outcomes:

PSO 1: Will be able to design, develop and implement efficient software for a given real life problem.

PSO 2: Will be able to apply knowledge of AI, Machine Learning and Data Mining in analyzing big data forextracting useful information from it and for performing

predictive analysis.

PSO 3: Will be able to design, manage and secure wired/ wireless computer networks for transfer and sharing ofinformation.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

Classification, nomenclature and isomerism

Classification of Organic Compounds

Common and IUPAC systems of nomenclature of organic compounds

(up to 10 Carbons open chain and carbocyclic compounds)

Structural isomerisms in organic compounds

Alkanes*, Alkenes* and Conjugated dienes*

SP^3 hybridization in alkanes, Halogenation of alkanes, uses of paraffins.

Stabilities of alkenes, SP^2 hybridization in alkenes

E_1 and E_2 reactions – kinetics, order of reactivity of alkyl halides, rearrangement of carbocations, Saytzeffs orientation and evidences. E_1 verses E_2 reactions, Factors affecting E_1 and E_2 reactions. Ozonolysis, electrophilic addition reactions of alkenes, Markownikoff's orientation, free radical addition reactions of alkenes, Anti Markownikoff's orientation.

Stability of conjugated dienes, Diel-Alder, electrophilic addition, free radical addition reactions of conjugated dienes, allylic rearrangement

Alkyl halides*

SN_1 and SN_2 reactions - kinetics, order of reactivity of alkyl halides, stereochemistry andrearrangement of carbocations.

SN_1 versus SN_2 reactions, Factors affecting SN_1 and SN_2 reactions

Structure and uses of ethylchloride, Chloroform, trichloroethylene, tetrachloroethylene,dichloromethane, tetrachloromethane and iodoform.

Alcohols*- Qualitative tests, Structure and uses of Ethyl alcohol, Methyl alcohol, chlorobutanol, Cetosteryl alcohol, Benzyl alcohol, Glycerol, Propylene glycol

Carbonyl compounds* (Aldehydes and ketones)

Nucleophilic addition, Electromeric effect, aldol condensation, Crossed Aldol condensation, Cannizzaro reaction, Crossed Cannizzaro reaction, Benzoin condensation, Perkin condensation, qualitative tests, Structure and uses of Formaldehyde, Paraldehyde, Acetone, Chloral hydrate, Hexamine, Benzaldehyde, Vanilin, Cinnamaldehyde.

Carboxylic acids*

Acidity of carboxylic acids, effect of substituents on acidity, inductive effect and qualitative tests for carboxylic acids ,amide and ester

Structure and Uses of Acetic acid, Lactic acid, Tartaric acid, Citric acid, Succinic acid. Oxalic acid, Salicylic acid, Benzoic acid, Benzyl benzoate, Dimethyl phthalate, Methyl salicylate and Acetyl salicylic acid

Aliphatic amines* -

Basicity, effect of substituent on Basicity. Qualitative test, Structure and uses of Ethanolamine, Ethylenediamine, Amphetamine

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

Organic Chemistry by Morrison and Boyd

Organic Chemistry by I.L. Finar, Volume-I

Textbook of Organic Chemistry by B.S. Bahl & Arun Bahl.

Organic Chemistry by P.L.Soni

Practical Organic Chemistry by Mann and Saunders.

Vogel's text book of Practical Organic Chemistry

Advanced Practical organic chemistry by N.K.Vishnoi.

Introduction to Organic Laboratory techniques by Pavia, Lampman and Kriz.

Reaction and reaction mechanism by Ahluwaliah/Chatwal.

Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Classification of Organic Compounds on the basis of structure.	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
2	Classification of Organic Compounds on the basis of functional group.	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
3	IUPAC systems of nomenclature of Alkanes, Alkenes and Conjugated dienes.	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
4	IUPAC systems of nomenclature of Alkyl halides and alcohol.	Tutorial	CO1,4	Mid Term-1, Quiz & End Sem Exam
5	IUPAC systems of nomenclature of Carbonyl compound (Aldehydes and ketones).	Lecture	CO1,2	Mid Term-1, Quiz & End Sem Exam
6	IUPAC systems of nomenclature of Carboxylic acids.	Lecture	CO1,2	Mid Term-1, Quiz & End Sem Exam
7	IUPAC systems of nomenclature of aliphatic amines.	Lecture	CO1,2	Mid Term-1, Quiz & End Sem Exam
8	Structural isomerism in organic compounds.	Tutorial	CO1,3	Mid Term-1, Quiz & End Sem Exam
9	Structural isomerism in organic compounds.	Lecture	CO1,2	Mid Term-1, Quiz & End Sem Exam
10	Alkanes- method of Prepration,	Lecture	CO1,3	Mid Term-1, Quiz

	reaction			& End Sem Exam
11	Quiz	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
12	SP^3 hybridization in alkanes.	Tutorial	CO1,4	Mid Term-1, Quiz & End Sem Exam
13	Halogenation of alkanes, uses of paraffin.	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
14	Stabilities of alkenes, SP^2 hybridization in alkenes.	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
15	Alkyl halide- method of Prepration, reaction	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
16	Unit test	Tutorial		Mid Term-1, Quiz & End Sem Exam
17	Rearrangement of carbocations.	Lecture	CO1,5	Mid Term-1, Quiz & End Sem Exam
18	Saytzeffs orientation and evidences.	Lecture	CO1,3	Mid Term-1, Quiz & End Sem Exam
19	E_1 verses E_2 reactions, Factors affecting E_1 and E_2 reactions.	Lecture	CO1,3	Mid Term-1, Quiz & End Sem Exam
20	Ozonolysis, electrophilic addition reactions of alkenes.	Tutorial	CO1,4	Mid Term-1, Quiz & End Sem Exam
21	Markownikoff's orientation, Anti Markownikoff's orientation.	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
22	Free radical addition reactions of alkenes,	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
23	Conjugated dienes* method of Prepration and reaction.	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
24	Quiz	Tutorial		Mid Term-1, Quiz & End Sem Exam
25	Stability of conjugated dienes, Diel-Alder.	Lecture	CO1,5	Mid Term-1, Quiz & End Sem Exam

26	Electrophilic addition reaction of dienes.	Lecture	CO1,3	Mid Term-1, Quiz & End Sem Exam
27	Free radical addition reactions of conjugated dienes, allylic rearrangement.	Lecture	CO1,5	Mid Term-1, Quiz & End Sem Exam
28	Method of Prepration and reaction of Alkyl halides. reaction Reaction of aromatic acid	Tutorial	CO1,5	Mid Term-1, Quiz & End Sem Exam
29	SN_1 and SN_2 reactions - kinetics, order of reactivity of alkyl halides.	Lecture	CO1,3	Mid Term-1, Quiz & End Sem Exam
30	SN_1 versus SN_2 reactions, Factors affecting SN_1 and SN_2 reactions.	Lecture	CO1,5	Mid Term-1, Quiz & End Sem Exam
31	Structure and uses of ethylchloride, Chloroform.	Lecture	CO1,2	Mid Term-2, Quiz & End Sem Exam
32	Structure and uses of trichloroethylene, tetrachloroethylene.	Tutorial	CO1,2	Mid Term-2, Quiz & End Sem Exam
33	Structure and uses of dichloromethane, tetrachloromethane and iodoform.	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
34	Alcohols- method of Prepration, reaction.	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
35	Qualitative tests of Alcohols.	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
36	Seminar	Tutorial	CO1,5	Mid Term-2, Quiz & End Sem Exam
37	Structure and uses of Ethyl	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam

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	alcohol, Methyl alcohol.			
38	Carbonyl compounds (Aldehydes and ketones) method of Prepration, reaction.	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
39	Acidity of carboxylic acids, effect of substituent on acidity.	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
40	Unit test	Tutorial	CO1,5	Mid Term-2, Quiz & End Sem Exam
41	Inductive effect and qualitative tests for carboxylic acids.	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
42	Structure and Uses of Acetic acid, Lactic acid, Tartaric acid.	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
43	Qualitative tests for amide and ester .	Lecture	CO1,3	Mid Term-2, Quiz & End Sem Exam
44	Seminar	Tutorial	CO1,3	Mid Term-2, Quiz & End Sem Exam
45	Structure and uses of chlorobutanol, Cetosteryl alcohol, Benzyl alcohol.	Lecture	CO1,4	Mid Term-2, Quiz & End Sem Exam
46	Structure and uses of Glycerol, Propylene glycol. .	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
47	Structure and Uses of Acetic acid, Lactic acid, Tartaric acid. .	Lecture	CO1,5	Quiz & End Sem Exam
48	Quiz	Tutorial		Quiz & End Sem Exam
49	Structure and Uses of Citric acid, Succinic acid. Oxalic acid,	Lecture	CO1,5	Quiz & End Sem Exam

	Salicylic acid			
50	Structure and Uses of Benzoic acid, Benzyl benzoate, Dimethyl phthalate.	Lecture	CO1,4	Quiz & End Sem Exam
51	Structure and Uses of Methyl salicylate and Acetyl salicylic acid. .	Lecture	CO1,4	Quiz & End Sem Exam
52	Aliphatic amines method of Prepration and reaction.	Tutorial	CO1,4	Quiz & End Sem Exam
53	Aliphatic amines method of Prepration and reaction.	Lecture	CO1,4	Quiz & End Sem Exam
54	Basicity, effect of substituent on Basicity.	Lecture	CO1,2	Quiz & End Sem Exam
55	Basicity, effect of substituent on Basicity.	Lecture	CO1,3	Quiz & End Sem Exam
56	Unit test	Tutorial		Quiz & End Sem Exam
57	Aliphatic amines. Qualitative test of amine.	Lecture	CO1,2	Quiz & End Sem Exam
58	Aliphatic amines. Qualitative test of amine.	Lecture	CO1,2	Quiz & End Sem Exam
59	Structure and uses of Ethanolamine, Ethylenediamine, Amphetamine.	Lecture	CO1,2	Quiz & End Sem Exam
60	Structure and uses of Ethanolamine, Ethylenediamine, Amphetamine.	Tutorial	CO1,2	Quiz & End Sem Exam

Dr. Mohan Patil

H. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP202T.1	Relate pharmacy education with pharmacy career options.	2	-	-	-	2	2	1	-	1	-	-				
BP202T.2.	Classify the different types of *organic compounds* based on medicinal use.	3	-	-	1	-	2	-	-	-	-	3				
BP202T.3.	Experiment in the preparation of various types organic compounds and their derivatives.	3	2	-	3	-	2	-	-	-	-	3				
BP202T.4.	Able to analyse and also to *write the structure, name and the type of*	2	2	3	3	-	1	-	-	-	-	3				

Dr. Mohan Katyal

	isomerism of the organic compound.															
BP202T.5.	Able to Solve and write *the reaction, name the reaction and also orientation of reactions* in different types of *organic compounds* .	1	-	3	-	-	-	-	-	-	-	3				

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacutical Chemistry I MID-SEMESTER (SEM –II nd) 2020-21						
Class: B.Pharm, IInd Semester						
Subject Name: BP202T Pharmaceutical Organic Chemistry-I Theory		Time: 1 Hrs		Max. Marks: 30		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,4,5	Q.2,3,6,8,9	Q.4,7	Q.2,5,		
Student will be able to CO1: List the broad perceptive of cloud architecture and model. CO2: Apply different cloud programming models as per need.						

CO Map	Question No.	Question	Marks
CO1	Q.1	Define organic compounds.	2
CO1	Q.2	Explain significance of ethyl Alcohol	2
CO2	Q.3	Classify structural Isomerism	2
CO2	Q.4	By showing structure of chloroform. And summarize any	2

		three medicinal uses of chloroform	
CO2	Q.5	What do you understand by Substitution reaction give example?	2
	Q.6	Explain IUPAn Nomenclature in carbonyl compounds.	10
CO1	Q.7	What relationship between Structural and Geometric Isomerism Give their Classification.	10
CO1	Q.8	Outline Markownikoff's rule with suitable example.	5
CO2	Q.9	Explain sp3 Hybridization.	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

100 % Percentage of students secured more than 60% marks, so this course Pharmaceutical Organic Chemistry I – Theory (BP202T) attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-2021

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

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PROGRAMMEARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
IIS EM																
	BP-203 T	3	-	1	-	1	2	2	1	1	-	2				

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MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICAL CHEMISTRY
Course Handout
Course : BIOCHEMISTRY (Theory)
Course Code : BP203T, Crédits : 04, Session :2020-2021 (Even Sem.), Class : B.Pharm. 1st Year
FacultyName: Dr. S Vijayaraj

A. Introduction: Biochemistry deals with complete understanding of the molecular levels of the chemical process associated with living cells. The scope of the subject is providing biochemical facts and the principles to understand metabolism of nutrient molecules in physiological and pathological conditions. It is also emphasizing on genetic organization of mammalian genome and hetero & autocatalytic functions of DNA

B. Course Outcomes: At the end of the course, students will be able to:

BP203T.1. Describe the concept of biomolecules and bioenergetics.

BP203T.2. Explain the metabolic pathways of biomolecules in both physiological and pathological conditions.

BP203T.3. Understand the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes.

BP203T.4.Understand the genetic organization of mammalian genome and functions of

DNA in the synthesis of RNAs and proteins.

BP203T.5. Describe the clinical pathology of blood and urine.

C. Programme Outcomes:

[PO.1].Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

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technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance isrequiredtobemaintainedbyastudenttto be qualified for taking up the EndSemester examination. The allowanceof 20%includesalltypesofleaves includingmedicalleaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

UNIT – I

Biomolecules Introduction, classification, chemical nature and biological role of carbohydrate, lipids, nucleic acids, amino acids and proteins.

Bioenergetics Concept of free energy, endergonic and exergonic reaction, Relationship between free energy, enthalpy and entropy; Redox potential. Energy rich compounds; classification; biological significances of ATPand cyclic AMP

UNIT – II

Carbohydrate metabolism: Glycolysis – Pathway, energetics and significance Citric acid cycle- Pathway, energetics and significance HMP shunt and its significance; Glucose-6-Phosphate dehydrogenase (G6PD) deficiency Glycogen metabolism Pathways and glycogen storage diseases (GSD) Gluconeogenesis- Pathway and its significance Hormonal regulation of blood glucose level and Diabetes mellitus.

Biological oxidation:

Electron transport chain (ETC) and its mechanism.Oxidative phosphorylation & its mechanism and substrate

Phosphorylation Inhibitors ETC and oxidative phosphorylation/Uncouplers level.

UNIT – III

Lipid metabolism:

B-Oxidation of saturated fatty acid (Palmitic acid). Formation and utilization of ketone bodies; ketoacidosis, De novo synthesis of fatty acids (Palmitic acid),Biological significance of cholesterol and conversion of cholesterol into bile acids, steroid hormone and vitamin D, Disorders of lipid metabolism: Hypercholesterolemia, atherosclerosis, fatty liver and obesity.

Amino acid metabolism

General reactions of amino acid metabolism: Transamination, deamination & decarboxylation, urea cycle and its disorders Catabolism of phenylalanine and tyrosine and their metabolic disorders (Phenyketonuria, Albinism, alkeptonuria, tyrosinemia) Synthesis and significance of biological substances; 5-HT, melatonin, dopamine, noradrenaline, adrenaline Catabolism of heme; hyperbilirubinemia and jaundice.

UNIT – IV

Nucleic acid metabolism and genetic information transfer

Biosynthesis of purine and pyrimidine nucleotides Catabolism of purine nucleotides and Hyperuricemia and Gout disease Organization of mammalian genome Structure of DNA and RNA and their functions DNA replication (semi conservative model) Transcription or RNA synthesis Genetic code, Translation or Protein synthesis and inhibitors

UNIV – V

Enzymes:

Introduction, properties, nomenclature and IUB classification of enzymes Enzyme kinetics (Michaelis plot, Line Weaver Burke plot) Enzyme inhibitors with examples Regulation of enzymes: enzyme induction and repression, allosteric enzymes regulation Therapeutic and diagnostic applications of enzymes and isoenzymes Coenzymes – Structure and biochemical functions

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

- Principles of Biochemistry by Lehninger.
- Harper's Biochemistry by Robert K. Murry, Daryl K. Granner and Victor W. Rodwell.
- Biochemistry by Stryer.
- Biochemistry by D. Satyanarayan and U.Chakrapani
- Textbook of Biochemistry by Rama Rao.
- Textbook of Biochemistry by Deb.
- Outlines of Biochemistry by Conn and Stump

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Introduction, classification, chemical nature of biomolecules	Lecture	1	Mid Term-1, Quiz & End Sem Exam
2	biological role of carbohydrate and lipids	Lecture	1	Mid Term-1, Quiz & End Sem Exam
3	Biological role of nucleic acids, amino acids and proteins.	Lecture		Mid Term-1, Quiz & End Sem Exam
4	Revision of biomolecules	Tutorial	1	Mid Term-1, Quiz & End Sem Exam
5	Concept of free energy, endergonic and exergonic reaction,	Lecture	1	Mid Term-1, Quiz & End Sem Exam
6	Relationship between free energy, enthalpy and entropy; Redox potential.	Lecture	1	Mid Term-1, Quiz & End Sem Exam
7	Classification and biological significances of ATP and cyclic AMP	Lecture	1	Mid Term-1, Quiz & End Sem Exam
8	Quiz	Tutorial		Mid Term-1, Quiz & End Sem Exam
9	Introduction of carbohydrate metabolism, Glycolysis – Pathway, energetics and significance	Lecture	1,2	Mid Term-1, Quiz & End Sem Exam
10	Pathway, energetics and significance ofCitric acid cycle	Lecture	2	Mid Term-1, Quiz & End Sem Exam
11	HMP shunt and its significance; Glucose-6-Phosphate dehydrogenase (G6PD) deficiency	Lecture	2	Mid Term-1, Quiz & End Sem Exam
12	Revision of carbohydrate metabolic pathways.	Tutorial		Mid Term-1, Quiz & End Sem Exam
13	Glycogen metabolism Pathways and glycogen storage diseases (GSD)	Lecture	2	Mid Term-1, Quiz & End Sem Exam
14	Gluconeogenesis- Pathway and its significance	Lecture	2	Mid Term-1, Quiz & End Sem Exam
15	Hormonal regulation of blood glucose level and Diabetes	Lecture	2	Mid Term-1, Quiz & End Sem Exam

	mellitus			
16	Complete discussion of carbohydrate metabolism.	Tutorial		Mid Term-1, Quiz & End Sem Exam
17	Electron transport chain (ETC) and its mechanism	Lecture	1	Mid Term-1, Quiz & End Sem Exam
18	Oxidative phosphorylation & its mechanism and substrate Phosphorylation.	Lecture	1	Mid Term-1, Quiz & End Sem Exam
19	Inhibitors ETC and oxidative phosphorylation/Uncouplers	Lecture	1	Mid Term-1, Quiz & End Sem Exam
20	Group discussion on biological oxidation.	Tutorial		Mid Term-1, Quiz & End Sem Exam
21	β-Oxidation of saturated fatty acid (Palmitic acid)	Lecture	2	Mid Term-1, Quiz & End Sem Exam
22	ketoacidosis : Formation and utilization of ketone bodies;	Lecture	2	Mid Term-1, Quiz & End Sem Exam
23	De novo synthesis of fatty acids (Palmitic acid	Lecture	2	Mid Term-1, Quiz & End Sem Exam
24	Revision of lipid metabolism	Tutorial		Mid Term-1, Quiz & End Sem Exam
25	conversion of cholesterol into bile acids, steroid hormone and vitamin D	Lecture	2	Mid Term-1, Quiz & End Sem Exam
26	Metabolic disorder of lipids.	Lecture	2,5	Mid Term-1, Quiz & End Sem Exam
27	Hypercholesterolemia, atherosclerosis, fatty liver and obesity	Lecture	2,5	Mid Term-1, Quiz & End Sem Exam
28	Quiz	Tutorial		Mid Term-1, Quiz & End Sem Exam
29	General reactions of amino acid metabolism: Transamination, deamination & decarboxylation	Lecture	2	Mid Term-1, Quiz & End Sem Exam
30	urea cycle and its disorders	Lecture	2,5	Mid Term-1, Quiz & End Sem Exam
31	Catabolism of phenylalanine and tyrosine and their metabolic disorders (Phenyketonuria, Albinism, alkeptonuria, tyrosinemia)	Lecture	2,5	Mid Term-2, Quiz & End Sem Exam
32	Group discussion on amino acid metabolism	Tutorial		Mid Term-2, Quiz & End Sem Exam
33	Synthesis and significance	Lecture	2	Mid Term-2, Quiz

	of biological substances; 5-HT, melatonin,			& End Sem Exam
34	dopamine, noradrenaline, adrenaline	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
35	Catabolism of heme; hyperbilirubinemia and jaundice methods to overcome	Lecture	4	Mid Term-2, Quiz & End Sem Exam
36	Seminar	Tutorial		Mid Term-2, Quiz & End Sem Exam
37	Introduction of Nucleic acid metabolism and genetic information transfer	Lecture	4	Mid Term-2, Quiz & End Sem Exam
38	Biosynthesis of purine nucleotides	Lecture	4	Mid Term-2, Quiz & End Sem Exam
39	Biosynthesis of pyrimidine nucleotides	Lecture	4	Mid Term-2, Quiz & End Sem Exam
40	Catabolism of purine nucleotides and Hyperuricemia and Gout disease	Lecture	4	Mid Term-2, Quiz & End Sem Exam
41	Unit test	Tutorial		Mid Term-2, Quiz & End Sem Exam
42	Organization of mammalian genome Structure of DNA and RNA and their functions.	Lecture	4	Mid Term-2, Quiz & End Sem Exam
43	DNA replication (semi conservative model)	Lecture	4	Mid Term-2, Quiz & End Sem Exam
44	Transcription or RNA synthesis	Lecture	4	Mid Term-2, Quiz & End Sem Exam
45	Seminar	Tutorial		Mid Term-2, Quiz & End Sem Exam
46	Genetic code	Lecture	4	Mid Term-2, Quiz & End Sem Exam
47	Translation or Protein synthesis and inhibitors	Lecture	4	Mid Term-2, Quiz & End Sem Exam
48	Introduction and properties of enzymes	Lecture	3	Mid Term-2, Quiz & End Sem Exam
49	nomenclature and IUB classification of enzymes	Lecture	3	Mid Term-2, Quiz & End Sem Exam
50	Enzyme kinetics (Michaelis plot, Line Weaver Burke plot	Lecture	3	Quiz & End Sem Exam
51	Revision of enzyme kinetics	Tutorial		Quiz & End Sem Exam

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52	Enzyme inhibitors with examples	Lecture	3	Quiz & End Sem Exam
53	Enzyme induction and repression	Lecture	3	Quiz & End Sem Exam
54	Regulation of enzymes	Lecture	3	Quiz & End Sem Exam
55	Group discussion on enzyme inhibitors	Tutorial		Quiz & End Sem Exam
56	Therapeutic applications of enzyme	Lecture	3	Quiz & End Sem Exam
57	Diagnostic applications of enzyme	Lecture	3	Quiz & End Sem Exam
58	isoenzymes	Lecture	3	Quiz & End Sem Exam
59	Structure and biochemical functions of coenzymes	Lecture	3	Quiz & End Sem Exam
60	Unit test	Tutorial		Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP203T.1	**BP203T.1**. Describe the concept of biomolecules and bioenergetics.	3	-	-	-	2	2	1	-	1	-	3				
BP203T.2.	**BP203T.2**. Explain the metabolic pathways of biomolecules in both physiological and pathological conditions.	3	-	-	1	-	2	-	-	-	-	3				
BP203T.3.	**BP203T.3**. . Understand the catalytic role of	3	2	-	3	-	2	-	-	-	-	3				

	enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes.															
BP203T.4.	**BP203T.4**. Understand the genetic organization of mammalian genome and functions of DNA in the synthesis of RNAs and proteins.	2	2	3	3	-	1	-	-	-	-	3				
BP203T.5.	**BP203T.5**. Describe the clinical pathology of blood and urine.	1	-	3	-	-	-	-	-	-	-	3				

SampleQuestionPaper

Amity Institute of Pharmacy DepartmentofPharmaceutics IMID-SEMESTER(SEM–IInd) 2020-2021						
Class: B.Pharm, IInd Semester						
SubjectName: BP203T BIOCHEMISTRY (Theory)-I		Time:1Hrs			Max.Marks:30	
Levels of thequestions as perBloomsTaxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
QuestionMapping	Q.1,4,5	Q.2,3	Q.7,9,10	Q.6, 8		

The student willbeableto

CO1. Describe the concept of biomolecules and bioenergetics.

CO2. Explain the metabolic pathways of biomolecules in both physiological and pathological conditions.

CO3. Understand the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes.

CO4. Understand the genetic organization of mammalian genome and functions ofDNA in the synthesis of RNAs and proteins.

CO5. Describe the clinical pathology of blood and urine.

COMap	QuestionNo.	Question	Marks
CO1	Q.1	Write the name of high energy compounds of a cell.	2
CO1	Q.2	Write an exhaustive note on electron transport chain.	2
CO2	Q.3	What is nucleus and nucleolus?	2
CO2	Q.4	Give an example of carbohydrate that would give positive test with molisch test.	2
CO2	Q.5	Write down in short about glycolysis pathway.	2
CO2	Q.6	Explain about the beta oxidation of fatty acid.	10
CO4	Q.7	Give the biosynthesis of purine and pyrimidine nucleotides.	10
CO3	Q.8	Explain primary structure of protein.	5
CO3	Q.9	Write the complete classification of enzymes as per the IUBMB with suitable example.	5
CO3	Q.10	Write a note on enzyme kinetics.	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

98.2 % Percentage of students secured more than 60% marks, so this course Biochemistry-Theory (BP203T) attained Level -3.

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AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOLOGY

PROGRAMME OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-21

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge asscoited with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions

[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "-"

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
II SEM	BP 204T	3	3	3	3	2	2	3	1	1	3	1	-	-	-

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACOLOGY
Course Handout
Course : PATHOPHYSIOLOGY (THEORY)
Course Code : BP 204T, Credits : 04, Session : 2020-21 (Even Sem.), Class : B. Pharm.1st Year
Faculty Name : Mrs. Monika Kaushik/ Dr. M. Sathish Kumar

Introduction: This subject is intended to impart the fundamental knowledge on various aspects (the study of causes of diseases and reactions of the body to such disease producing causes), emphasis the basic concepts of bioassay.:

1. The relevant aspects of pathology of various conditions with reference to its pharmacological applications.
2. Understanding of basic pathophysiological mechanisms.
3. Help to study the syllabus of pathology.
4. Give baseline knowledge required to practice medicine safely, confidently, rationally, and effectively.
5.

Course Outcomes: At the end of the course, students will be able to:

BP204T.1. Describe the etiology and pathogenesis of the selected disease states.Discuss the

BP204T.2. Name the signs and symptoms of the diseases

BP204T.3. Mention the complications of the diseases.

BP204T.4. Distinguish environmental factors, physical, psychosocial, and cognitive characteristics of various diseases and conditions.

BP204T.5 Identify implications of therapeutic interventions for diseases and conditions.

A. Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time

management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

B. Assessment Plan:

Component of Evaluation	Description	Code	Weightage %
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	A minimum of 80% attendance is required to be maintained by a student to be qualified for taking up the Odd Semester examination	A	4 %
	Quiz/ Assignment/Open book test/ Field work/Group discussion/ Seminar	Q/A/OBT/FW/GD/S	3%
	Student – Teacher interaction	STA	3%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

Q: Quiz, A: Assignment, OBT: Open book test, FW: Field work, GD: Group discussion, S: Seminar

C. Syllabus

Unit I. 10Hours

Basic principles of Cell injury and Adaptation: Introduction, definitions, Homeostasis, Components and Types of Feedback systems, Causes of cellular injury,Pathogenesis (Cell membrane damage, Mitochondrial damage, Ribosome damage, Nuclear damage),Morphology of cell injury – Adaptive changes (Atrophy, Hypertrophy, hyperplasia, Metaplasia, Dysplasia),Cell swelling, Intra cellular accumulation, Calcification, Enzyme leakage and Cell Death Acidosis &Alkalosis,Electrolyte imbalance.

Basic mechanism involved in the process of inflammation and repair: Introduction, Clinical signs of inflammation, Different types of Inflammation,Mechanism of Inflammation – Alteration in vascular permeability and blood flow, migration of WBC's,Mediators of inflammation,Basic principles of wound healing in the skin,Pathophysiology of Atherosclerosis

Unit II. 10Hours

Cardiovascular System: Hypertension, congestive heart failure, ischemic heart disease (angina,myocardial infarction, atherosclerosis and arteriosclerosis)

Respiratory system:Asthma, Chronic obstructive airways diseases. Renal system:Acute and chronic renal failure .

Unit III. 10Hours

Haematological Diseases:

Iron deficiency, megaloblastic anemia (Vit B12 and folic acid), sickle cell anemia, thalasemia, hereditary acquired anemia, hemophilia

Endocrine system: Diabetes, thyroid diseases, disorders of sex hormones

Nervous system: Epilepsy, Parkinson's disease, stroke, psychiatric disorders: depression, schizophrenia and Alzheimer's disease.

Gastrointestinal system: Peptic Ulcer

Unit IV. 8 Hours

Inflammatory bowel diseases, jaundice, hepatitis (A,B,C,D,E,F) alcoholic liver disease.

Disease of bones and joints: Rheumatoid arthritis, osteoporosis and gout

Principles of cancer: classification, etiology and pathogenesis of cancer

Diseases of bones and joints:Rheumatoid Arthritis, Osteoporosis,Gout

Principles of Cancer: Classification, etiology and pathogenesis of Cancer

Unit V. 7 Hours

Infectious diseases:Meningitis,Typhoid, Leprosy, Tuberculosis

Urinary tract infections

Sexually transmitted diseases:AIDS, Syphilis, Gonorrhea

Examination Scheme:

Components	**CT**	**A**	**Q/A/OBT/FW/GD/S**	**STI**	**EE**
Weightage (%)	15	4	3	3	75

Q: Quiz, A: Assignment, OBT: Open book test, FW: Field work, GD: Group discussion, S: Seminar, STI: Student – Teacher interaction

D. Suggested Text/Reference Books:

A. 1. Vinay Kumar, Abul K. Abas, Jon C. Aster; Robbins &Cotran Pathologic Basis of Disease; South Asia edition; India; Elsevier; 2014.

B. 2. Harsh Mohan; Text book of Pathology; 6th edition; India; Jaypee Publications; 2010.

C. 3. Laurence B, Bruce C, Bjorn K. ; Goodman Gilman's The Pharmacological Basis of Therapeutics; 12th edition; New York; McGraw-Hill; 2011. 4. Best, Charles Herbert 1899-1978; Taylor, Norman Burke 1885-1972; West, John B (John Burnard); Best and Taylor's Physiological basis of medical practice; 12th ed; united states; 5. William and Wilkins, Baltimore;1991 [1990 printing]. 6. Nicki R. Colledge, Brian R. Walker, Stuart H. Ralston;Davidson's Principles and Practice of Medicine; 21st edition; London; ELBS/Churchill Livingstone; 2010.

7. Guyton A, John .E Hall; Textbook of Medical Physiology; 12th edition; WB Saunders Company; 2010. 8. Joseph DiPiro, Robert L. Talbert, Gary Yee, Barbara Wells, L. Michael Posey; Pharmacotherapy: A Pathophysiological Approach; 9th edition;

London; McGraw-Hill Medical; 2014. 9. V. Kumar, R. S. Cotran and S. L. Robbins; Basic Pathology; 6th edition; Philadelphia; WB Saunders Company; 1997. 10. Roger Walker, Clive Edwards; Clinical Pharmacy and Therapeutics; 3rd edition; London; Churchill Livingstone publication; 2003.

E. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1.	Introduction of cellular injury	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
2.	Definitions of cellular injury,	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
3.	Homeostasis,	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
4.	Tutorial 1	Tutorial 1		
5.	Components and Types of Feedback systems,	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
6.	Causes of cellular injury	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
7.	Pathogenesis (Cell membrane damage, Mitochondrial damage)	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
8.	Tutorial 2	Tutorial 2		
9.	Pathogenesis (Ribosome damage, Nuclear damage)	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
10.	Morphology of cell injury – Adaptive changes	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
11.	(Atrophy, Hypertrophy, hyperplasia, Metaplasia, Dysplasia)	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
12.	Tutorial 3	Tutorial 3		
13.	Cell swelling, Intra cellular accumulation,	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
14.	Acidosis & Alkalosis, Electrolyte imbalance	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam

15.	Introduction, Clinical signs of inflammation,	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
16.	Tutorial 4	Tutorial 4		
17.	Different types of Inflammation, Mechanism of Inflammation – Alteration in vascular permeability and blood flow	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
18.	migration of WBC's, Mediators of inflammation,Basic principles of wound healing in the skin,	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
19.	Pathophysiology of Atherosclerosis	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
20.	Hypertension, congestive heart failure,	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
21.	Tutorial 5	Tutorial 5		
22.	ischemic heart disease (angina, myocardial infarction)	Lecture	BP204T.2	Mid Term-1, Quiz & End Sem Exam
23.	atherosclerosis and arteriosclerosis	Lecture	BP204T.2	Mid Term-1, Quiz & End Sem Exam
24.	Tutorial 6	Tutorial 6		
25.	Asthma	Lecture	BP204T.2	Mid Term-1, Quiz & End Sem Exam
26.	Chronic obstructive airways diseases.	Lecture	BP204T.2	Mid Term-1, Quiz & End Sem Exam
27.	Acute and chronic renal failure	Tutorial	BP204T.2	Mid Term-1, Quiz & End Sem Exam
28.	Tutorial 7	Tutorial 7		
29.	Iron deficiency, megaloblastic anemia (Vit B12 and folic acid),	Lecture	BP204T.3	Mid Term-2, Quiz & End Sem Exam
30.	sickle cell anemia, thalasemia	Lecture	BP204T.3	Mid Term-2, Quiz & End Sem Exam
31.	hereditary acquired anemia, hemophilia	Lecture	BP204T.3	Mid Term-2, Quiz & End Sem Exam
32.	Tutorial 8	Tutorial 8		

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33.	Diabetes, thyroid diseases	Tutorial	BP204T.3	Mid Term-2, Quiz & End Sem Exam
34.	disorders of sex hormones	Lecture	BP204T.3	Mid Term-2, Quiz & End Sem Exam
35.	Epilepsy	Lecture	BP204T.3	Mid Term-2, Quiz & End Sem Exam
36.	Tutorial 9	Tutorial 9		
37.	stroke	Lecture	BP204T.3	Mid Term-2, Quiz & End Sem Exam
38.	Schizophrenia	Tutorial	BP204T.3	Mid Term-2, Quiz & End Sem Exam
39.	Alzheimer‘s disease	Lecture	BP204T.3	Mid Term-2, Quiz & End Sem Exam
40.	Tutorial 10	Tutorial 10		
41.	Peptic Ulcer	Lecture	BP204T.3	Mid Term-2, Quiz & End Sem Exam
42.	Inflammatory bowel diseases.	Lecture	BP204T.4	Mid Term-2, Quiz & End Sem Exam
43.	jaundice	Tutorial	BP204T.4	Mid Term-2, Quiz & End Sem Exam
44.	Tutorial 11	Tutorial 11		
45.	hepatitis (A,B,C,D,E,F)	Lecture	BP204T.4	Mid Term-2, Quiz & End Sem Exam
46.	alcoholic liver disease	Lecture	BP204T.4	Mid Term-2, Quiz & End Sem Exam
47.	Rheumatoid arthritis,	Lecture	BP204T.4	Mid Term-2, Quiz & End Sem Exam
48.	Tutorial 12	Tutorial 12		
49.	osteoporosis	Tutorial	BP204T.4	Mid Term-2, Quiz & End Sem Exam
50.	gout	Lecture	BP204T.4	Quiz & End Sem Exam
51.	psychiatric disorders: depression	Lecture	BP204T.4	Quiz & End Sem Exam
52.	Tutorial 13	Tutorial 13		

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53.	Classification, etiology and pathogenesis of cancer	Lecture	BP204T.5	Quiz & End Sem Exam
54.	Parkinson's disease	Tutorial	BP204T.5	Quiz & End Sem Exam
55.	Meningitis	Lecture	BP204T.5	Quiz & End Sem Exam
56.	Tutorial 14	Tutorial 14		
57.	Typhoid,	Lecture	BP204T.5	Quiz & End Sem Exam
58.	Leprosy,	Lecture	BP602T.5	Mid Term-2, Quiz & End Sem Exam
59.	Tuberculosis	Lecture	BP204T.5	Quiz & End Sem Exam
60.	Tutorial 15	Tutorial 15		
61.	Urinary tract infections	Lecture	BP204T.5	Quiz & End Sem Exam
62.	AIDS, Syphilis, Gonorrhea	Lecture	BP204T.5	Quiz & End Sem Exam

F. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP204T.1	Discuss the diffrenet type of components and feedback systems present in the body.	2	2	3	2	-	1	2	1	-	-	1
BP204T.2	What are the adaptaive changes ocuurs in morphology during cell injury.	2	2	2	3	-	1	1	1	-	-	1
BP204T.3	Write a descriptive note on disease know as porous bone or silent disease.	2	1	1	-	-	1	3	2	-	-	-
BP204T.4	What are the causes, symptoms and treatment of epilepsy.	2	2	2	1	-	1	-	-	-	-	-
BP204T.5	*Write a descriptive note on Tuberculosis.*	2	1	-	-	-	2	1	1	-	-	1

Sample Question Paper

Amity School of Pharmacy Department of Pharmacology I MID-SEMESTER(SEM–II)2021-22						
Class: B.Pharm. II Semester						
Subject Name: BP204T Pathophysiology		Time:1 Hrs		Max.Marks:30		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,4	Q.2,3	Q.4	Q.2,5,6		

CO Map	Question No.	Question	Marks
CO1	Q.1	Write about the disease caused by deficiency of Vit B12.	2
CO1	Q.2	Discuss the symptoms of Alzheimer's disease.	2
	Q.3	Write a note on Stroke.	2
	Q.4	Write a note on Rheumatoid Arthritis.	2
	Q.5	What is cancer?	2
CO1	Q.6	Write a about etiology, clinical presentation, diagnosis, and treatment of Peptic Ulcer.	10
CO2	Q.7	Discuss the symptoms and management of Schizophrenia.	10
CO2	Q.8	Write the descriptive note on CHF.	5
	Q.9	Write an explanatory note on hepatitis A, B and C?	5
CO2	Q.10	Explain the pathophysiology and treatment strategy for	5

		alcoholic liver disease.	

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

100 % Percentage of students secured more than 60% marks, so this course Pathophysiology - Theory (BP204T) attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICS

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-21

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
II SEM																
	BP205T	3	-	2	3	1	3	2	1	1	2	2				

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MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICS
Course Handout
Course : COMPUTER APPLICATION IN PHARMACY THEORY
Course Code: BP205T, Credits: 03, Session:2020-21 (Even Sem.), Class: B.Pharm - 1st Year
Faculty Name: Dr. Jovita Kanoujia and Mr. Vivek Parashar

A. Introduction: This subject deals with the introduction database, database management system,
computer application in clinical studies and use of databases.

B. Course Outcomes: At the end of the course, students will be able to:

BP205T.1. Apply one's complement, and two's complement methods to solve various problems based on the binary system.

BP205T.2. Illustrate data flow diagrams, product cycle and discover web technologies application in pharmacy.

BP205T.3. Define the role of computer in various fields of pharmacy

BP205T.4. Explain the application of bioinformatics in various disciplines.

BP205T.5. Outline the use of LIMS, TIMS and CDS in pre-clinical development.

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time

management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	Description	Code	Weightage %
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	50%
Total			**75%**

E. Syllabus

UNIT – I

Number system: Binary number system, Decimal number system, Octal number system, Hexadecimal number systems, conversion decimal to binary, binary to decimal, octal to binary etc, binary addition, binary subtraction – One's complement, Two's complement method, binary multiplication, binary division**.**

Concept of Information Systems and Software **:** Information gathering, requirement and feasibility analysis, data flow diagrams, process specifications, input/output design, process life cycle, planning and managing the project

UNIT –II

Web technologies:Introduction to HTML, XML,CSS and Programming languages, introduction to web servers and Server Products**,** Introduction to databases, MYSQL, MS ACCESS, Pharmacy Drug database

UNIT – III

Application of computers in Pharmacy – Drug information storage and retrieval, Pharmacokinetics, Mathematical model in Drug design, Hospital and Clinical Pharmacy, Electronic Prescribing and discharge (EP) systems, barcode medicine identification and automated dispensing of drugs, mobile technology and adherence monitoring Diagnostic System, Lab-diagnostic System, Patient Monitoring System, Pharma Information System.

UNIT – IV

Bioinformatics: Introduction, Objective of Bioinformatics, Bioinformatics Databases, Concept of Bioinformatics, Impact of Bioinformatics in Vaccine Discovery

UNIT-V

Computers as data analysis in Preclinical development: Chromatographic dada analysis(CDS), Laboratory Information management System (LIMS) and Text Information Management System(TIMS).

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

- Computer Application in Pharmacy – William E.Fassett –Lea and Febiger, 600 South Washington Square, USA, (215) 922-1330.
- Computer Application in Pharmaceutical Research and Development –Sean Ekins –Wiley-Interscience, A John Willey and Sons, INC., Publication, USA.
- Bioinformatics (Concept, Skills and Applications) – S.C.Rastogi-CBS Publishers and Distributors, 4596/1- A, 11 Darya Gani, New Delhi – 110 002(INDIA)
- Microsoft office Access - 2003, Application Development Using VBA, SQL Server, DAP and Infopath – Cary N.Prague – Wiley Dreamtech India (P) Ltd., 4435/7, Ansari Road, Daryagani, New Delhi – 110002.

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Binary number system, Decimal number system, Octal number system, Hexadecimal number systems,	Lecture	1	Mid Term-1, Quiz & End Sem Exam
2	Conversion decimal to	Lecture	1	Mid Term-1, Quiz

	binary, binary to decimal, octal to binary etc,			& End Sem Exam
3	Conversion decimal to binary, binary to decimal, octal to binary etc,	Lecture	1	Mid Term-1, Quiz & End Sem Exam
4	Binary addition, binary subtraction – One's complement, binary	Lecture	1	Mid Term-1, Quiz & End Sem Exam
5	Two's complement method, Binary multiplication, binary division	Lecture	1	Mid Term-1, Quiz & End Sem Exam
6	Two's complement method, Binary multiplication, binary division	Lecture	1	Mid Term-1, Quiz & End Sem Exam
7	**Concept of Information Systems and Software :** Information gathering, requirement and feasibility analysis,	Lecture	2	Mid Term-1, Quiz & End Sem Exam
8	Data flow diagrams, process Specifications	Lecture	2	Mid Term-1, Quiz & End Sem Exam
9	Input/output design, process life cycle,	Lecture	2	Mid Term-1, Quiz & End Sem Exam
10	Planning and managing the project	Lecture	2	Mid Term-1, Quiz & End Sem Exam
11	**Web technologies**:Introduction to HTML,	Lecture	2	Mid Term-1, Quiz & End Sem Exam
12	XML, CSS	Lecture	2	Mid Term-1, Quiz & End Sem Exam
13	Programming languages,	Lecture	2	Mid Term-1, Quiz & End Sem Exam
14	Introduction to web servers and Server Products	Lecture	2	Mid Term-1, Quiz & End Sem Exam
15	Introduction to databases, MYSQL, MS ACCESS,	Lecture	2	Mid Term-1, Quiz & End Sem Exam
16	Pharmacy Drug database	Lecture	3	Mid Term-1, Quiz & End Sem Exam
17	**Application of computers in Pharmacy** – Drug information storage and retrieval,	Lecture	3	Mid Term-1, Quiz & End Sem Exam
18	Pharmacokinetics, Mathematical model in Drug design,	Lecture	3	Mid Term-1, Quiz & End Sem Exam
19	Hospital and Clinical Pharmacy,	Lecture	3	Mid Term-1, Quiz & End Sem Exam

20	Electronic Prescribing and discharge (EP) systems,	Lecture	3	Mid Term-1, Quiz & End Sem Exam
21	Barcode medicine identification	Lecture	3	Mid Term-1, Quiz & End Sem Exam
22	Automated dispensing of drugs,	Lecture	3	Mid Term-1, Quiz & End Sem Exam
23	Mobile technology and adherence monitoring	Lecture	3	Mid Term-2, Quiz & End Sem Exam
24	Diagnostic System, Lab-diagnostic System,	Lecture	3	Mid Term-2, Quiz & End Sem Exam
25	Patient Monitoring System,	Lecture	3	Mid Term-2, Quiz & End Sem Exam
26	Pharma Information System	Lecture	3	Mid Term-2, Quiz & End Sem Exam
27	**Bioinformatics:** Introduction,	Lecture	4	Mid Term-2, Quiz & End Sem Exam
28	Objective of Bioinformatics,	Lecture	4	Mid Term-2, Quiz & End Sem Exam
29	Bioinformatics Databases,	Lecture	4	Mid Term-2, Quiz & End Sem Exam
30	Bioinformatics Databases,	Lecture	4	Mid Term-2, Quiz & End Sem Exam
31	Concept of Bioinformatics,	Lecture	4	Mid Term-2, Quiz & End Sem Exam
32	Concept of Bioinformatics,	Lecture	4	Mid Term-2, Quiz & End Sem Exam
33	Impact of Bioinformatics in Vaccine Discovery	Lecture	4	Mid Term-2, Quiz & End Sem Exam
34	Impact of Bioinformatics in Vaccine Discovery	Lecture	4	Mid Term-2, Quiz & End Sem Exam
35	Impact of Bioinformatics in Vaccine Discovery	Lecture	4	Mid Term-2, Quiz & End Sem Exam
36	Chromatographic dada analysis(CDS),	Lecture	5	Mid Term-2, Quiz & End Sem Exam
37	Features of CDS	Lecture	5	Mid Term-2, Quiz & End Sem Exam
38	HPLC, GC	Lecture	5	Mid Term-2, Quiz & End Sem Exam
39	Laboratory Information management System (LIMS)	Lecture	5	Mid Term-2, Quiz & End Sem Exam
40	Laboratory Information management System (LIMS)	Lecture	5	Mid Term-2, Quiz & End Sem Exam
41	Laboratory Information management System	Lecture	5	Mid Term-2, Quiz & End Sem Exam

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	(LIMS)			
42	Text Information Management System(TIMS)	Lecture	5	Mid Term-2, Quiz & End Sem Exam
43	Steps in TIMS	Lecture	5	Mid Term-2, Quiz & End Sem Exam
44	Features of TIMS	Lecture	5	Mid Term-2, Quiz & End Sem Exam
45	Uses in Pharmacy	Lecture	5	Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP205T.1	**BP205T.1**. Apply one's complement, and two's complement methods to solve various problems based on the binary system.	3	-	3	3	1	2	1	-	1	-	-				
BP205T.2.	**BP205T.2**. Illustrate data flow diagrams, product cycle and discover web technologies application in pharmacy.	2	1	3	3	-	2	1	-	-	-	3				
BP205T.3.	**BP205T.3**. Define the role of computer in various fields of pharmacy	3	2	2	3	2	2	3	3	2	1	2				
BP205T.4.	**BP205T.4**. Explain the application of bioinformatics in various disciplines.	2	1	3	3	-	2	-	2	1	1	3				
BP205T.5.	**BP205T.5**. Outline the use of LIMS, TIMS and CDS in pre-clinical	2	3	3	3	2	2	-	3	1	-	3				

	development.														

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutics I MID-SEMESTER (SEM –IInd) 2020-21						
Class: B.Pharm, II Semester						
Subject Name: BP205T Computer Application in Pharmacy-Theory		Time: 1 Hrs		Max. Marks: 30		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q1,3,4,9,10	Q2,5,6	Q7	Q8		
The student will be able to **CO.3**. Define the role of computer in various fields of pharmacy **CO.4**. Explain the application of bioinformatics in various disciplines.						

CO Map	Question No.	Question	Marks
CO5	Q.1	What are the two examples of CADS?	2
CO3	Q.2	Outline the limitation of a bar-code identification system.	2
CO3	Q.3	What is the use of PMS in the ICU?	2
CO4	Q.4	Define the objective of bioinformatics.	2
CO4	Q.5	Classify database used in pharmacy?	2
CO3	Q.6	Explain the role of computers in hospital pharmacies.	10
CO3	Q.7	Make use of MS. Access in pharmacy?	10
CO3	Q.8	Compare LIMs and TIMs.	5

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CO3	Q.9	How barcode medicine identification systems are useful in pharmacy?	5
CO4	Q.10	Write about proteomic databases.	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

89.3 % Percentage of students secured more than 60% marks, so this course Computer Applications In Pharmacy - Theory (BP205T) attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOLOGY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-21

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

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Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3: Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
II SEM																
	BP206T	2	1	2	3	1	3	2	1	2	3	3				

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AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACOLOGY
Course Handout
Course : ENVIRONMENTAL SCIENCES-THEORY
Course Code: BP206T, Credits: 03, Session:2020-21 (Even Sem.), Class: B.Pharm - 1st Year
Faculty Name: Dr. Rwitabrata Mallick

A. **Introduction:** This subject deals with the scientific study of the environmental system and the status of its inherent or induced changes on organisms. It includes not only the study of physical and biological characters of the environment but also the social and cultural factors and the impact of man on environment.

B. **Course Outcomes:** At the end of the course, students will be able to:

BP206T: 1. Create the awareness about environmental problems among learners.

BP206T: 2. Impart basic knowledge about the environment and its allied problems.

BP206T: 3. Develop an attitude of concern for the environment.

BP206T: 4. Motivate learner to participate in environment protection and environment improvement.

BP206T: 5. Acquire skills to help the concerned individuals in identifying and solving environmental problems.

C. **Programme Outcomes:**

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

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[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to

identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	50%
Total			**75%**

E. Syllabus

Unit-I

The Multidisciplinary nature of environmental studies

Natural Resources

Renewable and non-renewable resources:

Natural resources and associated problems

a) Forest resources; b) Water resources; c) Mineral resources; d) Food resources; e) Energy resources; f) Land resources: Role of an individual in conservation of natural resources.

Unit-II

Ecosystems

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Introduction, types, characteristic features, structure and function of the ecosystems: Forest ecosystem; Grassland ecosystem; Desert ecosystem; Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Unit- III

Environmental Pollution: Air pollution; Water pollution; Soil pollution

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. Y.K. Sing, Environmental Science, New Age International Pvt, Publishers, Bangalore
2. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
3. Bharucha Erach, The Biodiversity of India, Mapin Pu blishing Pvt. Ltd., Ahmedabad – 380 013, India,
4. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
5. Clark R.S., Marine Pollution, Clanderson Press Oxford
6. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumbai, 1196p
7. De A.K., Environmental Chemistry, Wiley Eastern Ltd.

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	The Multidisciplinary nature of environmental studies	Lecture	3,4	Mid Term-1, Quiz & End Sem Exam
2	Natural Resources Renewable and non-renewable	Lecture	3,4	Mid Term-1, Quiz & End Sem Exam

	resources.			
3	Natural resources and associated problems	Lecture	3,4	Mid Term-1, Quiz & End Sem Exam
4	a) Forest resources;	Lecture	3,4	Mid Term-1, Quiz & End Sem Exam
5	b) Water resources;	Lecture	3,4	Mid Term-1, Quiz & End Sem Exam
6	c) Mineral resources;	Lecture	3,4	Mid Term-1, Quiz & End Sem Exam
7	d) Food resources;	Lecture	3,4	Mid Term-1, Quiz & End Sem Exam
8	e) Energy resources;	Lecture	3,4	Mid Term-1, Quiz & End Sem Exam
9	f) Land resources:	Lecture	3,4	Mid Term-1, Quiz & End Sem Exam
10	Role of an individual in conservation of natural resources	Lecture	2	Mid Term-1, Quiz & End Sem Exam
11	Ecosystems	Lecture	2	Mid Term-2, Quiz & End Sem Exam
12	Concept of an ecosystem.	Lecture	2	Mid Term-2, Quiz & End Sem Exam
13	Structure and function of an ecosystem.	Lecture	2	Mid Term-2, Quiz & End Sem Exam
14	Introduction, types of ecosystems.	Lecture	3	Mid Term-2, Quiz & End Sem Exam
15	characteristic features of the ecosystems	Lecture	3	Mid Term-2, Quiz & End Sem Exam
16	structure and function of the ecosystems	Lecture	3	Mid Term-2, Quiz & End Sem Exam
17	Forest ecosystem;	Lecture	3	Mid Term-2, Quiz & End Sem Exam
18	Grassland ecosystem;	Lecture	3	Mid Term-2, Quiz & End Sem Exam
19	Desert ecosystem;	Lecture	3	Mid Term-2, Quiz & End Sem Exam
20	Aquatic ecosystems (ponds,	Lecture	3	Mid Term-2, Quiz

Dr. Mohanty

	streams, lakes, rivers, oceans, estuaries)			& End Sem Exam
21	Environmental Pollution	Lecture	1,2	Mid Term-2, Quiz & End Sem Exam
22	Air pollution;	Lecture	1,2	Mid Term-2, Quiz & End Sem Exam
23	Air pollution;	Lecture	1,2	Mid Term-2, Quiz & End Sem Exam
24	Quiz	Lecture	1,2	Mid Term-2, Quiz & End Sem Exam
25	Water pollution;	Lecture	1,2	Mid Term-2, Quiz & End Sem Exam
26	Water pollution;	Lecture	1,2	Mid Term-2, Quiz & End Sem Exam
27	Quiz	Lecture	1,2	Mid Term-2, Quiz & End Sem Exam
28	Soil pollution	Lecture	1,2	Mid Term-2, Quiz & End Sem Exam
29	Soil pollution	Lecture	1,2	Mid Term-2, Quiz & End Sem Exam
30	Quiz	Lecture	1,2	Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP206T: 1	**BP206T: 1**. Create the awareness about environmental problems among learners.	3	1	1	1	1	2	1	-	1	3	2				

BP206T: 2	**BP206T: 2**. Impart basic knowledge about the environment and its allied problems.	2	1	2	1	-	2	1	-	1	3	3				
BP206T: 3	**BP206T: 3.** Develop an attitude of concern for the environment.	2	1	2	2	2	2	2	1	2	3	2				
BP206T: 4	**BP206T: 4**. Motivate learner to participate in environment protection and environment improvement.	2	1	1	1	-	2	1	1	1	3	3				
BP206T: 5	**BP206T: 5**. Acquire skills to help the concerned individuals in identifying and solving environmental problems	2	1	1	1	2	2	1	1	1	3	3				

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacology I MID-SEMESTER (SEM –IInd) 2020-21						
Class: B. Pharm, II Semester						
Subject Name: Environmental Sciences BP206T-Theory		Time: 1 Hrs			Max. Marks: 30	
Levels of the questions as per Blooms	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating

Taxonomy						
Question Mapping	Q1,Q2,Q5	Q3,Q4				

The student will be able to

CO: 3. Develop an attitude of concern for the environment.

CO: 4. Motivate learner to participate in environment protection and environment improvement.

CO Map	Question No.	Question	Marks
CO3,4	Q.1	Explain the Multidisciplinary nature of environmental studies.	5
CO3,4	Q.2	Write about Natural resources and associated problems With the forest resources.	5
CO3,4	Q.3	Discuss the role of an individual in conservation of natural resources.	5
CO3,4	Q.4	Write about the natural resources.	5
CO3,4	Q.5	Gives a detailed note on Renewable and non-renewable resources.	10

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

96.4% Percentage of students secured more than 60% marks, so this course Environmental Sciences - Theory (BP206T) attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOLOGY

PROGRAMME OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-21

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions

[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3: Substantial (High)

If there is no correlation, put "-"

PROGRAMME ARTICULATION MATRIX												
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
II SEM	BP 207P	3	2	2	3	1	2	2	1	3	2	3

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACOLOGY
Course Handout
Course : Human Anatomy and Physiology (Practical)
Course Code : BP207P, Credits : 02, Session : 2020-21 (Even Sem.), Class : B. Pharm. First Year
Faculty Name : Dr. Shvetank Bhatt, Dr. Naveen Sharma

Introduction: This subject is designed to impart fundamental and practical knowledge of pharmaceutical *microbiology* and various categories of microorganisms especially for the production of alcohol, antibiotics, vaccines, vitamins enzymes etc.

A. Course Outcomes: At the end of the course, students will be able to:

BP207P: 1. To study the human body systems using specimen, models, etc.,

BP207P: 2. Recording of body temperature.

BP207P: 3. To demonstrate positive and negative feedback mechanism.

BP207P: 4. Determination of tidal volume and vital capacity.

BP207P: 5. Study of family planning devices and pregnancy diagnosis test.

BP207P: 6. Demonstration of total blood count by cell analyser.

B. Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers,

employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

C. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance isrequiredtobemaintainedbyastudentto be qualified for taking up the EndSemester examination. The allowanceof 20%includesalltypesofleaves includingmedicalleaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

PR: Practical Records, RV: Regular viva, As: Assignment

D. Syllabus

1. To study the integumentary and special senses using specimen, models, etc.,
2. To study the nervous system using specimen, models, etc.,
3. To study the endocrine system using specimen, models, etc
4. To demonstrate the general neurological examination
5. To demonstrate the function of olfactory nerve
6. To examine the different types of taste.
7. To demonstrate the visual acuity
8. To demonstrate the reflex activity
9. Recording of body temperature
10. To demonstrate positive and negative feedback mechanism.
11. Determination of tidal volume and vital capacity.
12. Study of digestive, respiratory, cardiovascular systems, urinary and reproductive systems with the help of models, charts and specimens.
13. Recording of basal mass index.
14. Study of family planning devices and pregnancy diagnosis test.
15. Demonstration of total blood count by cell analyser
16. Permanent slides of vital organs and gonads.

E. Examination Scheme:

Components	A	CT	LR	V	EE
Weightage (%)	2	10	1	2	35

PR: Practical Records, RV: Regular viva, As: Assignment

F. Suggested Text/Reference Books:

1. Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypee brothers medical publishers, New Delhi.
2. Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York
3. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co,Riverview,MI USA
4. Text book of Medical Physiology- Arthur C,Guyton andJohn.E. Hall. Miamisburg, OH, U.S.A.
5. Principles of Anatomy and Physiology by Tortora Grabowski. Palmetto, GA, U.S.A.
6. Textbook of Human Histology by Inderbir Singh, Jaypee brothers medical publishers, New Delhi.
7. Textbook of Practical Physiology by C.L. Ghai, Jaypee brothers medical publishers, New

Delhi.
8. Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee brother's medical publishers, New Delhi.

G. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1.	1. To study the integumentary and special senses using specimen, models, etc.,	Practical	CO1	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
2.	2. To study the nervous system using specimen, models, etc.,	Practical	CO1	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
3.	3. To study the endocrine system using specimen, models, etc	Practical	CO1	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
4.	4. To demonstrate the general neurological examination	Practical	CO, 9	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
5.	*5.* To demonstrate the function of olfactory nerve	Practical	CO1, 11	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
6.	6. To examine the different types of taste.	Practical	CO1, 9	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
7.	7. To demonstrate the visual activity	Practical	CO1, 9, 10, 11	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
8.	8. To demonstrate the reflex activity	Practical	CO1, 10, 11	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
9.	9. Recording of body temperature	Practical	CO1, 9	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
10.	10. To demonstrate positive and negative feedback mechanism.	Practical	CO1	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
11.	11. Determination of tidal volume and vital capacity.	Practical	CO1, 11	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
12.	12. Study of digestive,	Practical	CO1,11	Mid Term-2 & End Sem

	respiratory, cardiovascular systems, urinary and reproductive systems with the help of models, charts and specimens.			Exam as Synopsis/ Experiments/ Viva voce for both
13.	13. Recording of basal mass index.	Practical	CO1, 11	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
14.	14. Study of family planning devices and pregnancy diagnosis test.	Practical	CO1, 11	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
15.	15. Demonstration of total blood count by cell Analyzer	Practical	CO1, 11	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
16.	16. Permanent slides of vital organs and gonads.	Practical	CO1, 11	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both

H. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP207P: 1.	**BP207P: 1**. To study the human body systems using specimen, models, etc.,	1	1	1	3	1	-	-	1	2	2	3
BP207P: 2	**BP207P: 2**. Recording of body temperature.	2	1	1	3	1	-	1	1	2	2	2
BP207P: 3	**BP207P: 3**. To demonstrate positive and negative feedback mechanism.	1	1	1	2	1	-	-	1	1	2	2
BP207P: 4	**BP207P: 4**. Determination of tidal volume and vital capacity.	2	1	1	3	1	-	1	1	2	3	2

BP207P: 5	**BP207P: 5**. Study of family planning devices and pregnancy diagnosis test.	2	1	1	3	1	-	1	1	2	2	2
BP207P: 6	**BP207P: 6**. Demonstration of total blood count by cell analyser.	3	1	1	2	1	-	1	1	2	2	2

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacy I MID-SEMESTER (SEM–II) 2020-21						
Class: B. Pharm II Semester						
Subject Name: Human Anatomy and Physiology-II BP 207P (Practical)		Time: 4 Hrs			Max. Marks: 40	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3	Q.2		Q.2	Q.2	

Student will be able to
CO1: To study the human body systems using specimen, models, etc.,
CO2: To demonstrate positive and negative feedback mechanism.

CO Map	Question No.	Question	Marks
CO1 and CO3	Q.1	Synopsis	10
CO3	Q.2	To demonstrate the function of olfactory nerve	25
CO1 and CO3	Q.3	Viva voce	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

100% Percentage of students secured more than 60% marks, so this course Human Anatomy And Physiology II- Practical (BP207P) attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-21

Programme Outcomes:

[PO.1]. Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
II SEM	BP208P	3	1	2	1	1	2		2							

Dr. Mohanty

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICAL CHEMISTRY
Course Handout
Course : PHARMACEUTICAL ORGANIC CHEMISTRY – I PRACTICAL
Course Code : BP208P, Crédits : 02, Session :2020-21 (Even Sem.), Class : B.Pharm. 1st Year
Faculty Name: Dr. Pawan Kumar Gupta

A. Introduction: The course is designed to impart skill development in the arts and science of preparing the different conventional dosage forms.

B. Course Outcomes: At the end of the course, students will be able to:

BP208P.1. Understand the principles of analysis

BP208P.2. Operate equipment used in chemical analysis

BP208P.3. Carryout various qualitative test for determination of unknown compound.

BP208P.4. Carryout various functional group test.

BP208P.5. Develop analytical skills

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

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[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

C. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance	A	2%

	is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.		
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

D. Syllabus

Systematic qualitative analysis of unknown organic compounds like

a. Preliminary test: Color, odour, aliphatic/aromatic compounds, saturationand unsaturation, etc.

b. Detection of elements like Nitrogen, Sulphur and Halogenby Lassaigne's test

c. Solubility test

d. Functional group test like Phenols, Amides/ Urea, Carbohydrates, Amines, Carboxylic acids, Aldehydes and Ketones, Alcohols, Esters, Aromatic and Halogenated Hydrocarbons, Nitro compounds and Anilide.

e. Melting point/Boiling point of organic compounds

f. Identification of the unknown compound from the literature usingmelting point/ boiling point.

g. Preparation of the derivatives and confirmation of the unknown compound by melting point/ boiling point.

h. Minimum 5 unknown organic compounds to be analysed systematically.

Preparation of suitable solid derivatives from organic compounds
Construction of molecular models

E. Examination Scheme:

Components	A	CT	LR	V	EE
Weightage (%)	2	10	1	2	35

CT: Class Test, LR: Lab Record, V: Viva, EE: End Semester Examination; A: Attendance

F. Suggested Text/Reference Books:

A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, StahlonePress of University of London

A.I. Vogel, Text Book of Quantitative Inorganic analysis

P. Gundu Rao, Inorganic Pharmaceutical Chemistry

Bentley and Driver's Textbook of Pharmaceutical Chemistry

John H. Kennedy, Analytical chemistry principles

Indian Pharmacopoeia.

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G. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	To determine melting point of the given sample.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
2	To determine boiling point of the given sample.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
3	To perform solubility test of given sample.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
4	To perform preliminary investigation of following organic compound.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
5	To perform elemental analysis of the given sample.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
6	To perform identification of functional group in the given sample (Carbohydrate).	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
7	To perform identification of functional group in the given sample (Urea and Thiourea)).	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
8	To perform identification of functional group in the given sample (Carboxylic Acid).	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam

9	To perform identification of functional group in the given sample (Phenol).	Practical	CO1, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
10	To perform identification of functional group in the given sample (Aldehyde)	Practical	CO1, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
11	To perform identification of functional group in the given sample (Ketone)	Practical	CO1, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
12	To perform identification of functional group in the given sample (Amine) .	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
13	To determine Iodine value of the given sample of castor oil.	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
14	To Synthesize Benzanilide (Benzylaniline) by Bezoylation process.	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
15	To prepare and submit Phenyl Benzoate from Phenol.	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam

H. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	

BP208P.1	Understand the principles of analysis	3		2	1	2	1	-	2	1	2	1	
BP208P.2.	Operate equipment used in chemical analysis	2	-	-	1	-	1	-	-	-	-	3	
BP208P.3.	Carryout various qualitative test for determination of unknown compound	3	2	2	1	-	2	-	2	-	-	3	
BP208P 4.	Carryout various functional group test.	2	2	2	1	-	2	-	2	-	-	3	
BP208P.5.	Develop analytical skills	1	2	3	-	-	2	-	2	-	-	3	

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutical Chemistry I MID-SEMESTER (SEM –IInd) 2022-23						
Class: B.Pharm, IInd Semester						
Subject Name: BP108P Pharmaceutical Organic Chemistry-I Practical		Time: 4 Hrs		Max. Marks: 40		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,4	Q.2,3	Q.4	Q.2,5,6		
Student will be able to **CO.1**. Understand the principles of analysis **CO.2**. Operate equipment used in chemical analysis **CO.3**. Carryout various qualitative test for determination of unknown compound						

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CO.4. Carryout various functional group test. **CO.5**. Develop analytical skills			
CO Map	Question No.	Question	Marks
CO1,2,4	Q.1a	Synopsis- Define Analysis.	2
CO1,2,4	Q.1b	Synopsis- Define Functional Group.	2
CO1,2,4	Q.1c	Synopsis- Illustrate the formula of Carboxylic Group.	2
CO1,2,4	Q.1d	Synopsis- List the any three methods of qualitative Analysis.	2
CO1,2,4	Q.1e	Synopsis- What are various functional groups?	2
CO1,2, 4,5	Q.2	Experiment To perform Solubility analysis of the given sample.	25
CO1,2,3,4,5	Q.3	Viva	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

100% Percentage of students secured more than 60% marks, so this course Pharmaceutical Organic Chemistry I– Practical (BP208P) attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES
Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-21

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2].Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMMEARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
IISEM																
	BP209P	3	2	3	1	1	2		3		1	2				

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AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICAL CHEMISTRY
Course Handout
Course : BIOCHEMISTRY (Practical)
Course Code : BP209P, Crédits : 02, Session :2020-21 (Even Sem.), Class : B.Pharm. 1st Year
Faculty Name: Dr. S Vijayaraj

A. Introduction: Biochemistry deals with complete understanding of the molecular levels of the chemical process associated with living cells. The scope of the subject is providing biochemical facts and the principles to understand metabolism of nutrient molecules in physiological and pathological conditions. It is also emphasizing on genetic organization of mammalian genome and hetero & autocatalytic functions of DNA.

B. Course Outcomes: At the end of the course, students will be able to:

BP209P.1. Perform various Qualitative analysis of biomolecules i.e. carbohydrates (Glucose, Fructose, Lactose, Maltose,Sucrose and starch), proteins (albumin and Casein).

BP209P.2. Learn about the normal constituents of urine, blood and their significance in maintaining good health.

BP209P.3. Learn qualitative and quantitative analysis of constituents of biological fluids such as urine, blood and their estimation using standard methods.

BP209P.4. Prepare various buffer solution with specific pH Value

BP209P.5. Perform various enzymatic activities.

C. Programme Outcomes:

[PO.1].Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2].Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of

technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance isrequiredtobemaintainedbyastudentto be qualified for taking up the EndSemester examination. The allowanceof 20%includesalltypesofleaves includingmedicalleaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

E. Syllabus;

1. Qualitative analysis of carbohydrates (Glucose, Fructose, Lactose, Maltose, Sucrose and starch) 2. Identification tests for Proteins (albumin and Casein)
3. Quantitative analysis of reducing sugars (DNSA method) and Proteins (Biuret method)
4. Qualitative analysis of urine for abnormal constituents
5. Determination of blood creatinine
6. Determination of blood sugar
7. Determination of serum total cholesterol
8. Preparation of buffer solution and measurement of pH
9. Study of enzymatic hydrolysis of starch
10. Determination of Salivary amylase activity
11. Study the effect of Temperature on Salivary amylase activity.
12. Study the effect of substrate concentration on salivary amylase activity.

Examination Scheme:

Components	**A**	**CT**	**LR**	**V**	**EE**
Weightage (%)	2	10	1	2	35

CT: Class Test, LR: Lab Record, V: Viva,EE: End Semester Examination; A: Attendance

F. Suggested Text/Reference Books:

1. Practical Biochemistry by R.C. Gupta and S. Bhargavan.

2. Introduction of Practical Biochemistry by David T. Plummer. (3rd Edition)

3. Practical Biochemistry for Medical students by Rajagopal and Ramakrishna.

4. Practical Biochemistry by Harold Varley

5. Indian Pharmacopoeia

G. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	To perform the qualitative analysis of different unknown sample of carbohydrates.	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
2	To perform the qualitative analysis of different unknown sample of carbohydrates.	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
3	To perform the qualitative analysis of different unknown sample of carbohydrates.	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
4	To estimate creatinine in given blood sample.	Practical	CO2,3	Mid Term-1, Quiz & End Sem Exam
5	To perform the identification Test For albumin in given sample.	Practical	CO2,3	Mid Term-1, Quiz & End Sem Exam
6	To prepare carbonate – bicarbonate buffer of pH 10.2	Practical	CO 4	Mid Term-1, Quiz & End Sem Exam
7	To perform qualitative analysis of abnormal constituent of urine Sample.	Practical	CO 2,3	Mid Term-2, Quiz & End Sem Exam
8	To perform qualitative analysis of normal constituent of urine Sample.	Practical	CO2,3	Mid Term-2, Quiz & End Sem Exam
9	To analyze the effect of pH on activity of salivary amylase	Practical	CO 4,5	Mid Term-2, Quiz & End Sem Exam
10	To determine the time needed for hydrolysis of starch in presence of	Practical	CO4,5,	Mid Term-2, Quiz & End Sem Exam

	amylase.			
11	To determine the protein content of the serum sample	Practical	CO 2,3	Mid Term-2, Quiz & End Sem Exam
12	To determine serum total cholestrol.	Practical	CO 2,3	Mid Term-2, Quiz & End Sem Exam

H. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	
BP209P.1	Perform various Qualitative analysis of biomolecules i.e. carbohydrates (Glucose, Fructose, Lactose, Maltose, Sucrose and starch), proteins (albumin and Casein).	3	-	2	1	2	1	-	2	1	2	1	
BP209P.2.	Learn about the normal constituents of urine, blood and their significance in maintaining good health.	2	-	-	1	-	1	-	-	-	-	3	
BP209P.3.	Learn qualitative and quantitative analysis of constituents of biological fluids such as urine, blood and their estimation using standard methods	3	2	2	1	-	2	-	2	-	-	3	
BP209P.4.	Prepare various buffer solution with specific pH Value	2	2	2	1	-	2	-	2	-	-	3	

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BP209P.5.	Perform various enzymatic activities.	1	2	3	-	-	2	-	2	-	-	3	

SampleQuestionPaper

Amity Institute of Pharmacy DepartmentofPharmaceuticalchemistry IMID-SEMESTER(SEM–II)2020-21						
Class: B.Pharm, IISemester						
SubjectName: BP209PBiochemistry Practical		Time:4 Hrs			Max.Marks:40	
Levels of thequestions as perBloomsTaxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
QuestionMapping	Q.1,2,5	Q.4,5	Q.3	Q.3, 4		

Student willbeableto

CO.1. Recall different qualitative testfor identification of carbohydrates.
CO.2.perform identification tests of protein in given sample.
CO.3. Determine the normal and abnormal constituents of urine sample.
CO.4.analyze the effect of time for the hydrolysis of starch in presence of amylase.
CO.5.prepare various buffer solution of given pH

COMap	QuestionNo.	Question	Marks
CO1	Q.1a	Synopsis-Define carbohydrates.	2
CO2	Q.1b	Synopsis- Define holoenzymes and apozymes.	2
CO 2,3	Q.1c	Synopsis- enlist the various normal and abnormal constituents of urine	2
CO1	Q.1d	Synopsis- What is Seliwanoff's test?	2
CO1	Q.1e	Synopsis- what is Biuret test?	2
CO 2,3,4	Q.2	Experiment To perform qualitative analysis of abnormal constituent of urine Sample.	25
CO1,2,3,4,5	Q.3	Viva voce	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

100 % Percentage of students secured more than 60% marks, so this course Biochemistry – Practical (BP209P) attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICS

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-21

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

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[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
II SEM	BP210P	3	1	2	1	1	2		2		3	2				

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AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICS
Course Handout
Course : COMPUTER APPLICATIONS IN PHARMACY- PRACTICAL
Course Code : BP210P, Crédits : 01, Session :2020-21 (Even Sem.), Class : B.Pharm. 1st Year
Faculty Name: Dr. Pratiksha Gautam

A. Introduction: The course is designed to impart skill development in database management.

B. Course Outcomes: At the end of the course, students will be able to:

BP210P.1. Create and manage databases on the given information

BP210P.2. Design a questionnaire using various processing packages to gather information about a particular disease.

BP210P.3. Generate, edit and print reports and webpage and XML pages based on patient information.

BP210P.4. Explain drug information storage and retrieval system.

BP210P.5. Utilize Ms-office, Ms-Access for data management

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	Description	Code	Weightage %
Continuous Internal Evaluation	Mid Term 1	CT	5%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	15%
Total			**25%**

E. Syllabus

1. Design a questionnaire using a word processing package to gather information
2. about a particular disease.
3. Create a HTML web page to show personal information.
4. Retrieve the information of a drug and its adverse effects using online tools
5. Creating mailing labels Using Label Wizard, generating label in MS WORD
6. Create a database in MS Access to store the patient information with the required
7. fields Using access
8. Design a form in MS Access to view, add, delete and modify the patient record in
9. the database
10. Generating report and printing the report from patient database
11. Creating invoice table using – MS Access
12. Drug information storage and retrieval using MS Access
13. Creating and working with queries in MS Access
14. Exporting Tables, Queries, Forms and Reports to web pages
15. Exporting Tables, Queries, Forms and Reports to XML pages

F. Examination Scheme:

Components	A	CT	LR	V	EE
Weightage (%)	2	5	1	2	15

CT: Class Test, LR: Lab Record, V: Viva, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. Computer Application in Pharmacy – William E.Fassett –Lea and Febiger, 600 South Washington Square, USA, (215) 922-1330.

2. Computer Application in Pharmaceutical Research and Development –Sean Ekins – Wiley-Interscience, A John Willey and Sons, INC., Publication, USA
3. Bioinformatics (Concept, Skills and Applications) – S.C.Rastogi-CBS Publishers and Distributors, 4596/1- A, 11 Darya Gani, New Delhi – 110 002(INDIA)
4. Microsoft office Access - 2003, Application Development Using VBA, SQL Server, DAP and Infopath – Cary N.Prague – Wiley Dreamtech India (P) Ltd., 4435/7,Ansari Road, Daryagani, New Delhi – 110002

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Design a questionnaire using a word processing package to gather information about a particular disease.	Practical	CO1, 2	Mid Term-1, Quiz & End Sem Exam
2	Design a questionnaire using a word processing package to gather information about a particular disease.	Practical	CO1, 2	Mid Term-1, Quiz & End Sem Exam
3	Create a HTML web page to show personal information.	Practical	CO3	Mid Term-1, Quiz & End Sem Exam
4	Retrieve the information of a drug using online tools	Practical	CO4	Mid Term-1, Quiz & End Sem Exam
5	Retrieve the information of drug adverse effects using online tools	Practical	CO4	Mid Term-1, Quiz & End Sem Exam
6	Creating mailing labels Using Label Wizard, generating label in MS WORD	Practical	CO5	Mid Term-1, Quiz & End Sem Exam
7	Create a database in MS Access to store the patient information with the required fields using access	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
8	Design a form in MS Access to view, add, delete and modify the patient record in the database	Practical	CO1,5	Mid Term-2, Quiz & End Sem Exam
9	Design a form in MS Access to view, add, delete and modify the patient record in the database	Practical	CO1, 5	Mid Term-2, Quiz & End Sem Exam
10	Generating report and printing the report from patient database	Practical	CO1, 3	Mid Term-2, Quiz & End Sem Exam

11	Creating invoice table using – MS Access	Practical	CO5	Mid Term-2, Quiz & End Sem Exam
12	Drug information storage and retrieval using MS Access	Practical	CO5	Mid Term-2, Quiz & End Sem Exam
13	Creating and working with queries in MS Access	Practical	CO5	Mid Term-2, Quiz & End Sem Exam
14	Exporting Tables, Queries, Forms and Reports to web pages	Practical	CO3	Mid Term-2, Quiz & End Sem Exam
15	Exporting Tables, Queries, Forms and Reports to XML pages	Practical	CO3	Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	
BP210P.1	Create and manage databases on the given information	2	2	3	3	2	1	-	1	1	1	1	
BP210P.2.	Design a questionnaire using various processing packages to gather information about a particular disease	2	1	3	3	1	1	-	1	1	1	1	
BP210P.3.	Generate, edit and print reports and webpage and XML pages based on patient information.	2	2	3	3	1	2	-	2	-	-	2	
BP210P.4.	Explain drug information storage and retrieval system.	2	2	3	3	1	2	-	2	-	-	2	

BP210P.5.	Utilize Ms-office, Ms-Access for data management	2	2	3	3	1	2	-	2	-	1	3	

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutics I MID-SEMESTER (SEM –IInd) 2020-21						
Class: B.Pharm, II Semester						
Subject Name: BP210P Computer Application in Pharmacy-Practical		Time: 2 Hrs			Max. Marks: 40	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1a,b,c,d,e	Q.3	Q.3	Q.2,5,6	Q.3	Q.2

Student will be able to

CO.1. Create and manage databases on the given information

CO.2. Design a questionnaire using various processing packages to gather information about a particular disease.

CO.3. Generate, edit and print reports and webpage and XML pages based on patient information.

CO.4. Explain drug information storage and retrieval system.

CO.5. Utilize Ms-office, Ms-Access for data management

CO Map	Question No.	Question	Marks
CO5	Q.1a	Synopsis- What is the use of MS Office?	2
CO5	Q.1b	Synopsis- What is the standard font size in MS word?	2
CO1,3	Q.1c	Synopsis- What is the full form of XML?	2
CO5	Q.1d	Synopsis- Which field type will you select if you need to enter long name in MS Access?	2
CO5	Q.1e	Synopsis- What is the Microsoft word shortcut key to Copy and save a file?	2
CO3	Q.2	Experiment To Create an HTML web page to show patients medical record.	25

CO1,2,3,4,5	Q.3	Viva	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

100 % Percentage of students secured more than 60% marks, so this course Computer Applications In Pharmacy - Practical (BP210P) attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-21

Programme Outcomes:

[PO.1]. Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Programme Specific Outcomes:

PSO 1: Will be able to design, develop and implement efficient software for a given real life problem.

PSO 2: Will be able to apply knowledge of AI, Machine Learning and Data Mining in analyzing big data forextracting useful information from it and for performing predictive analysis.

PSO 3: Will be able to design, manage and secure wired/ wireless computer networks for transfer and sharing ofinformation.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
III SEM																
	BP301T	2	-	2	-	1	2	2	1	1	-	2				

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICAL CHEMISTRY
Course Handout
Course : PHARMACEUTICAL ORGANIC CHEMISTRY – II THEORY
Course Code : BP 301T, Crédits : 04, Session : 2020`-21 (Odd Sem.), Class : B.Pharm. II nd Year
Faculty Name: Dr. Pawan Kumar Gupta

A. Introduction: The course is designed to impart fundamental knowledge on the preparatory pharmacy with arts and science of preparing the different conventional dosage forms.

B. Course Outcomes: At the end of the course, students will be able to:

BP301T.1. Relate pharmacy education with pharmacy career options.

BP301T.2. Classify the different types of *organic compounds* based on medicinal use.

BP301T.3. Experiment in the preparation of various types organic compounds and their derivatives.

BP301T.4. Able to analyse and also to *write the structure, name and the type of isomerism of the organic compound*.

BP301T.5. Able to Solve and write *the reaction, name the reaction and also orientation of reactions* in different types of *organic compounds*

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

C. Programme Specific Outcomes:

PSO 1: Will be able to design, develop and implement efficient software for a given real life problem.

PSO 2: Will be able to apply knowledge of AI, Machine Learning and Data Mining in analyzing big data forextracting useful information from it and for performing predictive analysis.

PSO 3: Will be able to design, manage and secure wired/ wireless computer networks for transfer and sharing ofinformation.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

UNIT – I Benzene and its derivatives

Analytical, synthetic and other evidences in the derivation of structure of benzene, Orbital picture, resonance in benzene, aromatic characters, Huckel's rule Reactions of benzene - nitration, sulphonation, halogenation- reactivity, Friedelcrafts alkylation- reactivity, limitations, Friedelcrafts acylation. Substituents, effect of substituents on reactivity and orientation of mono substituted benzene compounds towards electrophilic substitution reaction Structure and uses of DDT, Saccharin, BHC and Chloramine

UNIT – II

Phenols* - Acidity of phenols, effect of substituents on acidity, qualitativetests, Structure and uses of phenol, cresols, resorcinol, naphthols **Aromatic Amines* -** Basicity of amines, effect of substituents on basicity,and synthetic uses of aryl diazonium salts **Aromatic Acids*** Acidity, effect of substituents on acidity andimportant reactions of benzoic acid

UNIT – III Fats and Oil

Fatty acids reaction Hydrolysis, Hydrogenation, Saponification and Rancidity of oils, Drying oils. Analytical constants – Acid value, Saponification value, Ester value, Iodine value, Acetyl value, Reichert Meissl (RM) value- significance and principle involved in their determination.

UNIT – IV Polynuclear hydrocarbons:

Synthesis, reactions Structure and medicinal uses of Naphthalene, Phenanthrene, Anthracene,Diphenylmethane, Triphenylmethane and their derivatives.

UNIT – V Cyclo alkanes*

Stabilities – Baeyer's strain theory, limitation of Baeyer's strain theory,Coulson and Moffitt's modification, Sachse Mohr's theory (Theory of strainless rings), reactions of cyclopropane and cyclobutane only

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

Organic Chemistry by Morrison and Boyd.

Organic Chemistry by I.L. Finar, Volume-I
Textbook of Organic Chemistry by B.S. Bahl & Arun Bahl.
Organic Chemistry by P.L.Soni.
Practical Organic Chemistry by Mann and Saunders.
Vogel's text book of Practical Organic Chemistry.
Advanced Practical organic chemistry by N.K.Vishnoi.

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Analytical, evidences in the derivation of structure of benzene.	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
2	Synthetic and other evidences in the derivation of structure of benzene.	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
3	Orbital picture, resonance in benzene.	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
4	Aromatic characters, Hückel's rule of benzene.	Tutorial	CO1,4	Mid Term-1, Quiz & End Sem Exam
5	Nitration Reactions of benzene	Lecture	CO1,2	Mid Term-1, Quiz & End Sem Exam
6	Sulfonation Reactions of benzene	Lecture	CO1,2	Mid Term-1, Quiz & End Sem Exam
7	Halogenation Reactions of benzene	Lecture	CO1,2	Mid Term-1, Quiz & End Sem Exam
8	Friedel Craft Alkylation Reactions of benzene	Tutorial	CO1,3	Mid Term-1, Quiz & End Sem Exam
9	Friedel Craft Acylation Reactions of benzene	Lecture	CO1,2	Mid Term-1, Quiz & End Sem Exam
10	Substituents effect on	Lecture	CO1,3	Mid Term-1, Quiz

	Reactivity and orientation of benzene.			& End Sem Exam
11	Quiz	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
12	Structure and uses of D.D.T.	Tutorial	CO1,4	Mid Term-1, Quiz & End Sem Exam
13	Structure and uses of Saccharin.	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
14	Structure and uses of BHC.	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
15	Structure and uses of Chloramine.	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
16	Unit test	Tutorial		Mid Term-1, Quiz & End Sem Exam
17	Method of prepration and reaction Reaction of Phenol	Lecture	CO1,5	Mid Term-1, Quiz & End Sem Exam
18	Acidity of phenols. Effect of substituents on acidity	Lecture	CO1,3	Mid Term-1, Quiz & End Sem Exam
19	Qualitative tests of Phenol	Lecture	CO1,3	Mid Term-1, Quiz & End Sem Exam
20	Structure and uses of phenol	Tutorial	CO1,4	Mid Term-1, Quiz & End Sem Exam
21	Structure and uses of cresol	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
22	Structure and uses of resorcinol	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
23	Structure and uses of naphthol	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
24	Quiz	Tutorial		Mid Term-1, Quiz & End Sem Exam
25	Method of prepration and reaction Reaction of amine	Lecture	CO1,5	Mid Term-1, Quiz & End Sem Exam
26	Basicity of amine. Effect of substituents on Basicity	Lecture	CO1,3	Mid Term-1, Quiz & End Sem Exam
27	synthetic uses of aryl diazonium salt	Lecture	CO1,5	Mid Term-1, Quiz & End Sem Exam
28	Method of prepration and reaction Reaction of aromatic acid	Tutorial	CO1,5	Mid Term-1, Quiz & End Sem Exam
29	Acidity of aromatic acid Effect of substituents on acidity	Lecture	CO1,3	Mid Term-1, Quiz & End Sem Exam
30	Important reaction of Benzoic acid	Lecture	CO1,5	Mid Term-1, Quiz & End Sem Exam

Dr. Mohan Katyal

31	Fats and Oils Definition, Properties and Classification	Lecture	CO1,2	Mid Term-2, Quiz & End Sem Exam
32	Fats and Oils Nomenclature	Tutorial	CO1,2	Mid Term-2, Quiz & End Sem Exam
33	Fatty acids – reactions. Hydrolysis	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
34	Fatty acids – reactions, Hydrogenation	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
35	Saponification and Rancidity of oils	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
36	Seminar	Tutorial	CO1,5	Mid Term-2, Quiz & End Sem Exam
37	Drying of oil Analytical constants: Acetyl value	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
38	Analytical constants: Acid value	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
39	Analytical constants: Saponification value	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
40	Unit test	Tutorial	CO1,5	Mid Term-2, Quiz & End Sem Exam
41	Analytical constants: Iodine value	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
42	Analytical constants: Ester value , Reichert Meissl (RM) value	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
43	Polycyclic Aromatic Hydrocarbons, Classification.	Lecture	CO1,3	Mid Term-2, Quiz & End Sem Exam
44	Seminar	Tutorial	CO1,3	Mid Term-2, Quiz & End Sem Exam
45	Preparation, Reactions *and derivative of* biphenyl.	Lecture	CO1,4	Mid Term-2, Quiz & End Sem Exam
46	Synthesis and reactions of Naphthalene.	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam

Dr. Mohanpatil

47	Synthesis and reactions of anthracene.	Lecture	CO1,5	Quiz & End Sem Exam
48	Quiz	Tutorial		Quiz & End Sem Exam
49	*Synthesis and reactions of Phenanthrene*	Lecture	CO1,5	Quiz & End Sem Exam
50	Structure and medicinal uses of Naphthalene.	Lecture	CO1,4	Quiz & End Sem Exam
51	Structure and medicinal uses of Phenanthrene .	Lecture	CO1,4	Quiz & End Sem Exam
52	*Structure and medicinal uses of Diphenylmethane and Triphenylmethane*	Tutorial	CO1,4	Quiz & End Sem Exam
53	*Prepration, Reaction **of** Cyclo alkanes.*	Lecture	CO1,4	Quiz & End Sem Exam
54	Baeyer's strain theory.	Lecture	CO1,2	Quiz & End Sem Exam
55	Limitation of Baeyer's strain theory.	Lecture	CO1,3	Quiz & End Sem Exam
56	Unit test	Tutorial		Quiz & End Sem Exam
57	Coulson and Moffitt's modification.	Lecture	CO1,2	Quiz & End Sem Exam
58	Sachse Mohr's theory.	Lecture	CO1,2	Quiz & End Sem Exam
59	Reactions of cyclopropane.	Lecture	CO1,2	Quiz & End Sem Exam
60	*Reactions of cyclobutane*	Tutorial	CO1,2	Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP301T.1	Relate pharmacy education with pharmacy career options.	2	-	-	-	2	2	1	-	1	-	-				
BP103T.2.	Classify the different types of *organic compounds* based on medicinal use.	3	-	-	1	-	2	-	-	-	-	3				
BP103T.3.	Experiment in the preparation of various types organic compounds and their derivatives.	3	2	-	3	-	2	-	-	-	-	3				
BP103T.4.	Able to analyse and also to *write the structure, name and the type of isomerism of the organic compound*.	2	2	3	3	-	1	-	-	-	-	3				
BP103T.5.	Able to Solve and write *the reaction, name the reaction and also orientation of reactions* in different types of *organic compounds* .	1	-	3	-	-	-	-	-	-	-	3				

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutical Chemistry I MID-SEMESTER (SEM –Ist) 2022-23						
Class: B.Pharm, III Semester						
Subject Name: BP301T Pharmaceutical Organic Chemistry-II Theory		Time: 1 Hrs		Max. Marks: 30		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,4,5	Q.2,3,6,8,9	Q.4,7	Q.2,5,		

Student will be able to
CO1: List the broad perceptive of cloud architecture and model.
CO2: Apply different cloud programming models as per need.

CO Map	Question No.	Question	Marks
CO1	Q.1	Define Saponification Value.	2
CO1	Q.2	Explain significance of Iodine Value .	2
CO2	Q.3	Classify Poly Aromatic hydrocarbons.	2
CO2	Q.4	By showing structure of Phenanthrene. And summarize any three medicinal uses of Phenanthrene.	2
CO2	Q.5	What do you understand by Cyclo alkanes give example?	2
	Q.6	Explain Sulfonation reaction in benzene.	10
CO1	Q.7	What relationship between Fat and Oil Give their Classification and Nomenclature.	10
CO1	Q.8	Outline Huckel's rule for determination of aromaticity with suitable example.	5
CO2	Q.9	Explain Basicity of Amine.	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

100 % Percentage of students secured more than 60% marks, so this course Pharmaceutical Organic Chemistry II – Theory (BP301T) attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICS

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-21

Programme Outcomes:

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1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
III SEM																
	B302T	3	-	2	-	1	3	2	1	1	-	2				
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICS
Course Handout
Course : PHYSICAL PHARMACEUTICS I
Course Code : BP302T, Programme : B. Pharmacy III-Semester **Crédits : 04, Session :2020-21(Odd Sem.)**
Faculty Name: Dr. Jovita Kanoujia

A. Scope: The course deals with the various physical and physicochemical properties, and principle involved in dosage forms/formulations. Theory and practical components of the subject help the student to get a better insight into various areas of formulation research and development, and stability studies of pharmaceutical dosage forms.

B. Course Outcome: ***At the end of each course, the student will be able to:***

CO302.1	Write the importance of solubility in designing of dosage forms and principles of diffusion in biological systems.
CO302.2	Classify the states of matter and understand the applications of various physiochemical properties to design dosage forms
CO302.3	Explain the principles of interfacial tension and the applications of surface active agents in drug solubilization
CO302.4	Make use of concepts of complexation and protein binding in pharmacy
CO302.5	Function of pH, buffers and their use in the stabilization of pharmaceutical formulations.

C. 1.Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices**.**

2. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

3. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice.

Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

4. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

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10. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

11. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively

D.Programme specific outcomes:

1. Scientific Thinking: Enable student's knowledge in scientific perception to understand the concepts and to solve the problems positively while making pharmaceutical formulations.
2. Analytical Skills: Assimilate and develop analytical skills using advanced equipment to design and evaluate pharmaceutical products, also to assess their quality.
3. Resource Management: Utilize and manage resources from natural, semi synthetic and synthetic origin to develop real time products with utmost benefit and safety.
4.Public Health Care: Promote and empower the healthy living in the community by various means of awareness and health strategies.
5. Entrepreneurship: Acquire and develop entrepreneurship and administration skills to establish community pharmacy, learning and training centers for the long term wellbeing of society.

E. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2 quiz, assignment, open book test, field work, group discussion and seminar)		
	Seminar/ Assignment/Quiz/ Open book test	S/As/Q/OBT	3%
Interaction	Student-Teacher interaction	ST	3%

Attendance	A minimum of 80% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

F. Syllabus

UNIT-I

Solubility of drugs: Solubility expressions, mechanisms of solute solvent interactions, ideal solubility parameters, solvation & association, quantitative approach to the factors influencing solubility of drugs, diffusion principles in biological systems. Solubility of gas in liquids, solubility of liquids in liquids, (Binary solutions, ideal solutions) Raoult's law, real solutions. Partially miscible liquids, Critical solution temperature and applications. Distribution law, its limitations and applications

UNIT-II

States of Matter and properties of matter: State of matter, changes in the state of matter, latent heats, vapor pressure, sublimation critical point, eutectic mixtures, gases, aerosols– inhalers, relative humidity, liquid complexes, liquid crystals, glassy states, solid crystalline, amorphous & polymorphism.

Physicochemical properties of drug molecules: Refractive index, optical rotation, dielectric constant, dipole moment, dissociation constant, determinations and applications

UNIT-III

Surface and interfacial phenomenon: Liquid interface, surface & interfacial tensions, surface free energy, measurement of surface & interfacial tensions, spreading coefficient, adsorption at liquid interfaces, surface active agents, HLB Scale, solubilization, detergency, adsorption at solid interface.

UNIT-IV

Complexation and protein binding: Introduction, Classification of Complexation, Applications, methods of analysis, protein binding, Complexation and drug action, crystalline structures of complexes and thermodynamic treatment of stability constants.

UNIT-V 07 Hours

pH, buffers and Isotonic solutions: Sorensen's pH scale, pH determination (electrometric and calorimetric), applications of buffers, buffer equation, buffer capacity, buffers in pharmaceutical and biological systems, buffered isotonic solutions.

G. Examination Scheme:

Components	**A**	**ST**	**CT**	**S/As/Q/OBT**	**EE**
Weightage (%)	4	3	15	3	75

CT: Class Test, As: Assignment, ST: Student teacher interaction,

S/A/Q/OBT: Seminar/ Assignment/Quiz/ Open book test, EE: End Semester Examination; A: Attendance

H. Suggested Text/Reference Books:

1. Physical Pharmacy by Alfred Martin
2. Experimental Pharmaceutics by Eugene, Parott.

3. Tutorial Pharmacy by Cooper and Gunn.
4. Stocklosam J. Pharmaceutical Calculations, Lea &Febiger, Philadelphia.
5. Liberman H.A, Lachman C., Pharmaceutical Dosage forms, Tablets, Volume-1 to 3, MarcelDekkar Inc.
6. Liberman H.A, Lachman C, Pharmaceutical Dosage forms. Disperse systems, volume 1, 2, 3. Marcel Dekkar Inc.
7. Physical Pharmaceutics by Ramasamy C and ManavalanR.
8. Laboratory Manual of Physical Pharmaceutics, C.V.S. Subramanian, J. Thimma settee
9. Physical Pharmaceutics by C.V.S. Subramanyam

I. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Introduction, Solvent-solute interactions	Lecture	BP302T.1	Mid Term-1, Quiz & End Sem Exam
2	Solubility of gas in liquids	Lecture	BP302T.1	Mid Term-1, Quiz & End Sem Exam
3	Solubility of liquids in liquids and solids in liquids	Lecture	BP302T.1	Mid Term-1, Quiz & End Sem Exam
4	Distribution of solutes in solvents	Tutorial	BP302T.1	Mid Term-1, Quiz & End Sem Exam
5	Fick's first law and second law	Lecture	BP302T.1	Mid Term-1, Quiz & End Sem Exam
6	Raoult's law, real solutions	Lecture	BP302T.1	Mid Term-1, Quiz & End Sem Exam
7	Partially miscible liquids	Lecture	BP302T.1	Mid Term-1, Quiz & End Sem Exam
8	Critical solution temperature and applications	Tutorial	BP302T.1	Mid Term-1, Quiz & End Sem Exam
9	Solubility of liquids in liquids and solids in liquids	Lecture	BP302T.1	Mid Term-1, Quiz & End Sem Exam
10	Fick's first law and second law	Lecture	BP302T.1	Mid Term-1, Quiz & End Sem Exam
11	mechanisms of solute solvent interactions,	Lecture	BP302T.1	Mid Term-1, Quiz & End Sem Exam
12	mechanisms of solute solvent interactions,	Tutorial	BP302T.1	Mid Term-1, Quiz & End Sem Exam
13	States of Matter and properties of matter: State of matter	Lecture	BP302T.2	Mid Term-1, Quiz & End Sem Exam
14	changes in the state of matter	Lecture	BP302T.2	Mid Term-1, Quiz & End Sem Exam
15	changes in the state of matter	Lecture	BP302T.2	Mid Term-1, Quiz &

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				End Sem Exam
16	latent heats, vapor pressure	Tutorial	BP302T.2	Mid Term-1, Quiz & End Sem Exam
17	sublimation critical point, eutectic mixtures	Lecture	BP302T.2	Mid Term-1, Quiz & End Sem Exam
18	sublimation critical point, eutectic mixtures	Lecture	BP302T.2	Mid Term-1, Quiz & End Sem Exam
19	Refractive index, optical rotation,	Lecture	BP302T.2	Mid Term-1, Quiz & End Sem Exam
20	optical rotation, dielectric constant	Tutorial	BP302T.2	Mid Term-1, Quiz & End Sem Exam
21	dielectric constant, optical rotatory dispersion	Lecture	BP302T.2	Mid Term-1, Quiz & End Sem Exam
22	optical rotatory dispersion	Lecture	BP302T.2	Mid Term-1, Quiz & End Sem Exam
23	Liquid interface, surface & interfacial tensions	Lecture	BP302T.3	Mid Term-1, Quiz & End Sem Exam
24	Liquid interface, surface & interfacial tensions	Tutorial	BP302T.3	Mid Term-1, Quiz & End Sem Exam
25	surface free energy	Lecture	BP302T.3	Mid Term-1, Quiz & End Sem Exam
26	measurement of surface & interfacial tensions	Lecture	BP302T.3	Mid Term-1, Quiz & End Sem Exam
27	measurement of surface & interfacial tensions	Lecture	BP302T.3	Mid Term-1, Quiz & End Sem Exam
28	measurement of surface & interfacial tensions	Tutorial	BP302T.3	Mid Term-2, Quiz & End Sem Exam
29	spreading coefficient	Lecture	BP302T.3	Mid Term-2, Quiz & End Sem Exam
30	spreading coefficient	Lecture	BP302T.3	Mid Term-2, Quiz & End Sem Exam
31	adsorption at liquid interfaces,	Lecture	BP302T.3	Mid Term-2, Quiz & End Sem Exam
32	adsorption at liquid interfaces,	Tutorial	BP302T.3	Mid Term-2, Quiz & End Sem Exam
33	adsorption at liquid interfaces,	Lecture	BP302T.3	Mid Term-2, Quiz & End Sem Exam
34	surface active agents	Lecture	BP302T.3	Mid Term-2, Quiz & End Sem Exam
35	HLB Scale, solubilization, detergency,	Lecture	BP302T.3	Mid Term-2, Quiz & End Sem Exam
36	adsorption at solid interface	Tutorial	BP302T.3	Mid Term-2, Quiz & End Sem Exam

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37	adsorption at solid interface	Lecture	BP302T.3	Mid Term-2, Quiz & End Sem Exam
38	Complexation and protein binding: Introduction,	Lecture	BP302T.4	Mid Term-2, Quiz & End Sem Exam
39	Classification of Complexation	Lecture	BP302T.4	Mid Term-2, Quiz & End Sem Exam
40	Classification of Complexation	Tutorial	BP302T.4	Mid Term-2, Quiz & End Sem Exam
41	Classification of Complexation	Lecture	BP302T.4	Mid Term-2, Quiz & End Sem Exam
42	methods of analysis,	Lecture	BP302T.4	Mid Term-2, Quiz & End Sem Exam
43	methods of analysis	Lecture	BP302T.4	Mid Term-2, Quiz & End Sem Exam
44	methods of analysis	Tutorial	BP302T.4	Mid Term-2, Quiz & End Sem Exam
45	protein binding	Lecture	BP302T.4	Mid Term-2, Quiz & End Sem Exam
46	protein binding	Lecture	BP302T.4	Mid Term-2, Quiz & End Sem Exam
47	Complexation and drug action	Lecture	BP302T.4	Mid Term-2, Quiz & End Sem Exam
48	Complexation and drug action	Tutorial	BP302T.4	Mid Term-2, Quiz & End Sem Exam
49	crystalline structures of complexes	Lecture	BP302T.4	Mid Term-2, Quiz & End Sem Exam
50	Sorensen's pH scale	Lecture	BP302T.5	Mid Term-2, Quiz & End Sem Exam
51	pH determination (electrometric and calorimetric)	Lecture	BP302T.5	Mid Term-2, Quiz & End Sem Exam
52	pH determination (electrometric and calorimetric)	Tutorial	BP302T.5	Mid Term-2, Quiz & End Sem Exam
53	applications of buffers	Lecture	BP302T.5	Mid Term-2, Quiz & End Sem Exam
54	buffer equation	Lecture	BP302T.5	Mid Term-2, Quiz & End Sem Exam
55	buffer equation, buffer capacity,	Lecture	BP302T.5	Mid Term-2, Quiz & End Sem Exam
56	buffer capacity, buffers in pharmaceutical and biological systems	Tutorial	BP302T.5	Mid Term-2, Quiz & End Sem Exam
57	buffered isotonic solutions	Lecture	BP302T.5	Mid Term-2, Quiz & End Sem Exam

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58	buffered isotonic solutions	Lecture	BP302T.5	Mid Term-2, Quiz & End Sem Exam
59	buffered isotonic solutions	Lecture	BP302T.5	Mid Term-2, Quiz & End Sem Exam
60	buffered isotonic solutions	Tutorial	BP302T.5	Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

Code	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
C302.1	Write the importance of solubility in designing of dosage forms and principles of diffusion in biological systems.	3	3	-	-	3	2	-	-	-	1	-
C302.2	Classify the states of matter and understand the applications of various physiochemical properties to design dosage forms	1	-	3	2	-	-	-	-	-	1	1
C302.3	Explain the principles of interfacial tension and the applications of surface active agents in drug solubilization	3	2	1	-	-	-	-	1	-	-	1
C302.4	Make use of concepts of complexation and protein	1	2	1	1	0	1	-	-	1		2

	binding in pharmacy											
C302.5	Function of pH, buffers and their use in the stabilization of pharmaceutical formulations.	1	2	2	-	2	-	-	-	1	2	3
Average		1.8	1.8	1.66	1.4	1	0.6	1	0.2	0.4	0.8	1.4

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutics I MID-SEMESTER (SEM –IIIrd) 2020-21						
Class: B.Pharm, III Semester						
Subject Name: BP 302T Physical Pharmaceutics-I Theory		Time: 1 Hrs		Max. Marks: 30		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,4,5	Q.6,8, 10	Q.2,3	Q.7,9,		

The student will be able to

C302.1 Write the importance of solubility in designing of dosage forms and principles of diffusion in biological systems.

C302.2 Classify the states of matter and understand the applications of various physiochemical properties to design dosage forms

C302.3 Explain the principles of interfacial tension and the applications of surface active agents in drug solubilization

C302.4 Make use of concepts of complexation and protein binding in pharmacy

C302.5 Function of pH, buffers and their use in the stabilization of pharmaceutical formulations.

CO Map	Question No.	Question	Marks
CO4	Q.1	Define complexation	2
CO1	Q.2	Fick's law of diffusion	2
CO3	Q.3	Mechanism action of spreading co-efficient	2
CO5	Q.4	Define buffer and buffer capacity	2
CO2	Q.5	Define optical rotatory dispersion	2
CO4	Q.6	Enumerate the methods for analysis of complexes and explain in detail about solubility method and pH titration method	10
CO3	Q.7	. Explain the term surface tension & interfacial phenomena. Write the different methods used to measure surface tensions. Explain any two methods elaborately	10
CO2	Q.8	Write the methods to achieve liquefaction of gases with neat labeled diagram	5
CO1	Q.9	Define dipole moment. Explain the correlations with the insecticidal activity method	5

CO5	Q.10	Application of buffers in pharmaceutical and biological system	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

98.1% Percentage of students secured more than 60% marks, so this course Physical Pharmaceutics I – Theory (BP302T) attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOLOGY

PROGRAMME OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-21

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge asscoited with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions

[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "-"

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
III SEM	BP 303T	3	3	3	3	2	2	3	1	1	3	1	-	-	-

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACOLOGY
Course Handout
Course : PHARMACEUTICAL MICROBIOLOGY (Theory)
Course Code : BP303T, Credits : 04, Session : 2020-21 (Odd Sem.), Class : B. Pharm. 2nd Year
Faculty Name : Mrs. Monika Kaushik/ Dr. Anantha Naik Nagappa

A. Introduction: This subject is intended to impart the fundamental knowledge on various aspects (study of all organisms that are invisible to the naked eye- that is the study of microorganisms. Microbiology has an impact on medicine and in addition, emphasis on to;

1. Microorganisms are necessary for the production of bread, cheese, beer, antibiotics, vaccines, vitamins, enzymes etc.
2. Microbiology has an impact on agriculture, food science, ecology, genetics, biochemistry, immunology etc.

B. Course Outcomes: At the end of the course, students will be able to:

BP303T.1. Understand methods of identification, cultivation and preservation of various microorganisms

BP303T.2. Importance of sterilization in microbiology. and pharmaceutical industry

BP303T.3. Learn sterility testing of pharmaceutical products.

BP303T.4. Microbiological standardization of Pharmaceuticals.

BP303T.5. Understand the cell culture technology and its applications in pharmaceutical industries.

C. Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions

during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**

Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	A minimum of 80% attendance is required to be maintained by a student to be qualified for taking up the Odd Semester examination	A	4 %
	Quiz/ Assignment/Open book test/ Field work/Group discussion/ Seminar	Q/A/OBT/FW/GD/S	3%
	Student – Teacher interaction	STA	3%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

Q: Quiz, A: Assignment, OBT: Open book test, FW: Field work, GD: Group discussion, S: Seminar

E. Syllabus

Unit I. 10 Hours

Introduction, history of microbiology, its branches, scope and its importance. a) Introduction to Prokaryotes and Eukaryotes. b) Study of ultra-structure and morphological classification of bacteria, nutritional requirements, raw materials used for culture media and physical parameters for growth, growth curve, isolation and preservation methods for pure cultures, cultivation of anaerobes, quantitative measurement of bacterial growth (total & viable count). c) Study of different types of phase constrast microscopy, dark field microscopy and electron microscopy.

Unit II. 10 Hours

a) Identification of bacteria using staining techniques (simple, Gram's &Acid fast staining) and biochemical tests (IMViC). b) Study of principle, procedure, merits, demerits and applications of Physical, chemical and mechanical method of sterilization. c) Evaluation of the efficiency of sterilization methods. d) Equipments employed in large scale sterilization. Sterility indicators.

Unit III. 10 Hours

a) Study of morphology, classification, reproduction/replication and cultivation of Fungi and Virus. b) Classification and mode of action of disinfectants. c) Factors influencing disinfection, antiseptics and their evaluation. For bacteriostatic and bactericidal actions. d)

Evaluation of bactericidal & Bacteriostatic. e) Sterility testing of products (solids, liquids, ophthalmic and other sterile products) according to IP, BP and USP.

Unit IV. 08 Hours

Designing of aseptic area, laminar flow equipments; study of different sources of contamination in an aseptic area and methods of prevention, clean area classification. a) Principles and methods of different microbiological assay. Methods for standardization of antibiotics, vitamins and amino acids. b) Assessment of a new antibiotic and testing of antimicrobial activity of a new substance. c) General aspects-environmental cleanliness.

Unit V. 07Hours

a). Types of spoilage, factors affecting the microbial spoilage of pharmaceutical products, sources and types of microbial contaminants, assessment of microbial contamination and spoilage. b) Preservation of pharmaceutical products using antimicrobial agents, evaluation of microbial stability of formulations. c) Growth of animal cells in culture, general procedure for cell culture, Primary, established and transformed cell cultures. d) Application of cell cultures in pharmaceutical industry and research.

Examination Scheme:

Components	CT	A	Q/A/OBT/FW/GD/S	STI	EE
Weightage (%)	15	4	3	3	75

Q: Quiz, A: Assignment, OBT: Open book test, FW: Field work, GD: Group discussion, S: Seminar, STI: Student – Teacher interaction

F. Suggested Text/Reference Books:

1. W.B. Hugo and A.D. Russel: Pharmaceutical Microbiology, Blackwell Scientific publications, Oxford London.
2. Prescott and Dunn., Industrial Microbiology, 4th edition, CBS Publishers & Distributors, Delhi.
3. Pelczar, Chan Kreig, Microbiology, Tata McGraw Hill edn.
4. Malcolm Harris, Balliere Tindall and Cox: Pharmaceutical Microbiology.
5. Rose: Industrial Microbiology.
6. Probisher, Hinsdill et al: Fundamentals of Microbiology, 9th ed. Japan
7. Cooper and Gunn's: Tutorial Pharmacy, CBS Publisher and Distribution.
8. Peppler: Microbial Technology.
9. I.P., B.P., U.S.P.- latest editions.
10. Ananthnarayan : Text Book of Microbiology, Orient-Longman, Chennai
11. Edward: Fundamentals of Microbiology.
12. N.K.Jain: Pharmaceutical Microbiology, Vallabh Prakashan, Delhi
13. Bergeys manual of systematic bacteriology, Williams and Wilkins- A Waverly company

G. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO

1.	Introduction, history of microbiology, its branches, scope and its importance.	Lecture	BP303T.1	Mid Term-1, Quiz & End Sem Exam
2.	Branches of microbiology, scope and its importance.	Lecture	BP303T.1	Mid Term-1, Quiz & End Sem Exam
3.	Introduction to Prokaryotes Eukaryotes	Lecture	BP303T.1	Mid Term-1, Quiz & End Sem Exam
4.	Tutorial 1	Tutorial1		
5.	*Study of ultra-structure of bacteria*	Lecture	BP303T.1	Mid Term-1, Quiz & End Sem Exam
6.	Study of morphological classification of bacteria	Lecture	BP303T.1	Mid Term-1, Quiz & End Sem Exam
7.	Study of nutritional requirements of bacteria, raw materials used for culture media	Lecture	BP303T.1	Mid Term-1, Quiz & End Sem Exam
8.	Tutorial 2	Tutorial 2		
9.	Study of physical parameters for of bacterial growth	Lecture	BP303T.1	Mid Term-1, Quiz & End Sem Exam
10.	Study of growth curve	Lecture	BP303T.1	Mid Term-1, Quiz & End Sem Exam
11.	Study of isolation and preservation methods for pure culture	Lecture	BP303T.1	Mid Term-1, Quiz & End Sem Exam
12.	Tutorial 3	Tutorial 3		
13.	Study of quantitative measurement of bacterial growth (total & viable count).	Lecture	BP303T.1	Mid Term-1, Quiz & End Sem Exam
14.	Study of different types of phase constrast microscopy	Lecture	BP303T.1	Mid Term-1, Quiz & End Sem Exam
15.	Study of dark field microscopy and electron microscopy.	Lecture	BP303T.1	Mid Term-1, Quiz & End Sem Exam
16.	Tutorial 4	Tutorial4		
17.	Identification of bacteria using staining techniques (simple staining, Gram's staining, Acid fast staining)	Lecture	BP303T.2	Mid Term-1, Quiz & End Sem Exam
18.	Identification of bacteria using biochemical tests (IMViC).	Lecture	BP303T.2	Mid Term-1, Quiz & End Sem Exam
19.	Study of principle, procedure, merits, demerits and applications of Physical,	Lecture	BP701T.2	Mid Term-1, Quiz & End Sem Exam

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	chemical and mechanical method of sterilization.			
20.	Tutorial 5	Tutorial 5		
21.	Evaluation of the efficiency of sterilization methods.	Lecture	BP303T.2	Mid Term-1, Quiz & End Sem Exam
22.	Equipments employed in large scale sterilization.	Lecture	BP303T.2	Mid Term-1, Quiz & End Sem Exam
23.	Sterility indicators	Lecture	BP303T.2	Mid Term-1, Quiz & End Sem Exam
24.	Tutorial 6	Tutorial 6		
25.	Study of morphology and classification of Fungi.	Lecture	BP303T.3	Mid Term-2, Quiz & End Sem Exam
26.	Study of reproduction/replication of Fungi	Lecture	BP303T.3	Mid Term-2, Quiz & End Sem Exam
27.	Study of cultivation of Fungi	Lecture	BP303T.3	Mid Term-2, Quiz & End Sem Exam
28.	Tutorial 7	Tutorial 7		
29.	Study of morphology of Virus.	Lecture	BP303T.3	Mid Term-2, Quiz & End Sem Exam
30.	Study of classification and cultivation of Virus.	Lecture	BP303T.3	Mid Term-2, Quiz & End Sem Exam
31.	Study of reproduction/replication of Virus.	Lecture	BP303T.3	Mid Term-2, Quiz & End Sem Exam
32.	Classification of action of disinfectants method of sterilization.	Lecture	BP303T.3	Mid Term-2, Quiz & End Sem Exam
33.	Classification and mode of action of disinfectants method of sterilization.	Lecture	BP303T.3	Mid Term-1, Quiz & End Sem Exam
34.	Tutorial 08	Tutorial 08		
35.	Factors influencing disinfection, antiseptics and their evaluation.	Lecture	BP303T.3	Mid Term-1, Quiz & End Sem Exam
36.	applications of Physical, chemical and mechanical method of sterilization	Lecture	BP303T.3	Mid Term-2, Quiz & End Sem Exam
37.	Evaluation of bactericidal & Bacteriostatic.	Lecture	BP303T.3	Mid Term-2, Quiz & End Sem Exam
38.	Tutorial 09	Tutorial 09		

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39.	Sterility testing of products (solids, liquids, ophthalmic and other sterile products) according to IP, BP and USP.	Lecture	BP303T.3	Mid Term-2, Quiz & End Sem Exam
40.	Designing of aseptic area, laminar flow.	Lecture	BP303T.4	Mid Term-2, Quiz & End Sem Exam
41.	Designing of study of different sources of contamination.	Lecture	BP303T.4	Mid Term-2, Quiz & End Sem Exam
42.	Tutorial 10	Tutorial 10		
43.	methods of prevention, clean area classification.	Lecture	BP303T.4	Mid Term-2, Quiz & End Sem Exam
44.	Principles and methods of different microbiological assay.	Lecture	BP303T.4	Mid Term-2, Quiz & End Sem Exam
45.	Tutorial 11	Tutorial 11		
46.	Methods for standardization of antibiotics, vitamins and amino acids.	Lecture	BP303T.4	Quiz & End Sem Exam
47.	Assessment of a new antibiotic.	Lecture	BP303T.4	Quiz & End Sem Exam
48.	testing of antimicrobial activity of a new substance.	Lecture	BP303T.4	Quiz & End Sem Exam
49.	Tutorial 12	Tutorial 12		
50.	General aspects- environmental cleanliness. Types of spoilage	Lecture	BP303T.5	Quiz & End Sem Exam
51.	factors affecting the microbial spoilage of pharmaceutical products, sources and types of microbial contaminants, assessment of microbial contamination and spoilage.	Lecture	BP303T.5	Quiz & End Sem Exam
52.	sources of microbial contaminants	Lecture	BP303T.5	Quiz & End Sem Exam
53.	Tutorial 13	Tutorial 13		
54.	types of microbial contaminants,	Lecture	BP303T.5	Quiz & End Sem Exam
55.	assessment of microbial contamination and spoilage.	Lecture	BP303T.5	Quiz & End Sem Exam
56.	Preservation of pharmaceutical products using antimicrobial agents, evaluation of microbial stability of formulations.	Lecture	BP303T.5	Quiz & End Sem Exam

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57.	Tutorial 13	Tutorial 13		
58.	Growth of animal cells in culture	Lecture	BP303T.5	Mid Term-2, Quiz & End Sem Exam
59.	Tutorial 14	Tutorial 14		
60.	general procedure for cell culture, Primary, established and transformed cell cultures	Lecture	BP303T.5	Mid Term-2, Quiz & End Sem Exam
61.	Application of cell cultures in pharmaceutical industry and research.	Lecture	BP303T.5	Mid Term-2, Quiz & End Sem Exam
62.	Tutorial 15	Tutorial 15		

H. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP303T.1	Discuss various methods used for evaluation of disinfectants.	2	2	3	2	-	1	2	1	-	-	1
BP303T.2	*Discuss phenol coefficient test.*	2	2	2	3	-	1	1	1	-	-	1
BP303T.3	*What is sterilization? Explain in detail the various physical methods of sterilization.*	2	1	1	-	-	1	3	2	-	-	-
BP303T.4	*Discuss the various applications of cell cultures in pharmaceutical industries*	2	2	2	1	-	1	-	-	-	-	-
BP303T.5	*Write a note on chemical indicators of sterilization.*	2	1	-	-	-	2	1	1	-	-	1

Sample Question Paper

Amity School of Pharmacy Department of Pharmacology I MID-SEMESTER(SEM–III)2021-22						
Class: B.Pharm.- III Semester						
Subject Name: BP303T PHARMACEUTICAL MICROBIOLOGY (Theory)		Time:1 Hrs			Max.Marks:30	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,4	Q.2,3	Q.4	Q.2,5,6		

CO Map	Question No.	Question	Marks
CO1	Q.1	Write down the principle of pour plate.	2
CO1	Q.2	Define IMViC test.	2
	Q.3	Write down the microbiological assay of antibiotics.	2
	Q.4	Define Hanging drop method.	2
	Q.5	Differentiate among Gram +ve and Gram -ve bacteria.	2
CO1	Q.6	a) Give description of most common biochemical test used for identification of bacteria. b) Explain the principle of acid-fast staining of bacteria.	10
CO2	Q.7	a) Discuss the various applications of cell cultures in pharmaceutical industries. b) Write a note on Pour Plate method.	10
	Q.8	Explain the growth curve of bacteria in detail.	5

CO2	Q.9	Explain the various substances required for the growth of microorganisms.	5
CO2	Q.10	Explain the principle of moist heat and radiation sterilization method.	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

100 % Percentage of students secured more than 60% marks, so This Pharmaceutical Microbiology – Theory (BP303T) attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICS

PROGRAMME OUTCOMES AND PROGRAMME-SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-21

Program Outcomes:

[PO.1]. Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills, and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific inquiry, thinking analytically, clearly, and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership, and team-building when planning changes required for the fulfillment of practice, and professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication, and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

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[PO.10]. Environment and sustainability: Understand the impact of professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Programme Specific Outcomes:

PSO 1: Will be able to design, develop and implement efficient software for a given real life problem.

PSO 2: Will be able to apply knowledge of AI, Machine Learning and Data Mining in analyzing big data forextracting useful information from it and for performing predictive analysis.

PSO 3: Will be able to design, manage and secure wired/ wireless computer networks for transfer and sharing ofinformation.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
III SEM	BP304T	3	2	3	1	-	-	1	-	-	3	2				

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICS
Course Handout
Course : PHARMACEUTICAL ENGINEERING THEORY
Course Code : BP304T, Crédits : 04, Session :2020-21 (Odd Sem.), Class : B.Pharm. 2nd Year
Faculty Name: Dr. Neeraj Mishra

A. **Introduction:** This course is designed to impart fundamental knowledge on the art and science of various unit operations used in the pharmaceutical industry.

B. **Course Outcomes:** At the end of the course, students will be able to:

BP304T.1. **Define** various unit operations used in pharmaceutical industries.

BP304T.2. **Relate** the material handling techniques according to the available materials.

BP304T.3. **Explain** various processes & equipment involved in the pharmaceutical manufacturing process.

BP304T.4. **Analys**e various conditions & precautions to prevent environmental pollution.

BP304T.5. **Analyse & Plan** plant layout design for optimum use of resources.

BP304T.6 Utilize various preventive methods used for corrosion control in pharmaceutical industries.

C. **Programme Outcomes:**

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

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PSO 2: Will be able to apply knowledge of AI, Machine Learning and Data Mining in analyzing big data forextracting useful information from it and for performing predictive analysis.

PSO 3: Will be able to design, manage and secure wired/ wireless computer networks for transfer and sharing ofinformation.

E. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

F. Syllabus

UNIT – I

Flow of fluids: Types of manometers, Reynolds number and its significance, Bernoulli's theorem and its applications, Energy losses, Orifice meter, Venturimeter, Pitot tube and Rotometer.

Size Reduction: Objectives, Mechanisms & Laws governing size reduction, factors affecting size reduction, principles, construction, working, uses, merits and demerits of Hammer mill, ball mill, fluid energy mill, Edge runner mill & end runner mill.

Size Separation: Objectives, applications & mechanism of size separation, official standards of powders, sieves, size separation Principles, construction, working, uses, merits and demerits of Sieve shaker, cyclone separator, Air separator, Bag filter & elutriation tank.

UNIT – II

Heat Transfer: Objectives, applications & Heat transfer mechanisms. Fourier's law, Heat transfer by conduction, convection & radiation. Heat interchangers & heat exchangers.

Evaporation: Objectives, applications and factors influencing evaporation, differences between evaporation and other heat process. principles, construction, working, uses,

merits and demerits of Steam jacketed kettle, horizontal tube evaporator, climbing film evaporator, forced circulation evaporator, multiple effect evaporator& Economy of multiple effect evaporator.

Distillation: Basic Principles and methodology of simple distillation, flash distillation, fractional distillation, distillation under reduced pressure, steam distillation & molecular distillation

UNIT – III

Drying: Objectives, applications & mechanism of drying process, measurements & applications of Equilibrium Moisture content, rate of drying curve. principles, construction, working, uses, merits and demerits of Tray dryer, drum dryer spray dryer, fluidized bed dryer, vacuum dryer, freeze dryer.

Mixing: Objectives, applications & factors affecting mixing, Difference between solid and liquid mixing, mechanism of solid mixing, liquids mixing and semisolids mixing. Principles, Construction, Working, uses, Merits and Demerits of Double cone blender, twin shell blender, ribbon blender, Sigma blade mixer, planetary mixers, Propellers, Turbines, Paddles & Silverson Emulsifier,

UNIT – IV

Filtration: Objectives, applications, Theories & Factors influencing filtration, filter aids, filter medias. Principle, Construction, Working, Uses, Merits and demerits of plate & frame filter, filter leaf, rotary drum filter, Meta filter & Cartridge filter, membrane filters and Seidtz filter.

Centrifugation: Objectives, principle & applications of Centrifugation, principles, construction, working, uses, merits and demerits of Perforated basket centrifuge, Non-perforated basket centrifuge, semi continuous centrifuge & super centrifuge.

UNIV – V

Materials of pharmaceutical plant construction, Corrosion and its prevention: Factors affecting during materials selected for Pharmaceutical plant construction, Theories of corrosion, types of corrosion and there prevention. Ferrous and nonferrous metals, inorganic and organic non metals, basic of material handling systems.

G. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

H. Suggested Text/Reference Books:

1. Introduction to chemical engineering – Walter L Badger & Julius Banchero, Latest edition.

2. Solid phase extraction, Principles, techniques and applications by Nigel J.K. Simpson-Latest edition.

3. Unit operation of chemical engineering – Mcabe Smith, Latest edition.

4. Pharmaceutical engineering principles and practices – C.V.S Subrahmanyam et al., Latest edition.

5. Remington practice of pharmacy- Martin, Latest edition.

6. Theory and practice of industrial pharmacy by Lachmann., Latest edition.

7. Physical pharmaceutics- C.V.S Subrahmanyam et al., Latest edition. 8. Cooper and Gunn's Tutorial pharmacy, S.J. Carter, Latest edition.

I. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Introduction to flow of fluid and simple manometer	Lecture	2	Mid Term-1, Quiz & End Sem Exam
2	Differential and inclined manometer, Energy losses	Lecture	2,5	Mid Term-1, Quiz & End Sem Exam
3	Reynolds number and its significance	Lecture	3	Mid Term-1, Quiz & End Sem Exam
4	Doubt clearing session	Tutorial	2,3,5	Mid Term-1, Quiz & End Sem Exam
5	Bernoulli's theorem and its applications	Lecture	2	Mid Term-1, Quiz & End Sem Exam
6	Orifice meter, Venturimeter	Lecture	2	Mid Term-1, Quiz & End Sem Exam
7	Pitot tube, Rotameter	Lecture	2	Mid Term-1, Quiz & End Sem Exam
8	Revision of fluid flow	Tutorial	2.3.5	Mid Term-1, Quiz & End Sem Exam
9	Objectives, Mechanisms & Laws governing size reduction, factors affecting size reduction	Lecture	1	Mid Term-1, Quiz & End Sem Exam
10	Hammer mill, ball mill	Lecture	2, 3	Mid Term-1, Quiz & End Sem Exam
11	fluid energy mill, Edge runner mill & end runner mill	Lecture	2, 3. 5	Mid Term-1, Quiz & End Sem Exam

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12	Class test	Tutorial	2,3,5	Mid Term-1, Quiz & End Sem Exam
13	Objectives, applications & mechanism of size separation, official standards of powders	Lecture	1, 2	Mid Term-1, Quiz & End Sem Exam
14	official standards of sieves, size separation Principles, construction, working, uses, merits and demerits of cyclone separator, Sieve shaker	Lecture	2,3,4	Mid Term-1, Quiz & End Sem Exam
15	Air separator, Bag filter & elutriation tank	Lecture	2,3,4	Mid Term-1, Quiz & End Sem Exam
16	Corelative discussion of size reduction & size separation	Tutorial	1,2,3,4,5	Mid Term-1, Quiz & End Sem Exam
17	Objectives, applications & Heat transfer mechanisms	Lecture	1,	Mid Term-1, Quiz & End Sem Exam
18	Heat transfer by conduction	Lecture	1	Mid Term-1, Quiz & End Sem Exam
19	Heat transfer by convection & radiation	Lecture	1	Mid Term-1, Quiz & End Sem Exam
20	Group discussion on different topics	Tutorial	1,2,3,4,5	Mid Term-1, Quiz & End Sem Exam
21	Heat interchangers	Lecture	2,3,4	Mid Term-1, Quiz & End Sem Exam
22	heat exchangers	Lecture	2,3,4	Mid Term-1, Quiz & End Sem Exam
23	Objectives, applications and factors influencing evaporation, differences between evaporation and other heat process, Steam jacketed kettle,	Lecture	1,2	Mid Term-1, Quiz & End Sem Exam
24	Revision of heat chapter	Tutorial	1,2,3,4	Mid Term-1, Quiz & End Sem Exam
25	principles, construction,	Lecture	2,3,4	Mid Term-1,

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	working, uses, merits and demerits of horizontal tube evaporator, climbing film evaporator			Quiz & End Sem Exam
26	forced circulation evaporator, multiple effect evaporator & Economy of multiple effect evaporator	Lecture	2,3,4	Mid Term-1, Quiz & End Sem Exam
27	Basic Principles and methodology of simple distillation, steam distillation	Lecture	2,3,4	Mid Term-1, Quiz & End Sem Exam
28	Model making	Tutorial	3	Mid Term-1, Quiz & End Sem Exam
29	flash distillation,	Lecture	2,3,4	Mid Term-1, Quiz & End Sem Exam
30	molecular distillation	Lecture	2,3,4	Mid Term-1, Quiz & End Sem Exam
31	distillation under reduced pressure	Lecture	2,3,4	Mid Term-2, Quiz & End Sem Exam
32	Group discussion on ditillation	Tutorial	1,2,3,4,5	Mid Term-2, Quiz & End Sem Exam
33	fractional distillation	Lecture	2,3,4	Mid Term-2, Quiz & End Sem Exam
34	Drying: Objectives, applications & mechanism of drying process, measurements & applications of Equilibrium Moisture content	Lecture	2,3,4	Mid Term-2, Quiz & End Sem Exam
35	rate of drying curve, principles, construction, working, uses, merits and demerits of Tray dryer	Lecture	2,3,4	Mid Term-2, Quiz & End Sem Exam
36	Class test	Tutorial	1,2,3,4,5	Mid Term-2, Quiz & End Sem Exam
37	drum dryer, spray dryer	Lecture	2,3,4	Mid Term-2, Quiz & End Sem Exam
38	fluidized bed dryer, vacuum	Lecture	2,3,4	Mid Term-2,

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	dryer			Quiz & End Sem Exam
39	freeze dryer,	Lecture	2,3,4	Mid Term-2, Quiz & End Sem Exam
40	Quiz	Tutorial	1,2,3,4,5	Mid Term-2, Quiz & End Sem Exam
41	Objectives, applications & factors affecting mixing, Difference between solid and liquid mixing	Lecture	1,2	Mid Term-2, Quiz & End Sem Exam
42	mechanism of solid mixing, liquids mixing and semisolids mixing	Lecture	2,3,4	Mid Term-2, Quiz & End Sem Exam
43	Principles, Construction, Working, uses, Merits and Demerits of Double cone blender, twin shell blender	Lecture	2,3,4	Mid Term-2, Quiz & End Sem Exam
44	Seminar	Tutorial	1,2,3,4,5	Mid Term-2, Quiz & End Sem Exam
45	ribbon blender, Sigma blade mixer, planetary mixers	Lecture	2,3,4	Mid Term-2, Quiz & End Sem Exam
46	Propellers, Turbines, Paddles & Silverson Emulsifier	Lecture	2,3,4	Mid Term-2, Quiz & End Sem Exam
47	Objectives, applications, Theories & Factors influencing filtration, filter aids	Lecture	1,2	Quiz & End Sem Exam
48	Discussion	Tutorial	1,2,3,4,5	Quiz & End Sem Exam
49	filter medias, rotary drum filter	Lecture	2,3,4	Quiz & End Sem Exam
50	Principle, Construction, Working, Uses, Merits and demerits of plate & frame filter	Lecture	2,3,4	Quiz & End Sem Exam
51	filter leaf, Meta filter & Cartridge filter, membrane filters and Seidtz filter	Lecture	2,3,4	Quiz & End Sem Exam
52	Model making	Tutorial	3	Quiz & End Sem Exam
53	Objectives, principle & applications of Centrifugation,	Lecture	1,2	Quiz & End Sem Exam

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54	principles, construction, working, uses, merits and demerits of Perforated basket centrifuge, Non -perforated basket centrifuge	Lecture	2,3,4	Quiz & End Sem Exam
55	semi continuous centrifuge & super centrifuge	Lecture	2,3,4	Quiz & End Sem Exam
56	Test	Tutorial	1,2,3,4,5	Quiz & End Sem Exam
57	types of corrosion and there prevention	Lecture	1,2,5, 6	Quiz & End Sem Exam
58	Ferrous and nonferrous metals, inorganic and organic non metals	Lecture	1,2,5, 6	Quiz & End Sem Exam
59	basic of material handling systems	Lecture	1,2,5, 6	Quiz & End Sem Exam
60	Unit test	Tutorial	1,2,3,4,5 ,6	Quiz & End Sem Exam

J. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP304T.1	Define various unit operations used in pharmaceutical industries.	3	1	1	-	-	-	-	-	-	-	-				
BP304T.2.	Relate the material handling techniques according to the available materials.	3	3	3	2	-	-	-	-	-	1	2				

BP304T.3.	Explain various processes & equipment involved in the pharmaceutical manufacturing process.	3	1	1	2	-	-	-	-	-	2	1				
BP304T.4.	Analyze various conditions & precautions to prevent environmental pollution.	3	3	2	1	-	-	3	-	-	3	3				
BP304T.5.	Analyze & plan plant layout design for optimum use of resources.	3	3	2	1	-	-	3	-	-	3	3				
BP304T.6.	Utilize various preventive methods used for corrosion control in pharmaceutical industries.	3	3	3	1	-	-	-	-	-	3	1				

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Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutics II MID-SEMESTER (SEM –IIIrd) 2020-21						
Class: B.Pharm, III Semester						
Subject Name: BP304T Pharmaceutical Engineering Theory		Time: 1 Hrs		Max. Marks: 30		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,2,4	Q.3,5	Q.7,9	Q. 8,		

Students will be able to
CO1: List the broad perceptive of cloud architecture and model.
CO2: Apply different cloud programming models as per need.

CO Map	Question No.	Question	Marks
CO2	Q.1	How drying rate can be enhanced?	2
CO3	Q.2	What are the basic objectives of mixing?	2
CO3	Q.3	Explain the material handling system.	2
CO3	Q.4	Which working principle is there for the super centrifuge?	2
CO2	Q.5	Illustrate the rotary drum filter.	2
	Q.6	Derive the basic equation for the flow of fluid through the pipe and discuss its applications.	10
CO3	Q.7	Make use of a suitable diagram of a ribbon blender for explaining its principle, construction, working, uses, advantages and disadvantages.	10
CO2	Q.8	List the types of corrosion.	5
CO4	Q.9	Identify the various factors that can affect filteration.	5
CO3	Q.10	Explain the menchanism of mixing for different type of material.	5

Attainments	**Rubric**

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Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

83.3 % Percentage of students secured more than 60% marks, so this course Pharmaceutical Engineering – Theory (BP304T) attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharmacy), Academic Year – 2021-2022

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PROGRAMMEARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11				
III SEM	BP305P	3	3	3	3	-	-	1		1	-	3		-	-	-

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AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICAL CHEMISTRY
Course Handout
Course : PHARMACEUTICAL ORGANIC CHEMISTRY-II (Practical)
Course Code : BP305P, Crédits : 02, Session : 2020-21 (Odd Sem.), Class : B.Pharm. 2nd Year
Faculty Name : Dr. Srabanti Jana

Introduction: This subject imparts knowledge on synthesis of organic compounds that could involve with design, chemical synthesis and development of medicinal compounds. Further, characterization of oils including standardization of their reagents.

A. ***Course Outcomes:***At the end of the course

BP305P.1. Students will be able to understand principle and procedure of melting point determination, purification and steam distillation.

BP305P.2. Students will be able to **estimate** different analytical constantstofindthequalityofoils.

BP305P.3. Students will be able to **acquire** knowledge about pharmaceutical organic compounds, with emphasis on their synthetic methods.

BP305P.4. Students will be able to **illustrate** the experiments relating to preparations of organic compounds.

BP305P.5. Students will be able to **apply**reagents and various named reactions for synthesis of organic compounds.

B. Programme Outcomes:

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the consequent responsibilities relevant to the professional pharmacypractice.

[PO.10].Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainabledevelopment.

[PO.11].Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoingbasis.

C. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance isrequiredtobemaintainedbyastudentto be qualified for taking up the EndSemester examination. The allowanceof 20%includesalltypesofleaves includingmedicalleaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

D. Syllabus

I . Experiments involving laboratory techniques

- Recrystallization
- Steam distillation

II . Determination of following oil values (including standardization of reagents)

- Acid value
- Saponification value

- Iodine value

III . **Preparation of compounds**

- Benzanilide/Phenyl benzoate/Acetanilide from Aniline/ Phenol /Aniline by acylation reaction.
- 2,4,6-Tribromo aniline/Para bromo acetanilide from Aniline/Acetanilide by halogenation (Bromination) reaction.
- 5-Nitro salicylic acid/Meta di nitro benzene from Salicylic acid / Nitro benzene by nitration reaction.
- Benzoic acid from Benzyl chloride by oxidation reaction.
- Benzoic acid/ Salicylic acid from alkyl benzoate/ alkyl salicylate by hydrolysis reaction.
- 1-Phenyl azo-2-napthol from Aniline by diazotization and coupling reactions.
- Benzil from Benzoin by oxidation reaction.
- Dibenzal acetone from Benzaldehyde by Claison Schmidt reaction
- Cinnammic acid from Benzaldehyde by Perkin reaction

E. Examination Scheme:

Components	A	CT	LR	V	EE
Weightage (%)	2	10	1	2	35

LT: Lab Test,PR/RVV: Practical Records/ Regular viva voce, EE: End Semester Examination; A: Attendance

F. Suggested Text/Reference Books:

- Organic chemistry by I.L. Finar, Volume-I & II.
- A text book of organic chemistry – Arun Bahl, B.S. Bahl.
- Heterocyclic Chemistry by Raj K. Bansal
- Organic Chemistry byMorrison and Boyd

G. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Recrystallization	Practical	BP305P.1	Mid Term-1, PR/RVV&End Sem Exam
2	Steam distillation	Practical	BP305P.1	Mid Term-1, PR/RVV & End Sem Exam
3	Melting point	Practical	BP305P.1	Mid Term-1,

Dr. Mohanpatil

				PR/RVV & End Sem Exam
4	Acid value	Practical	BP305P.2	Mid Term-1, PR/RVV & End Sem Exam
5	Saponification value	Practical	BP305P.2	Mid Term-1, PR/RVV & End Sem Exam
6	Iodine value	Practical	BP305P.2	Mid Term-1, PR/RVV & End Sem Exam
7	Benzanilide/Phenyl benzoate/Acetanilide from Aniline/ Phenol /Aniline by acylation reaction.	Practical	BP305P.3 & BP305P.4	Mid Term-1, PR/RVV & End Sem Exam
8	2,4,6-Tribromo aniline/Para bromo acetanilide from Aniline/Acetanilide by halogenation (Bromination)	Practical	BP305P.3 & BP305P.4	Mid Term-1, PR/RVV & End Sem Exam
9	5-Nitro salicylic acid/Meta di nitro benzene from Salicylic acid / Nitro benzene by nitration reaction.	Practical	BP305P.3 & BP305P.4	Mid Term-2, PR/RVV & End Sem Exam
10	Benzoic acid from Benzyl chloride by oxidation reaction.	Practical	BP305P.3 & BP305P.5	Mid Term-2, PR/RVV & End Sem Exam
11	Benzoic acid from alkyl benzoate by hydrolysis reaction.	Practical	BP305P.3 & BP305P.5	Mid Term-2, PR/RVV & End Sem Exam
12	1-Phenyl azo-2-napthol from Aniline by diazotization and coupling reactions.	Practical	BP305P.3 & BP305P.4	Mid Term-2, PR/RVV & End Sem Exam
13	Benzil from Benzoin by oxidation reaction.	Practical	BP305P.3 & BP305P.4	Mid Term-2, PR/RVV & End Sem

				Exam
14	Dibenzal acetone from Benzaldehyde by Claison Schmidt reaction	Practical	BP305P.3 & BP305P.4	Mid Term-2, PR/RVV & End Sem Exam
15	Cinnammic acid from Benzaldehyde by Perkin reaction	Practical	BP305P.3 & BP305P.4	Mid Term-2, PR/RVV & End Sem Exam
16	Salicylic acid from alkyl salicylate by hydrolysis reaction.	Practical	BP305P.3 & BP305P.5	Mid Term-2, PR/RVV & End Sem Exam

H. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP305P.1.	Students will be able to understand principle and procedure of melting point determination, purification and steam distillation..	3	3	3	3				1	1		3
BP305P.2.	Students will be able to **estimate** different analytical constantstofindthequalityof oils.	3	3	3	3				1	2		3
BP305P.3.	Students will be able to **acquire** knowledge about pharmaceutical organic compounds, with emphasis on their synthetic methods.	3	3	3	3				1	3		3
BP305P.4.	Students will be able to **illustrate** the experiments relating to preparations of organic compounds.	3	3	3	3				2	2		3

BP305P.5.	Students will be able to **apply** reagents and various named reactions for synthesis of organic compounds.	3	3	3	3				2	2		3

SampleQuestionPaper

Amity Institute of pharmacy DepartmentofPharmaceutical Chemistry IIMID-SEMESTER(SEM–III) 2020-21						
Class:B.PharmacyIIISemester						
SubjectName: BP305PPHARMACEUTICAL ORGANIC CHEMISTRY-II PRACTICALS		Time:4Hr		Max.Marks:40		
Levels of thequestions as perBloomsTaxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
QuestionMapping	Q5	Q.1,2	Q.3, 4			

CO.1. Students will be able to **understand** principle and procedure of melting point determination, purification and steam distillation.

CO.2. Students will be able to **estimate** different analytical constantstofindthequalityofoils.

CO.3. Students will be able to **acquire** knowledge about pharmaceutical organic compounds, with emphasis on their synthetic methods.

CO.4. Students will be able to **illustrate** the experiments relating to preparations of organic compounds.

CO.5. Students will be able to **apply** reagents and various named reactions for synthesis of organic compounds.

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COMap	QuestionNo.	Question	Marks
CO3	Q.1	Explain the principle involved in the preparation of tribromo aniline	5
CO3	Q.2	Explain the principle involved in the preparation of acetanelide	5

CO4 &CO5	Q.3	To prepare, submit and report the percentage yield of Dibenzal acetone	10
CO4 & CO5	Q.4	To prepare, submit and report the percentage yield of Benzoic acid	15
CO4 & CO5	Q5	Viva	5

Attainments		**Rubric**
Level	1	IF60%ofstudentssecuremorethan60%marksthenlevel1
Level	2	IF70%ofstudentssecuremorethan60%marksthenlevel2
Level	3	IF80%ofstudentssecuremorethan60%marksthenlevel3

Attainment Level 3 :

100% Percentage of students secured more than 60% marks, so this course Pharmaceutical Organic Chemistry II – Practical (BP305P) attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICS

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-21

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
III SEM	BP306P	3	-	3	2	-	3	-	--	1	3	1				

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AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICS
Course Handout
Course : PHYSICAL PHARMACEUTICS-I PRACTICAL
Course Code : BP306P, Programme :B. Pharmacy III-Semester **Crédits : 04, Session :2020-21 (Odd Sem.)**
Faculty Name : Dr. Jovita Kanoujia

A. Scope: The course deals with the various physical and physicochemical properties, and principle involved in dosage forms/formulations. Theory and practical components of the subject help the student to get a better insight into various areas of formulation research and development, and stability studies of pharmaceutical dosage forms.

B. Course Outcome: ***At the end of each course, the student will be able to:***

C306.1	To understand the significance of physical properties such as solubility, surface tension, partition coefficient and pKa in the design of dosage forms.
C306.2	To explain adsorption isotherms and determine Freundlich- Langmuir constant using activated charcoal
C306.3	To apply Henderson – Hasselbalch equation for interpretation of pKa value of drugs
C306.4	To determine the surface tension of sample liquids by drop count and drop weight methods
C306.5	To deduce the HLB value and critical micellar concentration of a surfactant.
C306.6	To estimate the stability constants of complexes by solubility and pH titration methods

C. 1.Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices**.**

2. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

3. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice.

Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

4. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

5. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well-being.

6. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

7. Pharmaceutical Ethics: Honor personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

8. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

9. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional Pharmacy Practice

10. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

11. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively

D.Programme specific outcomes:

1. Scientific Thinking: Enable student's knowledge in scientific perception to understand the concepts and to solve the problems positively while making pharmaceutical formulations.
2. Analytical Skills: Assimilate and develop analytical skills using advanced equipment to design and evaluate pharmaceutical products, also to assess their quality.
3. Resource Management: Utilize and manage resources from natural, semi synthetic and synthetic origin to develop real time products with utmost benefit and safety.
4.Public Health Care: Promote and empower the healthy living in the community by various means of awareness and health strategies.
5. Entrepreneurship: Acquire and develop entrepreneurship and administration skills to establish community pharmacy, learning and training centers for the long term wellbeing of society.

E. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance is required	A	2%

	to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.		
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

F. Syllabus

1. Determination the solubility of drug at room temperature
2. Determination of pKa value by Half Neutralization/ Henderson Hasselbalch equation.
3. Determination of Partition co- efficient of benzoic acid in benzene and water
4. Determination of Partition co- efficient of Iodine in CCl4 and water
5. Determination of % composition of NaCl in a solution using phenol-water system by CST method
6. Determination of surface tension of given liquids by drop count and drop weight method
7. Determination of HLB number of a surfactant by saponification method
8. Determination of Freundlich and Langmuir constants using activated char coal
9. Determination of critical micellar concentration of surfactants
10. Determination of stability constant and donor acceptor ratio of PABA-Caffeine complex by solubility method
11. Determination of stability constant and donor acceptor ratio of Cupric-Glycine complex by pH titration method

G. Examination Scheme:

Components	**A**	**CT**	**LR**	**V**	**EE**
Weightage (%)	2	10	1	2	35

LT: Lab Test,PR/RVV: Practical Records/ Regular viva voce, EE: End Semester Examination; A: Attendance

H. Suggested Text/Reference Books:

1. Physical Pharmacy by Alfred Martin
2. Experimental Pharmaceutics by Eugene, Parott.
3. Tutorial Pharmacy by Cooper and Gunn.
4. Stocklosam J. Pharmaceutical Calculations, Lea &Febiger, Philadelphia.
5. Liberman H.A, Lachman C., Pharmaceutical Dosage forms, Tablets, Volume-1 to 3, MarcelDekkar Inc.
6. Liberman H.A, Lachman C, Pharmaceutical Dosage forms. Disperse systems, volume 1, 2, 3. Marcel Dekkar Inc.
7. Physical Pharmaceutics by Ramasamy C and ManavalanR.

8. Laboratory Manual of Physical Pharmaceutics, C.V.S. Subramanian, J. Thimma settee
9. Physical Pharmaceutics by C.V.S. Subramanyam

I. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Determination the solubility of drug at room temperature	Practical	C306.1	Mid Term-1, PR/RVV & End Sem Exam
2	Determination of pKa value by Half Neutralization/ Henderson Hasselbalch equation.	Practical	C306.1& C306.3	Mid Term-1, PR/RVV & End Sem Exam
3	Determination of Partition co- efficient of benzoic acid in benzene and water	Practical	C306.1	Mid Term-1, PR/RVV & End Sem Exam
4	Determination of Partition co-efficient of Iodine in CCl4 and water	Practical	C306.1	Mid Term-1, PR/RVV & End Sem Exam
5	Determination of % composition of NaCl in a solution using phenol-water system by CST method	Practical	C306.1& C306.3	Mid Term-1, PR/RVV & End Sem Exam
6	Determination of surface tension of given liquids by drop count and drop weight method	Practical	C306.4	Mid Term-1, PR/RVV & End Sem Exam
7	Determination of HLB number of a surfactant by saponification method	Practical	C306.5	Mid Term-1, PR/RVV & End Sem Exam
8	Determination of Freundlich and Langmuir constants using activated char coal	Practical	C306.2	Mid Term-1, PR/RVV & End Sem Exam
9	Determination of critical micellar concentration of surfactants	Practical	C306.1& C306.3	Mid Term-2, PR/RVV & End Sem

				Exam
10	Determination of stability constant and donor acceptor ratio of PABA-Caffeine complex by solubility method.	Practical	C306.1& C306.3	Mid Term-2, PR/RVV & End Sem Exam
11	Determination of stability constant and donor acceptor ratio of Cupric-Glycine complex by pH titration method.	Practical	C306.1& C306.3	Mid Term-2, PR/RVV & End Sem Exam
12	Determination of surface tension of given liquids by drop count and drop weight method	Practical	C306.4	Mid Term-2, PR/RVV & End Sem Exam
13	Effect of sodium chloride on critical solution temperature of phenol- water system	Practical	C306.4	Mid Term-2, PR/RVV & End Sem Exam
14	Effect of ethanol on critical solution temperature of phenol-water system	Practical	C306.4	Mid Term-2, PR/RVV & End Sem Exam
15	Determination of buffer capacity of a pharmaceutical buffer.	Practical	C306.1& C306.3	Mid Term-2, PR/RVV & End Sem Exam
16	Effect of succinic acid on critical solution temperature of phenol-water system	Lecture	C306.1& C306.3	Mid Term-2, PR/RVV & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

Code	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
C306.1	To understand the significance of physical properties such as solubility, surface tension, partition coefficient and pKa in the design of dosage forms.	3	1	2	2	3	2	1	-	-	1	-
C306.2	To explain adsorption isotherms and determine Freundlich-Langmuir constant using activated charcoal	1	-	3	1	-	-	1	-	2	1	1
C306.3	To apply Henderson – Hasselbalch equation for interpretation of pKa value of drugs	1	2	-	1	2	-	2	1	-	-	1
C306.4	To determine the surface tension of sample liquids by	2	1	1	1	-	1	2	-	1	-	2

	drop count and drop weight methods											
C306.5	To deduce the HLB value and critical micellar concentration of a surfactant.	1	1	2	-	2	-	1	1	1	2	3
C306.6	To estimate the stability constants of complexes by solubility and pH titration methods	3	1	1	1	-	1	2	-	1	-	2
Average		1.8	1	1.5	1	1.16	0.66	1.3	0.3	0.83	0.66	1.5

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutics I MID-SEMESTER (SEM –III) 2020-21						
Class: B.Pharm, III Semester						
Subject Name: BP306P Physical Pharmaceutics-I Practical		Time: 4 Hrs			Max. Marks: 40	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,4	Q.2,3	Q.4	Q.2,5,6		

Student will be able to

C306.1	To understand the significance of physical properties such as solubility, surface tension, partition coefficient and pKa in the design of dosage forms.
C306.2	To explain adsorption isotherms and determine Freundlich- Langmuir constant using activated charcoal
C306.3	To apply Henderson – Hasselbalch equation for interpretation of pKa value of drugs
C306.4	To determine the surface tension of sample liquids by drop count and drop weight methods
C306.5	To deduce the HLB value and critical micellar concentration of a surfactant.
C306.6	To estimate the stability constants of complexes by solubility and pH titration methods

CO Map	Question No.	Question	Marks
CO1,2,4	Q.1a	Synopsis- Write the principle of buffer capacity of a pharmaceutical buffer	5
CO1,2,4	Q.2	Synopsis- Write the principle involved in stability constant and donor acceptor ratio of PABA-Caffeine complex by solubility method.	5
CO1,2, 4,5	Q.3	Experiment Determination HLB number of a surfactant by saponification method	25
CO1,2,3,4,5	Q.4	Viva	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

100% Percentage of students secured more than 60% marks, so this course Physical Pharmaceutics I – Practical (BP306P) attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOLOGY

PROGRAMME OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-21

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions

[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess

societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "-"

PROGRAMME ARTICULATION MATRIX												
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
III SEM	BP 307P	2	2	2	3	1	2	2	1	3	2	3

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACOLOGY
Course Handout
Course : Pharmaceutical Microbiology (Practical)
Course Code : BP307P, Credits : 02, Session : 2020-21 (Odd Sem.), Class : B. Pharm. 2nd Year
Faculty Name : Mrs Monika Kaushik

Introduction: This subject is designed to impart fundamental and practical knowledge of pharmaceutical microbiology and various categories of microorganisms especially for the production of alcohol, antibiotics, vaccines, vitamins enzymes etc.

A. Course Outcomes: At the end of the course, students will be able to:

BP307P: 1. Understand working of different equipment's used in experimental microbiology.
BP307P: 2 Sterilization methods of glassware, preparation and sterilization of media.
BP307P: 3 Preparation of culture media and Sub culturing of bacteria and fungus.
BP307P: 4 Staining methods for identification of microorganisms.
BP307P: 5 Microbiological assays of antibiotics and amino acids.
BP307P: 6 Process of Sterility testing of pharmaceuticals.

B. Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

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[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

C. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

PR: Practical Records, RV: Regular viva, As: Assignment

D. Syllabus

1. Introduction and study of different equipments and processing, e.g., B.O.D. incubator, laminar flow, aseptic hood, autoclave, hot air sterilizer, deep freezer, refrigerator, microscopes used in experimental microbiology.
2. Sterilization of glassware, preparation and sterilization of media.
3. Sub culturing of bacteria and fungus. Nutrient stabs and slants preparations.
4. Staining methods- Simple, Grams staining and acid fast staining (Demonstration with practical).
5. Isolation of pure culture of micro-organisms by multiple streak plate technique and other techniques.
6. Microbiological assay of antibiotics by cup plate method and other methods
7. Motility determination by Hanging drop method.
8. Sterility testing of pharmaceuticals.
9. Bacteriological analysis of water
10. Biochemical test.

E. Examination Scheme:

Components	A	CT	LR	V	EE
Weightage (%)	2	10	1	2	35

PR: Practical Records, RV: Regular viva, As: Assignment

F. Suggested Text/Reference Books:

1. W.B. Hugo and A.D. Russel: Pharmaceutical Microbiology, Blackwell Scientific publications, Oxford London.
2. Prescott and Dunn., Industrial Microbiology, 4th edition, CBS Publishers & Distributors, Delhi.
3. Pelczar, Chan Kreig, Microbiology, Tata McGraw Hill edn.
4. Malcolm Harris, Balliere Tindall and Cox: Pharmaceutical Microbiology.
5. Rose: Industrial Microbiology.
6. Probisher, Hinsdill et al: Fundamentals of Microbiology, 9th ed. Japan
7. Cooper and Gunn's: Tutorial Pharmacy, CBS Publisher and Distribution.
8. Peppler: Microbial Technology.
9. I.P., B.P., U.S.P.- latest editions.
10. Ananthnarayan : Text Book of Microbiology, Orient-Longman, Chennai
11. Edward: Fundamentals of Microbiology.
12. N.K.Jain: Pharmaceutical Microbiology, Vallabh Prakashan, Delhi
13. Bergeys manual of systematic bacteriology, Williams and Wilkins- A Waverly company

G. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1.	Introduction and study of different equipments and processing used in experimental microbiology, e.g., B.O.D. incubator,	Practical	CO4	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both

	laminar flow.			
2.	Introduction and study of different equipments and processing used in experimental microbiology, e.g aseptic hood, autoclave, hot air sterilizer.	Practical	CO4	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
3.	Introduction and study of different equipments and processing used in experimental microbiology, e.g deep freezer, refrigerator, microscopes	Practical	CO4	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
4.	Sterilization of glassware, preparation and sterilization of media.	Practical	CO4, 9	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
5.	Sub culturing of bacteria and fungus. Nutrient stabs and slants preparations.	Practical	CO4, 11	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
6.	Staining methods- Simple, Grams staining and acid fast staining (Demonstration with practical).	Practical	CO4, 9	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
7.	Isolation of pure culture of micro-organisms by multiple streak plate technique and other techniques.	Practical	CO4, 9, 10, 11	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
8.	Microbiological assay of antibiotics by cup plate method	Practical	CO4, 10, 11	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
9.	Microbiological assay of antibiotics by turbidity method	Practical	CO4, 9	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
10.	Motility determination by Hanging drop method.	Practical	CO4	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
11.	Sterility testing of pharmaceuticals.	Practical	CO4, 10	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
12.	Bacteriological analysis of	Practical	CO4,11	Mid Term-2 & End Sem

	water			Exam as Synopsis/ Experiments/ Viva voce for both
13.	Biochemical test for determination of microbials.	Practical	CO4, 11	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both

H. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP307P: 1.	Understand working of different equipment's used in experimental microbiology.	1	1	1	3	1	-	-	1	2	2	3
BP307P: 2	Sterilization methods of glassware, preparation and sterilization of media.	2	1	1	3	1	-	1	1	2	2	2
BP307P: 3	Preparation of culture media and Sub culturing of bacteria and fungus.	1	1	1	2	1	-	-	1	1	2	2
BP307P: 4	Staining methods for identification of microorganisms.	2	1	1	3	1	-	1	1	2	3	2
BP307P: 5	Microbiological assays of antibiotics and amino acids.	2	1	1	3	1	-	1	1	2	2	2
BP307P: 6	Process of Sterility testing of pharmaceuticals.	3	1	1	2	1	-	1	1	2	2	2

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacology I MID-SEMESTER (SEM–III) 2020-21						
Class: B. Pharm III Semester						
Subject Name: Pharmaceutical Microbiology BP 307P (Practical)		Time: 4 Hrs			Max. Marks: 40	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3	Q.2	Q.3	Q.2	Q.2	
Student will be able to CO1: Understand the different equipments used in experimental microbiology. CO2: Preparation of culture media and Sub culturing of bacteria and fungus.						

CO Map	Question No.	Question	Marks
CO1 CO2	Q.1	Synopsis	10
CO1	Q.2	To identify morphology of bacteria by gram staining methods.	25
CO1 and CO2	Q.3	Viva voce	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

100% Percentage of students secured more than 60% marks, so this course Pharmaceutical Microbiology – Practical (BP307P) attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICS

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-21

Programme Outcomes:

[PO.1]. Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2, and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
III SEM	BP308P	3	-	3	2	-	3	-	--	1	3	1				

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF Pharmaceutics
Course Handout
Course : PHARMACEUTICAL ENGINEERING PRACTICAL
Course Code : BP308P, Crédits : 02, Session :2020-21 (Odd Sem.), Class : B.Pharm. 2nd Year
Faculty Name: Dr. Neeraj Mishra

A. Introduction: The course is designed to impart skill development in the arts and science of preparing the different conventional dosage forms.

B. Course Outcomes: At the end of the course, students will be able to:

BP308P.1. To recall the principles used in the preparation of solid, liquid, and semi-solid dosage forms.

BP308P.2. Operate equipment used in the manufacturing of different dosage forms

BP308P.3. Formulate various conventional dosage forms such as solid dosage forms.

BP308P.4. Design various liquid dosage forms and semi-solid dosage forms.

BP308P.5. Estimate the ingredients calculation for preparation of dosage form

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	Description	Code	Weightage %
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

E. Syllabus

I. Determination of radiation constant of brass, iron, unpainted and painted glass.

II. Steam distillation – To calculate the efficiency of steam distillation.

III. To determine the overall heat transfer coefficient by heat exchanger.

IV. Construction of drying curves (for calcium carbonate and starch).

V. Determination of moisture content and loss on drying.

VI. Determination of humidity of air – i) From wet and dry bulb temperatures – use of Dew point method.

VII. Description of Construction working and application of Pharmaceutical Machinery such as rotary tablet machine, fluidized bed coater, fluid energy mill, de humidifier.

VIII. Size analysis by sieving – To evaluate size distribution of tablet granulations – Construction of various size frequency curves including arithmetic andlogarithmic probability plots.

IX. Size reduction: To verify the laws of size reduction using ball mill and determining Kicks, Rittinger's, Bond's coefficients, power requirement and critical speed of Ball Mill.

X. Demonstration of colloid mill, planetary mixer, fluidized bed dryer, freeze dryer and such othermajor equipment.

XI. Factors affecting Rate of Filtration and Evaporation (Surface area, Concentration and Thickness/ viscosity

XII. To study the effect of time on the Rate of Crystallization.

XIII. To calculate the uniformity Index for given sample by using Double Cone Blender.

F. Examination Scheme:

Components	A	CT	LR	V	EE
Weightage (%)	2	10	1	2	35

CT: Class Test, LR: Lab Record, V: Viva, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

- Laboratory Manual of Pharmaceutical Engineering C.V.S Subrahmanyam et. al
- Practical Pharmaceutical Engineering, Gary Prager
- Practical Manual Of Pharmaceutical Engineering By Mrs. B. Jeevana Jyothi
- Cooper and Gunn's Tutorial pharmacy, S.J. Carter, Latest edition

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Demonstrate the pharmaceutical machinery available in the lab	Practical	1, 2	Mid Term-1, Quiz & End Sem Exam
2	Explain the construction, working, and application of pharmaceutical equipment including fluidized bed coater, fluid energy mill, Silverson emulsifier	Practical	1,2	Mid Term-1, Quiz & End Sem Exam
3	Determine the effect of surface area on the rate of evaporation.	Practical	3	Mid Term-1, Quiz & End Sem Exam
4	Determine the effect of filter aid on the rate of filtration.	Practical	3, 5	Mid Term-1, Quiz & End Sem Exam
5	Deternine the crystalline behavior of copper sulfate by shock cooling method.	Practical	3, 5	Mid Term-1, Quiz & End Sem Exam
6	Deternine the effect of drying time on the moisture content of calcium carbonate slurry.	Practical	3,5	Mid Term-1, Quiz & End Sem Exam
7	Design the drying rate curve for given sample.	Practical	3, 5	Mid Term-1, Quiz & End Sem Exam
8	Determine the effect of surface	Practical	3, 5	Mid Term-2, Quiz

	area on the rate of drying.			& End Sem Exam
9	Determine the humidity of the air by the dew point method	Practical	1, 3, 4, 5	Mid Term-2, Quiz & End Sem Exam
10	Demonstrate the working and construction of tablet punching machine.	Practical	1, 2, 3, 4	Mid Term-2, Quiz & End Sem Exam
11	Analyze the effect of number and size of ball on size reduction of given granular material by using a ball mill.	Practical	1, 2, 3, 4	Mid Term-2, Quiz & End Sem Exam
12	Determine the particle size distribution of a given sample by the sieving method.	Practical	1	Mid Term-2, Quiz & End Sem Exam
13	Determine the particle size distribution of a given sample by the microscopic method.	Practical	1, 3, 4	Mid Term-2, Quiz & End Sem Exam
14	Determine the effect of concentration on the rate of filtration	Practical	3, 5	Mid Term-2, Quiz & End Sem Exam
15	Evaluate the effect of centrifugation speed & time on the rate of sedimentation.	Practical	3, 5	Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	
BP308P.1	Relate theoretical knowledge of equipment's practically, available in the lab	3	-	3	1	-	1	-	-	1	3	2	

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BP308P. 2.	Understanding of construction, working, applications and principles of various instruments available in lab.	3	2	3	3	-	1	-	-	1	3	2	
BP308P. 3.	Study of various factors affecting different unit processes.	3	2	3	-	-	1	-	-	1	3	1	
BP308P. 4.	Checking of working efficiency of various instruments available in lab through proper practical approach	3	3	3	3	-	3	1	-	-	1	2	
BP308P. 5.	Verification of various theories applicable to different principles of instruments	3	1	2	1	-	1	-	-	-	3	-	

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutics I MID-SEMESTER (SEM –Ist) 2020-21						
Class: B.Pharm, I Semester						
Subject Name: BP308P Pharmaceutical Engineering- Practical		Time: 4 Hrs		Max. Marks: 40		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3			Q.2		

Student will be able to

CO.1. Relate theoretical knowledge of equipment's practically, available in the lab

CO.2. Understanding of construction, working, applications and principles of various instruments available in lab.

CO.3. Study of various factors affecting different unit processes.

CO.4. Checking of working efficiency of various instruments available in lab through proper practical approach

CO.5. Verification of various theories applicable to different principles of instruments

CO Map	Question No.	Question	Marks
CO2	Q.1a	Synopsis- **What** is the principle of a fluid energy mill?	2
CO2	Q.1b	Synopsis- **Compare** the mechanisms of size reduction.	2
CO1,2,3	Q.1c	Synopsis- **what** is the working volume of ball mill?	2
CO1,2,4	Q.1d	Synopsis- **explain** the importance of humidity measurement in manufacturing units.	2
CO3,5	Q.1e	Synopsis- **Write** the equation for Reynold's No.?	2
CO1,2, 3,4,5	Q.2	**Experiment** To determine the effect of concentration on the rate of filtration.	25
CO1,2,3,4,5	Q.3	Viva	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

100% Percentage of students secured more than 60% marks, so this course Pharmaceutical Engineering –Practical (BP308P) attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharmacy), Academic Year – 2020-21

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values,

communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11				
IV SEM	BP401T	3	3	2	2	-	-	2	2	1	-	2		-	-	-

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DEPARTMENT OF PHARMACEUTICAL CHEMISTRY
Course Handout
Course : PHARMACEUTICAL ORGANIC CHEMISTRY-III (Theory)
Course Code : BP401T, Crédits : 04, Session :2020-21(Even Sem.), Class : B.Pharm. 2nd Year
Faculty Name : Dr. Pawan Kumar Gupta

A. Introduction: This subject imparts knowledge on stereo-chemical aspects of organic compounds and organic reactions, important named reactions, chemistry of important hetero cyclic compounds. It also emphasizes on medicinal and other uses of organic compounds.

B. ***Course Outcomes:*** At the end of the course

BP401T.1. Students will be able to **study** optical isomerism of compounds that could help the students to understand the chirality, sequence rules, reacemic modification of organic compounds.

BP401T.2. Students will be able to **acquire** knowledge about geometricsl isomerism of pharmaceutical organic compounds, with emphasis on their synthetic process, physical and chemical properties.

BP401T.3. Students will be able to **write** synthesis, reactions and medicinal uses different heterocyclic compounds.

BP401T.4. Students will be able to **analyze** various reactions for the synthesis of higher organic compounds.

BP401T.5. Students will be able to **apply** reagents and various named reactions for the design of organic medicinal compounds.

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find,

analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	Description	Code	Weightage %
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2 quiz, assignment, open book test, field work, group discussion and seminar)		
	Seminar/ Assignment/Quiz/ Open book test	S/As/Q/OBT	3%
Interaction	Student-Teacher interaction	ST	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

Unit-1: Stereo isomerism

Optical isomerism–Optical activity, enantiomerism, diastereoisomerism, meso compounds,Elements of symmetry, chiral and achiral molecules DL system of nomenclature of optical isomers, sequence rules, RS system of nomenclature of optical isomers, Reactions of chiral molecules, Racemic modification and resolution of racemic mixture. Asymmetric synthesis: partial and absolute

Unit-2: Geometrical isomerism

Nomenclature of geometrical isomers (Cis Trans, EZ, Syn Anti systems)
Methods of determination of configuration of geometrical isomers.
Conformational isomerism in Ethane, n-Butane and Cyclohexane.
Stereo isomerism in biphenyl compounds (Atropisomerism) and conditions for optical activity.
Stereospecific and stereoselective reactions

Unit-3: Heterocyclic compounds:

Nomenclature and classification,Synthesis, reactions and medicinal uses of following compounds/derivatives Pyrrole, Furan, and Thiophene - Relative aromaticity, reactivity and Basicity of pyrrole

Unit-4: Synthesis, reactions and medicinal uses of following compounds/derivatives

Pyrazole, Imidazole, Oxazole and Thiazole. Pyridine, Quinoline, Isoquinoline, Acridine and Indole. Basicity of pyridine, Synthesis and medicinal uses of Pyrimidine, Purine, azepines and their derivatives

Unit-5: Reactions of synthetic importance

Metal hydride reduction (NaBH4 and LiAlH4), Clemmensen reduction, Birch reduction, Wolff Kishner reduction. Oppenauer-oxidation and Dakin reaction. Beckmanns rearrangement and Schmidt rearrangement. Claisen-Schmidt condensation.

F. Examination Scheme:

Components	A	ST	CT	S/As/Q/OBT	EE
Weightage (%)	4	3	15	3	75

CT: Class Test, As: Assignment, ST: Student teacher interaction, S/A/Q/OBT: Seminar/ Assignment/Quiz/ Open book test, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

- Organic chemistry by I.L. Finar, Volume-I & II.
- A text book of organic chemistry – Arun Bahl, B.S. Bahl.
- Heterocyclic Chemistry by Raj K. Bansal
- Organic Chemistry byMorrison and Boyd

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Optical activity	Lecture	BP401T.1	Mid Term-1, Quiz & End Sem Exam
2	Enantiomerism	Lecture	BP401T.1	Mid Term-1, Quiz & End Sem Exam
3	Meso compounds	Lecture	BP401T.1	Mid Term-1, Quiz & End Sem Exam
4	Tutorial class Optical activity	Lecture	BP401T.1	Mid Term-1, Assignment ,Quiz & End Sem Exam
5	diastereoisomerism	Lecture	BP401T.1	Mid Term-1, Quiz & End Sem Exam
6	Elements of symmetry	Lecture	BP401T.1	Mid Term-1, Quiz & End Sem Exam
7	Chiral and achiral molecules,	Lecture	BP401T.1	Mid Term-1, Quiz & End Sem Exam
8	Tutorial class Elements of symmetry	Lecture	BP401T.1	Mid Term-1, Quiz, Class test & End Sem Exam
9	Resolution	Lecture	BP401T.1	Mid Term-1, Quiz & End Sem Exam
10	DL system of nomenclature of optical isomers	Lecture	BP401T.1	Mid Term-1, Quiz & End Sem Exam

11	Sequence rules	Lecture	BP401T.1	Mid Term-1, Quiz & End Sem Exam
12	*Tutorial class:* R and S	Lecture	BP401T.1	Mid Term-1, Assignment ,Quiz & End Sem Exam
13	Racemic modification	Lecture	BP401T.1	Mid Term-1, Quiz & End Sem Exam
14	Reactions	Lecture	BP401T.1	Mid Term-1, Quiz & End Sem Exam
15	Asymmetric synthesis	Lecture	BP401T.1	Mid Term-1, Quiz & End Sem Exam
16	*Tutorial class* Asymmetric synthesis	Lecture	BP401T.1	Mid Term-1, Class test, Quiz & End Sem Exam
17	Geometrical isomerism	Lecture	BP401T.2	Mid Term-1, Quiz & End Sem Exam
18	Cis-Trans	Lecture	BP401T.2	Mid Term-1, Quiz & End Sem Exam
19	EZ	Lecture	BP401T.2	Mid Term-1, Quiz & End Sem Exam
20	*Tutorial class* Geometrical isomerism	Lecture	BP401T.2	Mid Term-1, Assignment ,Quiz & End Sem Exam
21	Syn Anti systems	Lecture	BP401T.2	Mid Term-1, Quiz & End Sem Exam
22	Methods of determination of configuration of geometrical isomers	Lecture	BP401T.2	Mid Term-1, Quiz & End Sem Exam
23	Conformational isomerism	Lecture	BP401T.2	Mid Term-1, Quiz & End Sem Exam
24	*Tutorial class* Configuration of geometrical isomers	Lecture	BP401T.2	Mid Term-1, Quiz & End Sem Exam
25	Conditions for optical activity.	Lecture	BP401T.2	Mid Term-1, Quiz & End Sem Exam
26	Stereospecific and stereoselective reactions	Lecture	BP401T.2	Mid Term-1, Quiz & End

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				Sem Exam
27	Nomenclature of heterocyclic compounds	Lecture	BP401T.3	Mid Term-1, Quiz & End Sem Exam
28	*Tutorial class* Nomenclature	Lecture	BP401T.3	Mid Term-2, Seminar,Quiz & End Sem Exam
29	Classification of heterocyclic compounds	Lecture	BP401T.3	Mid Term-2, Quiz & End Sem Exam
30	Pyrrole	Lecture	BP401T.3 & BP401T.4	Mid Term-2, Quiz & End Sem Exam
31	Furan	Lecture	BP401T.3 & BP401T.4	Mid Term-2, Quiz & End Sem Exam
32	*Tutorial class* Pyrrole	Lecture	BP401T.3	Mid Term-2, Quiz & End Sem Exam
33	Thiophene.	Lecture	BP401T.3 & BP401T.4	Mid Term-2, Quiz & End Sem Exam
34	Relative aromaticity	Lecture	BP401T.3	Mid Term-2, Quiz & End Sem Exam
35	Reactivity	Lecture	BP401T.3	Mid Term-2, Quiz & End Sem Exam
36	*Tutorial class* Relative aromaticity	Lecture	BP401T.3	Mid Term-2, Assignment ,Quiz & End Sem Exam
37	Basicity of pyrrole	Lecture	BP401T.3	Mid Term-2, Quiz & End Sem Exam
38	Pyrazole	Lecture	BP401T.3	Mid Term-2, Quiz & End Sem Exam
39	Imidazole	Lecture	BP401T.3	Mid Term-2, Quiz & End Sem Exam
40	*Tutorial class* Pyrazole	Lecture	BP401T.3	Mid Term-2, Quiz & End Sem Exam
41	Oxazole	Lecture	BP401T.3 & BP401T.4	Mid Term-2, Quiz & End Sem Exam
42	Thiazole	Lecture	BP401T.3 & BP401T.4	Mid Term-2, Quiz & End

				Sem Exam
43	Pyridine	Lecture	BP401T.3 & BP401T.4	Mid Term-2, Quiz & End Sem Exam
44	*Tutorial class* Thiazole	Lecture	BP401T.3	Mid Term-2, Seminar, Quiz & End Sem Exam
45	Quinoline and Isoquinoline	Lecture	BP401T.3 & BP401T.4	Mid Term-2, Quiz & End Sem Exam
46	Acridine and Indole	Lecture	BP401T.3 & BP401T.4	Mid Term-2, Quiz & End Sem Exam
47	Basicity of pyridine	Lecture	BP401T.3 & BP401T.4	Mid Term-2, Quiz & End Sem Exam
48	*Tutorial class* Basicity of pyridine	Lecture	BP401T.3 & BP401T.4	Mid Term-2, Seminar, Quiz & End Sem Exam
49	Synthesis and medicinal uses of Pyrimidine, Purine, azepines	Lecture	BP401T.3 & BP401T.4	Mid Term-2, Quiz & End Sem Exam
50	Metal hydride reduction	Lecture	BP401T.5	Mid Term-2, Quiz & End Sem Exam
51	Clemmensen reduction	Lecture	BP401T.5	Mid Term-2, Quiz & End Sem Exam
52	*Tutorial class* Metal hydride reduction	Lecture	BP401T.5	Mid Term-2, Assignment ,Quiz & End Sem Exam
53	Birch reduction	Lecture	BP401T.5	Mid Term-2, Quiz & End Sem Exam
54	Wolff Kishner reduction	Lecture	BP401T.5	Mid Term-2, Quiz & End Sem Exam
55	Oppenauer-oxidation	Lecture	BP401T.5	Mid Term-2, Quiz & End Sem Exam
56	*Tutorial class* Wolff Kishner reduction	Lecture	BP401T.5	Mid Term-2, Quiz & End Sem Exam
57	Dakin reaction.	Lecture	BP401T.5	Mid Term-2, Quiz & End Sem Exam
58	Beckmanns rearrangement	Lecture	BP401T.5	Mid Term-2,

				Quiz & End Sem Exam
59	Schmidt rearrangement and Claisen-Schmidt condensation	Lecture	BP401T.5	Mid Term-2, Quiz & End Sem Exam
60	*Tutorial class* Claisen-Schmidt condensation	Lecture	BP401T.5	Mid Term-2, Seminar,Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP401T.1.	Students will be able to study optical isomerism of compounds that could help the students to understand the chirality, sequence rules, reacemic modification of organic compounds.	3	3	3	2					1		2
BP401T.2.	Students will be able to **acquire** knowledge about geometricsl isomerism of pharmaceutical organic compounds, with emphasis on their synthetic process, physical and chemical properties.	3	3	3	3					2		2
BP401T.3.	Students will be able to **write** synthesis, reactions and medicinal uses different heterocyclic compounds.	3	3	3	3					3		2

BP401T.4.	Students will be able to analyze various reactions for the synthesis of higher organic compounds.	3	3	3	2				2	2		2
BP401T.5.	Students will be able to **apply** reagents and various named reactions for the design of organic medicinal compounds.	3	3	3	3				2	2		3

Sample Question Paper

Amity Institute of pharmacy Department of Pharmaceutical Chemistry II MID-SEMESTER (SEM –IV) 2022-23						
Class: B.Pharmacy IV Semester						
Subject Name: BP401T PHARMACEUTICAL ORGANIC CHEMISTRY-III		Time: 1 Hr		Max. Marks: 30		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.4,5	Q.2,3,6,7,8,9		Q.1		

Student will be

CO.1. Students will be able to **study** optical isomerism of compounds that could help the students to understand the chirality, sequence rules, reacemic modification of organic compounds.

CO.2. Students will be able to **acquire** knowledge about geometricsl isomerism of pharmaceutical organic compounds, with emphasis on their synthetic process, physical and chemical properties.

CO.3. Students will be able to **write** synthesis, reactions and medicinal uses different heterocyclic compounds.

CO.4. Students will be able to **analyze** various reactions for the synthesis of higher organic compounds.

CO.5. Students will be able to **apply** reagents and various named reactions for the design of organic medicinal compounds.

CO Map	Question No.	Question	Marks
CO3	Q.1	Why pyridine is less aromatic than benzene	2
CO5	Q.2	Discuss the mechanism of clemensen reduction.	2
	Q.3	Explain the reaction and synthetic applications of schmidt condensation	2
CO3	Q.4	Draw any three structures of pyazole containing drugs	2
CO5	Q.5	Give a brief account on applications of LIAlH4	2

CO4	Q.6	Explain the relative reactivity of pyrrole, furan and thiphene	10
	Q.7	Discuss the reaction, mechanism and synthetic applications of beckmann rearrangement	10
CO3	Q 8	Describe aromaticity and chemical reactions of imidazole	5
CO4&CO4	Q.9	Explain the mechanism and synthetic applications of birch reduction	5
CO3&CO4	Q 10	Explain the chemical reactions and medicinal importance of thiophene	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

99.1 % Percentage of students secured more than 60% marks, so this course Pharmaceutical Organic Chemistry III– Theory (BP401T) attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-2021

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2].Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMMEARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
IVSEM	BP402T	3	-	2	-	1	3	2	1	1	-	2				
	-															
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AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICAL CHMISTRY
Course Handout
Course : **MEDICINAL CHEMISTRY – I THEORY**
Course Code : BP402T, Crédits: 04, Session : **2020-2021** (Even Sem.), Class : B.Pharm. 2ndYear
Faculty Name: **Dr. Srabanti Jana**

A. Introduction: The course is designed to impart fundamental knowledge on the preparatory
pharmacy with arts and science of preparing the different conventional dosage forms.

B. Course Outcomes: At the end of the course, students will be able to:

BP402T.1. Knowledge on Physicochemical properties of drugs in relation to biological action.

BP402T.2. Able to gain knowledge on Autonomic Nervous System like sympathomimetics, and sympahtholytics.

BP402T.3. To gain Knowledge on Cholinergic neurotransmitters like Parasympathomimetic and lytics.

BP402T.4. To gain Knowledge onDrugs acting on Central Nervous System like Benzodiazepines and Barbiturtes.

BP402T.5. To gain Knowledge onDrugs acting on Central Nervous System like General anesthetics, Narcotic and non-narcotic analgesics.

C. Programme Outcomes:

[PO.1].Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and

administrative pharmacy sciences; and manufacturing practices.

[PO.2].Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and

ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance isrequiredtobemaintainedbyastudentto be qualified for taking up the EndSemester examination. The allowanceof 20%includesalltypesofleaves includingmedicalleaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

UNIT – I

Introduction to Medicinal Chemistry

History and development of medicinal chemistry Physicochemical properties in relation to biological action Ionization, Solubility, Partition Coefficient, Hydrogen bonding, Protein binding, Chelation, Bioisosterism, Optical and Geometrical isomerism. Drug metabolism Drug metabolism principles- Phase I and Phase II. Factors affecting drug metabolism including stereo chemical aspects.

UNIT – II

Drugs acting on Autonomic Nervous System Adrenergic Neurotransmitters: Biosynthesis and catabolism of catecholamine. Adrenergic receptors (Alpha & Beta) and their

distribution. Sympathomimetic agents: SAR of Sympathomimetic agents Direct acting: Nor-epinephrine, Epinephrine, Phenylephrine*, Dopamine, Agents with mixed mechanism: Ephedrine, Metaraminol. Indirect acting agents: Hydroxyamphetamine, Pseudoephedrine, Propylhexedrine. Methyldopa, Clonidine, Dobutamine, Isoproterenol, Terbutaline, Salbutamol*, Bitolterol, Naphazoline, Oxymetazoline and Xylometazoline. Adrenergic Antagonists: Alpha adrenergic blockers: Tolazoline*, Phentolamine, Phenoxybenzamine, Prazosin, Dihydroergotamine, Methysergide. Beta adrenergic blockers: SAR of beta blockers, Propranolol*, Metibranolol, Atenolol,Betazolol, Bisoprolol, Esmolol, Metoprolol, Labetolol, Carvedilol.

UNIT – III

Cholinergic neurotransmitters: Biosynthesis and catabolism of acetylcholine. Cholinergic receptors (Muscarinic & Nicotinic) and their distribution. Parasympathomimetic agents: SAR of Parasympathomimetic agents Direct acting agents: Acetylcholine, Carbachol, Bethanechol, Methacholine, Pilocarpine. Indirect acting/ Cholinesterase inhibitors (Reversible & Irreversible): Physostigmine, Neostigmine*, Pyridostigmine, Edrophonium chloride, Tacrine hydrochloride, Ambenonium chloride, Isofluorphate, Echothiophate iodide, Parathione, Malathion. Cholinesterase reactivator: Pralidoxime chloride. Cholinergic Blocking agents: SAR of cholinolytic agents Solanaceous alkaloids and analogues: Atropine sulphate, Hyoscyamine sulphate, Scopolamine hydrobromide, Homatropine hydrobromide, Ipratropium bromide*. Synthetic cholinergic blocking agents: Tropicamide, Cyclopentolate hydrochloride, Clidinium bromide, Dicyclomine hydrochloride*, Glycopyrrolate, Methantheline bromide, Propantheline bromide, Benztropine mesylate, Orphenadrine citrate, Biperidine hydrochloride, Procyclidine hydrochloride*, Tridihexethyl chloride, Isopropamide iodide, Ethopropazine hydrochloride.

UNIT – IV

Drugs acting on Central Nervous System, A. Sedatives and Hypnotics: Benzodiazepines: SAR of Benzodiazepines, Chlordiazepoxide, Diazepam*, Oxazepam, Chlorazepate, Lorazepam, Alprazolam, Zolpidem Barbiturtes: SAR of barbiturates, Barbital*, Phenobarbital, Mephobarbital, Amobarbital, Butabarbital, Pentobarbital, Secobarbital Miscelleneous: Amides & imides: Glutethmide. Alcohol & their carbamate derivatives: Meprobomate, Ethchlorvynol. Aldehyde & their derivatives: Triclofos sodium, Paraldehyde. B. Antipsychotics Phenothiazeines: SAR of Phenothiazeines - Promazine hydrochloride, Chlorpromazine hydrochloride*, Triflupromazine, Thioridazine hydrochloride, Piperacetazine hydrochloride, Prochlorperazine maleate, Trifluoperazine hydrochloride.

UNIV – V

Drugs acting on Central Nervous System

General anesthetics: Inhalation anesthetics: Halothane*, Methoxyflurane, Enflurane, Sevoflurane, Isoflurane, Desflurane. Ultra short acting barbitutrates: Methohexital sodium*, Thiamylal sodium, Thiopental sodium. Dissociative anesthetics: Ketamine hydrochloride.* Narcotic and non-narcotic analgesics Morphine and related drugs: SAR of Morphine analogues, Morphine sulphate, Codeine, Meperidine hydrochloride, Anilerdine hydrochloride, Diphenoxylate hydrochloride, Loperamide hydrochloride, Fentanyl citrate*, Methadone hydrochloride*, Propoxyphene hydrochloride, Pentazocine, Levorphanol

tartarate. Narcotic antagonists: Nalorphine hydrochloride, Levallorphantartarate, Naloxone hydrochloride. Anti-inflammatory agents: Sodium salicylate, Aspirin, Mefenamic acid*, Meclofenamate, Indomethacin, Sulindac, Tolmetin, Zomepriac, Diclofenac, Ketorolac, Ibuprofen*, Naproxen, Piroxicam, Phenacetin, Acetaminophen, Antipyrine, Phenylbutazone.

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. Wilson and Giswold's Organic medicinal and Pharmaceutical Chemistry.
2. Foye's Principles of Medicinal Chemistry.
3. Burger's Medicinal Chemistry, Vol I to IV.
4. Introduction to principles of drug design- Smith and Williams.
5. Remington's Pharmaceutical Sciences.
6. Martindale's extra pharmacopoeia.

Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Introduction to Medicinal Chemistry History and development of medicinal chemistry	Lecture	1	Mid Term-1, Quiz & End Sem Exam
2	Physicochemical properties of drugs	Lecture	1	Mid Term-1, Quiz & End Sem Exam
3	Ionization, Solubility, Partition Coefficient, Hydrogen bonding,	Lecture	2	Mid Term-1, Quiz & End Sem Exam
4	Protein binding, Chelation, Bioisosterism, Optical and Geometrical isomerism	Tutorial	1	Mid Term-1, Quiz & End Sem Exam
5	Drug metabolism Drug metabolism principles-	Lecture	2	Mid Term-1, Quiz & End Sem Exam
6	Phase I and Phase II.	Lecture	2	Mid Term-1, Quiz & End Sem Exam
7	Factors affecting drug metabolism including stereo chemical aspects	Lecture	1	Mid Term-1, Quiz & End Sem Exam
8	Unit test	Tutorial		Mid Term-1, Quiz & End Sem Exam

9	Drugs acting on Autonomic Nervous System Adrenergic Neurotransmitters:**UNIT II**	Lecture	1	Mid Term-1, Quiz & End Sem Exam
10	Biosynthesis and catabolism of catecholamine. Adrenergic receptors (Alpha & Beta) and their distribution.	Lecture	1	Mid Term-1, Quiz & End Sem Exam
11	**Sympathomimetic agents:** SAR of Sympathomimetic agents Direct acting:	Lecture	1	Mid Term-1, Quiz & End Sem Exam
12	Nor-epinephrine, Epinephrine, Phenylephrine*, Dopamine	Lecture	1	Mid Term-1, Quiz & End Sem Exam
13	**Indirect acting agents:**Hydroxyamphetamine, Pseudoephedrine, Propylhexedrine.	Lecture	1	Mid Term-1, Quiz & End Sem Exam
14	Methyldopa, Clonidine, Dobutamine, Isoproterenol, Terbutaline, Salbutamol, Bitolterol, Naphazoline, Oxymetazoline and Xylometazoline.	Lecture	2	Mid Term-1, Quiz & End Sem Exam
15	**Alpha adrenergic blockers:** Tolazoline*, Phentolamine, Phenoxybenzamine, Prazosin, Dihydroergotamine, Methysergide. Beta adrenergic blockers: SAR of beta blockers, Propranolol*, Metibranolol, Atenolol, Betazolol, Bisoprolol, Esmolol, Metoprolol, Labetolol, Carvedilol	Lecture	3	Mid Term-1, Quiz & End Sem Exam
16	Unit test	Tutorial		Mid Term-1, Quiz & End Sem Exam
17	**Cholinergic neurotransmitters:UNIT III** iosynthesis and catabolism of acetylcholine. Cholinergic receptors (Muscarinic & Nicotinic) and their	Lecture	1	Mid Term-1, Quiz & End Sem Exam
18	**Parasympathomimetic agents:** SAR of Parasympathomimetic agents Direct acting agents: Acetylcholine, Carbachol*, Bethanechol, Methacholine, Pilocarpine	Lecture	1	Mid Term-1, Quiz & End Sem Exam
19	**Indirect acting/ Cholinesterase**	Lecture	1	Mid Term-1, Quiz

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	inhibitors (Reversible & Irreversible): Physostigmine, Neostigmine*, Pyridostigmine, Edrophonium chloride, Tacrine hydrochloride			& End Sem Exam
20	**Cholinesterase reactivator:** Pralidoxime chloride. Cholinergic Blocking agents: SAR of cholinolytic agents Solanaceous alkaloids and analogues: Atropine sulphate, Hyoscyamine sulphate, Scopolamine hydrobromide, Homatropine hydrobromide, Ipratropium bromide*.	Tutorial	2	Mid Term-2, Quiz & End Sem Exam
21	Synthetic cholinergic blocking agents: Tropicamide, Cyclopentolate hydrochloride, Clidinium bromide, Dicyclomine hydrochloride*	Lecture	2	Mid Term-2, Quiz & End Sem Exam
22	Glycopyrrolate, Methantheline bromide, Propantheline bromide, Benztropine mesylate, Orphenadrine citrate	Lecture	1	Mid Term-2, Quiz & End Sem Exam
23	Biperidine hydrochloride, Procyclidine hydrochloride*, Tridihexethyl chloride, Isopropamide iodide, Ethopropazine hydrochloride.	Lecture	2	Mid Term-2, Quiz & End Sem Exam
24	Quiz	Tutorial		Mid Term-2, Quiz & End Sem Exam
25	Drugs acting on Central (**UNIT-4**) Nervous System A. Sedatives and Hypnotics: Benzodiazepines: SAR of Benzodiazepines, Chlordiazepoxide, Diazepam*, Oxazepam, Chlorazepate, Lorazepam, Alprazolam, Zolpidem	Lecture	1	Mid Term-2, Quiz & End Sem Exam
26	Barbiturtes: SAR of barbiturates, Barbital*, Phenobarbital, Mephobarbital, Amobarbital, Butabarbital, Pentobarbital, Secobarbital	Lecture	1	Mid Term-2, Quiz & End Sem Exam
27	Miscelleneous: Amides & imides: Glutethmide. Alcohol	Lecture	1	Mid Term-2, Quiz & End Sem Exam

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	& their carbamate derivatives: Meprobomate, Ethchlorvynol. Aldehyde & their derivatives: Triclofos sodium, Paraldehyde.			
28	B. Antipsychotics Phenothiazeines: SAR of Phenothiazeines - Promazine hydrochloride, Chlorpromazine hydrochloride*, Trifluprомazine, Thioridazine hydrochloride, Piperacetazine hydrochloride, Prochlorperazine maleate, Trifluoperazine hydrochloride.	Lecture	2	Mid Term-2, Quiz & End Sem Exam
29	C. Anticonvulsants: SAR of Anticonvulsants, mechanism of anticonvulsant action Barbiturates: Phenobarbitone, Methabarbital. Hydantoins: Phenytoin*, Mephenytoin, Ethotoin Oxazolidine diones: Trimethadione, Paramethadione	Lecture	1	Mid Term-2, Quiz & End Sem Exam
30	Succinimides:Phensuximide, Methsuximide, Ethosuximide* Urea and monoacylureas:	Lecture	2	Mid Term-2, Quiz & End Sem Exam
31	Phenacemide, Carbamazepine* Benzodiazepines:Clonazepam Miscellaneous:Primidone, Valproic acid , Gabapentin, Felbamate	Lecture	1	Mid Term-2, Quiz & End Sem Exam
32	**Drugs acting on Central Nervous System: UNIT V** General anesthetics:Inhalation anesthetics: Halothane*, Methoxyflurane, Enflurane, Sevoflurane, Isoflurane, Desflurane.	Lecture	1	Mid Term-2, Quiz & End Sem Exam
33	Ultra short acting barbitutrates:Methohexital sodium*, Thiamylal sodium, Thiopental sodium. Dissociative anesthetics: Ketamine hydrochloride.*	Lecture	1	Mid Term-2, Quiz & End Sem Exam

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34	Narcotic and non-narcotic analgesics Morphine and related drugs: SAR of Morphine analogues, Morphine sulphate, Codeine, Meperidine hydrochloride,	Lecture	1	Mid Term-2, Quiz & End Sem Exam
35	Anilerdine hydrochloride, Diphenoxylate hydrochloride, Loperamide hydrochloride, Fentanyl citrate*, Methadone hydrochloride*, Propoxyphene hydrochloride, Pentazocine, Levorphanol tartarate.	Lecture	2	Mid Term-2, Quiz & End Sem Exam
36	Seminar	Tutorial		Mid Term-2, Quiz & End Sem Exam
37	Narcotic antagonists: Nalorphine hydrochloride, Levallorphantartarate, Naloxone hydrochloride.	Lecture	1	Mid Term-2, Quiz & End Sem Exam
38	Anti-inflammatory agents: Sodium salicylate, Aspirin, Mefenamic acid*, Meclofenamate,	Lecture	1	Mid Term-2, Quiz & End Sem Exam
39	Indomethacin, Sulindac, Tolmetin, Zomepriac, Diclofenac, Ketorolac, Ibuprofen*, Naproxen,	Lecture	1	Mid Term-2, Quiz & End Sem Exam
40	Unit test	Tutorial		Mid Term-2, Quiz & End Sem Exam
41	Piroxicam, Phenacetin, Acetaminophen, Antipyrine, Phenylbutazone	Lecture	1	Mid Term-2, Quiz & End Sem Exam
42	Quiz	Tutorial		Quiz & End Sem Exam
43	Unit test	Tutorial		Quiz & End Sem Exam

TOTAL CLASSES REQUIRED: 48
TOTAL CLASSES GIVEN: 45

H. Course Articulation Matrix (Mapping of COs with POs)

Dr. Mohanty

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP*402*T.1	**BP402T.1**. Relate history and study of physicchemical properties in relation to biological action	1	2	-	-	2	3	1	-	1	-	-				
BP*402*T.2.	**BP402T.2**. Classify the different types of Drugs acting on Autonomic Nervous System MOAS, SAR studies	2	-	-	3	-	2	-	-	-	-	3				
BP402T.3.	**BP402T.3**. Classify the different types of Drugs acting on Cholinergic neurotransmitters, MOAS, SAR studies	2	3	-	2	-	3	-	-	-	-	3				
BP402T.4.	**BP402T.4**. Drugs acting on Central Nervous System, Benzodiazepines, Barbiturates, Antipsychotics, SAR, MOAs.	2	3	3	3	-	2	-	-	-	-	3				
BP402T.5.	**BP402T.5**.Drugs acting on Central Nervous System General anesthetics, Narcotic and non-narcotic analgesics, SAR, MOAs.	2	-	2	-	3	-	-	-	-	-	3				

SampleQuestionPaper

Dr. Mohanty

Amity Institute of Pharmacy
Department of Pharmaceutical Chemistry
IMID-SEMESTER(SEM–IV)2020-21

Class:B.Pharm, IV Semester

Subject Name: BP402T-MEDICINAL CHEMISTRY-I Theory	Time:1Hrs	Max.Marks:30

Levels of thequestions as perBloomsTaxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
QuestionMapping	Q.1,3,4,5	Q.6,8,9	Q.2	Q.7, 10		

The student willbeableto

CO1. Relate history and development of molecules based on study of different physicochemical properties of drugs.

CO2. Classify the different types of Drugs acting on Autonomic Nervous System MOAS, SAR studies.

CO3. Classify the different types of Drugs acting on Cholinergic neurotransmitters, MOAS, SAR studies.

CO4. Able to study of Drugs acting on Central Nervous System, Benzodiazepines, Barbiturates, Antipsychotics, SAR, MOAs.

CO5. Drugs acting on Central Nervous System General anesthetics, Narcotic and non-narcotic analgesics, SAR, MOAs.

COMap	QuestionNo.	Question	Marks
CO4	Q.1	Enlist the different different physicochemical properties of drugs and its activity.	2
CO5	Q.2	Classify the Drugs acting on Autonomic Nervous SystemMOAS, SAR studies.	2
CO1	Q.3	What is the mode of action of narcotic analgesics?	2
CO2	Q.4	Classify structurally the barbiturates and discuss the SAR.	2
CO2	Q.5	Classify structurally the General anesthetics.	2
CO1	Q.6	Classify structurally the Antipsychotics and discuss its SAR.	10
CO4	Q.7	Write the synthesis of Dicyclomine hydrochloride.	10
CO3	Q.8	Discuss the SAR of Narcotic analgesiscs..	5

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CO2	Q.9	Illustrate the classification of Benzodiazepines and SAR.	5
CO4	Q.10	Classify the Anti-inflammatory agents.	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

81.5% Percentage of students secured more than 60% marks, so this course Medicinal Chemistry I – Theory (BP402T) attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
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PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2022-23

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge asscoited with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions

[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
VI SEM	BP403T	3	3	3	3	1	2	2	1	3	1	1	-	-	-

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACY
Course Handout
Course : Physcial Pharmacy (Theory)
Course Code : BP403T, Crédits : 04, Session : 2021-22 (Even Sem.), Class : B. Pharm. 6th Year
Faculty Name : Dr. Neeraj Mishra

A. **Introduction:** This course is designed to impart fundamental knowledge on pharmaceutical product development and translation from laboratory to market. Upon completion of the course, the student shall be able to:

1. Know the process of pilot plant and scale up of pharmaceutical dosage forms
2. Understand the process of technology transfer from lab scale to commercial batch
3. Know different Laws and Acts that regulate pharmaceutical industry
4. Understand the approval process and regulatory requirements for drug products

B. **Course Outcomes:** At the end of the course, students will be able to:

BP605T.1. Understand various physicochemical properties of drug molecules in the designing the dosage forms

BP605T.2. Know the principles of chemical kinetics & to use them for stability testing

BP605T.3. Discuss the use of chemical kinetics in determination of expiry date of formulations

BP605T.4. Demonstrate use of physicochemical properties in the formulation development

BP605T.5. Understand the evaluation parameters of dosage form

C. **Programme Outcomes:**

[PO.1].**Pharmacy Knowledge:** Posses knowledge and compression of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	10%
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves Including medical leaves.	A	5%
End Semester Examination	End Semester Examination	EE	70%
Total			**100%**

E. Syllabus

Module I

a) Brief introduction to Biotechnology with reference to Pharmaceutical Sciences. b) Enzyme Biotechnology- Methods of enzyme immobilization and applications. c) Biosensors- Working and applications of biosensors in Pharmaceutical Industries. d) Brief introduction to Protein Engineering. e) Use of microbes in industry. Production of Enzymes- General consideration - Amylase, Catalase, Peroxidase, Lipase, Protease, Penicillinase. f) Basic principles of genetic engineering.

Module II

a) Study of cloning vectors, restriction endonucleases and DNA ligase. b) Recombinant DNA technology. Application of genetic engineering in medicine. c) Application of r DNA technology and genetic engineering in the production of: i) Interferon ii) Vaccines-hepatitis- B iii) Hormones-Insulin. d) Brief introduction to PCR

Module III

Types of immunity- humoral immunity, cellular immunity a) Structure of Immunoglobulins b) Structure and Function of MHC c) Hypersensitivity reactions, Immune stimulation and Immune suppressions. d) General method of the preparation of bacterial vaccines, toxoids, viral vaccine, antitoxins, serum-immune blood derivatives and other products relative to immunity. e) Storage conditions and stability of official vaccines f) Hybridoma technology- Production, Purification and Applications g) Blood products and Plasma Substituties.

Module IV

a) Immuno blotting techniques- ELISA, Western blotting, Southern blotting. b) Genetic organization of Eukaryotes and Prokaryotes c) Microbial genetics including transformation, transduction, conjugation, plasmids and transposons. d) Introduction to Microbial biotransformation and applications. e) Mutation: Types of mutation/mutants

Module V

a) Fermentation methods and general requirements, study of media, equipment's, sterilization methods, aeration process, stirring.

b) Large scale production fermenter design and its various controls.

c) Study of the production of - penicillin's, citric acid, Vitamin B12, Glutamic acid, Griseofulvin,

d) Blood Products: Collection, Processing and Storage of whole human blood, dried human plasma, plasma Substitutes.

Examination Scheme:

Components	**A**	**CT**	**S/V/Q/HA**	**EE**
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; A: Attendance

F. Suggested Text/Reference Books:

1. B.R. Glick and J.J. Pasternak: Molecular Biotechnology: Principles and Applications of RecombinantDNA: ASM Press Washington D.C.

2. RA Goldshy et. al., : Kuby Immunology.

3. J.W. Goding: Monoclonal Antibodies.

4. J.M. Walker and E.B. Gingold: Molecular Biology and Biotechnology by Royal7 Society of Chemistry.

5. Zaborsky: Immobilized Enzymes, CRC Press, Degraland, Ohio.

6. S.B. Primrose: Molecular Biotechnology (Second Edition) Blackwell Scientific Publication.

7. Stanbury F., P., Whitakar A., and Hall J., S., Principles of fermentation technology, 2nd edition, Aditya books Ltd., New Delhi

G. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Classification of dispersed systems	Lecture	BP403T.1	Mid Term-1, Quiz & End Sem Exam
2	General characteristics, size & shapes of colloidal particles	Lecture	BP403T.1	Mid Term-1, Quiz & End Sem Exam
3	Classification of colloids & comparative account of their general properties	Lecture	BP403T.1	Mid Term-1, Quiz & End Sem Exam
4	Optical and kinetic properties of colloids	Lecture	BP403T.1	Mid Term-1, Quiz & End Sem Exam
5	Electrical, kinetic properties of colloids	Lecture	BP403T.1	Mid Term-1, Quiz & End Sem Exam
6	Effect of electrolytes, coacervation,	Lecture	BP403T.1	Mid Term-1, Quiz & End Sem Exam
7	Peptization of colloids	Lecture	BP403T.1	Mid Term-1, Quiz & End Sem Exam
8	Protective action	Lecture	BP403T.1	Mid Term-1,

	of colloids			Quiz & End Sem Exam
9	Newtonian systems and law of flow	Lecture	BP403T.2	Mid Term-1, Quiz & End Sem Exam
10	kinematic viscosity, effect of temperature,	Lecture	BP403T.2	Mid Term-1, Quiz & End Sem Exam
11	non-Newtonian systems, Dilatant	Lecture	BP403T.2	Mid Term-1, Quiz & End Sem Exam
12	Plastic and Pseudoplastic	Lecture	BP403T.2	
13	Thixotropy and its importance in pharmacy	Lecture	BP403T.2	Mid Term-1, Quiz & End Sem Exam
14	Thixotropy determination in pharmacy	Lecture	BP403T.2	Mid Term-1, Quiz & End Sem Exam
15	Determination of viscosity by capillary viscometer	Lecture	BP403T.2	Mid Term-1, Quiz & End Sem Exam
16	Determination of viscosity by falling Sphere, rotational viscometers	Lecture	BP403T.2	Mid Term-1, Quiz & End Sem Exam
17	Plastic and elastic deformation	Lecture	BP403T.2	Mid Term-1, Quiz & End Sem Exam
18	Heckel equation	Lecture	BP403T.2	Mid Term-1, Quiz & End Sem Exam
19	Stress, Strain and Elastic Modulus	Lecture	BP403T.2	Mid Term-1, Quiz & End Sem Exam
20	Suspension	Lecture	BP403T.3	Mid Term-2, Quiz & End Sem Exam
21	Interfacial properties of suspended particles	Lecture	BP403T.3	Mid Term-2, Quiz & End Sem Exam
22	Settling in	Lecture	BP403T.3	Mid Term-2,

	suspensions			Quiz & End Sem Exam
23	Flocculated and deflocculated suspensions.	Lecture	BP403T.3	Mid Term-2, Quiz & End Sem Exam
24	Formulation of suspensions	Lecture	BP403T.3	Mid Term-2, Quiz & End Sem Exam
25	Emulsions	Lecture	BP403T.3	Mid Term-2, Quiz & End Sem Exam
26	Theories of emulsification	Lecture	BP403T.3	Mid Term-2, Quiz & End Sem Exam
27	Microemulsion and multiple emulsions,	Lecture	BP403T.3	Mid Term-2, Quiz & End Sem Exam
28	Stability of emulsions	Lecture	BP403T.3	Mid Term-2, Quiz & End Sem Exam
29	Preservation of emulsions	Lecture	BP403T.3	Mid Term-2, Quiz & End Sem Exam
30	Rheological properties of emulsions	Lecture	BP403T.3	Mid Term-2, Quiz & End Sem Exam
31	emulsion formulation by HLB method.	Lecture	BP403T.3	Mid Term-2, Quiz & End Sem Exam
32	Particle size and distribution, mean particle size	Lecture	BP403T.3	Mid Term-2, Quiz & End Sem Exam
33	Number and weight distribution, particle number	Lecture	BP403T.4	Mid Term-2, Quiz & End Sem Exam
35	Methods for determining particle size by different methods, counting and separation method, particle shape, specific	Lecture	BP403T.4	Mid Term-2, Quiz & End Sem Exam

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	surface			
36	Methods for determining surface area	Lecture	BP403T.4	Mid Term-2, Quiz & End Sem Exam
37	Methods for determining permeability and absorption	Lecture	BP403T.4	Mid Term-2, Quiz & End Sem Exam
38	Porosity, packing arrangement	Lecture	BP403T.4	Mid Term-2, Quiz & End Sem Exam
39	Densities, bulkiness, and Flow properties	Lecture	BP403T.4	Mid Term-2, Quiz & End Sem Exam
40	Drug Stability and Reaction kinetics: zero, pseudo-zero	Lecture	BP403T.5	Mid Term-2, Quiz & End Sem Exam
41	First & second order, units of basic rate constants	Lecture	BP403T.5	Mid Term-2, Quiz & End Sem Exam
42	Determination of reaction order	Lecture	BP403T.5	Mid Term-2, Quiz & End Sem Exam
43	Physical and chemical factors influencing the chemical degradation of pharmaceutical product: temperature, solvent, ionic strength, dielectric constant	Lecture	BP403T.5	Mid Term-2, Quiz & End Sem Exam
44	specific & general acid base catalysis, Simple numerical problems.	Lecture	BP403T.5	Mid Term-2, Quiz & End Sem Exam
45	Stabilization of medicinal agents against common reactions like	Lecture	BP403T.5	Mid Term-2, Quiz & End Sem Exam

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	hydrolysis & oxidation			
46	Accelerated stability testing in expiration dating of pharmaceutical dosage forms. Photolytic degradation and its prevention	Lecture	BP403T.5	Mid Term-2, Quiz & End Sem Exam

H. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP403T.1	*Understand various physicochemical properties of drug molecules in the designing the dosage forms*	3	3	3	1	-	1	2	1	-	-	1
BP403T.2	Know the principles of chemical kinetics & to use them for stability testing	2	2	2	3	-	1	1	1	-	-	1
BP403T.3	*Discuss the use of chemical kinetics in determination of expiry date of formulations*	2	1	1	-	-	1	3	2	-	-	-
BP403T.4	*Demonstrate use of physicochemical properties in the formulation development*	2	2	2	1	-	1	-	-	-	-	-
BP403T.5	Understand the evaluation parameters of dosage form	2	1	-	-	-	2	1	1	-	-	1

Amity Institute of Pharmacy
Department of Pharmaceutics
I MID-SEMESTER (SEM –VIII) 2022-23

Class: B.Pharm, IV Semester

Subject Name: BP704T.Novel Drug Delivery System (Theory)	Time: 1 Hr	Max. Marks: 30

Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3,4	Q. 5, 6,8,9	Q.2	Q.7, 10		

The student will be able to

CO1. ***Understand various physicochemical properties of drug molecules in the designing the dosage forms***

CO2. Know the principles of chemical kinetics & to use them for stability testing

CO3. ***Discuss the use of chemical kinetics in determination of expiry date of formulations***

CO.4. ***Demonstrate use of physicochemical properties in the formulation development***

CO.5. Understand the evaluation parameters of dosage form

CO Map	Question No.	Question	Marks
CO3	Q.1	Discuss types of emulsifying agent.	2
CO5	Q.2	Explain the ICH guidelines of stability testing.	2
CO4	Q.3	Define methods of determining surface area of powder.	2
CO5	Q.4	What is first order rate of reaction and give formula of the same.	2
CO4	Q.5	Explain the methods of determining angle of repose.	2
CO1 & 2	Q.6	Define optical properties of colloids and explain shear thickening systems with suitable example.	10
CO5	Q.7	Discuss the importance of stability testing and zero, pseudo-zero, first & second order of reaction.	10
CO2	Q.8	Define the term Stress, Strain, Elastic Modulus.	5
CO3	Q.9	Define the methods of preparation of flocculated suspensions.	5
CO1	Q.10	Discuss the importance of thixotropy in pharmacy.	5

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Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

92.6 % Percentage of students secured more than 60% marks, so this course Physical Pharmaceutics II- Theory (BP403T) attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOLOGY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-21

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Programme Specific Outcomes:

PSO 1: This subject is designed to understand what drugs do to the living organisms and how their effects can be applied to therapeutics.

PSO 2: The subject covers the information about the drugs like, mechanism of action, physiological and biochemical effects (pharmacodynamics)

PSO 3: This subject also cover the information about absorption, distribution, metabolism and excretion (pharmacokinetics) along with the adverse effects, clinical uses, interactions, doses, contraindications and routes of administration of different classes of drugs.

PSO 4: The subject provides the basic knowledge required to understand the various disciplines of pharmacy

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
IV SEM	BP404T	-	3	2	1	-	1	3	2	1	3	2	2			
	-															
	-															
	-															
	-															
	-															
	-															
	-															

AMITY UNIVERSITY
MADHYA PRADESH
Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACOLOGY
Course Handout
Course : PHARMACOLOGY – I THEORY
Course Code : BP404T, Crédits : 04, Session :2020-21 (Even Sem.), Class : B.Pharm. 2nd Year
Faculty Name: Dr. Shvetank Bhatt

A. Introduction: This course is designed to impart fundamental knowledge on the structure and functions of the various systems of the human body. It also helps in understanding both homeostatic mechanisms. The subject provides the basic knowledge required to understand the various disciplines of pharmacy.

B. Course Outcomes: At the end of the course, students will be able to:

BP404T.CO1. a. Introduction to Pharmacology.
BP404T.CO2. Pharmacodynamics- Principles and mechanisms of drug action.
BP404T.CO3. Pharmacology of drugs acting on peripheral nervous system
BP404T.CO4. *Pharmacology of drugs acting on central nervous system*
BP404T.CO5. Pharmacology of drugs acting on central nervous system

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyse and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behaviour that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Programme Specific Outcomes:

PSO 1: Will be able to understand anatomy and physiology of human body system and how the human body maintain internal environment so that different organs perform work properly.

PSO 2: Will be able to give the information about how the cell communicate and maintain their functions and various disorders of different human organs so that we

can give the appropriate therapy.

PSO 3: Will be able to understand organization at the different level of human body.

Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

Unit I

Introduction to Pharmacology- Definition, historical landmarks and scope of pharmacology, nature and source of drugs, essential drugs concept and routes of drug administration, Agonists, antagonists(competitive and non competitive), spare receptors, addiction, tolerance, dependence, tachyphylaxis, idiosyncrasy, allergy. b. Pharmacokinetics- Membrane transport, absorption, distribution, metabolism and excretion of drugs .Enzyme induction, enzyme inhibition, kinetics of elimination.

Unit II

Pharmacodynamics- Principles and mechanisms of drug action. Receptor theories and classification of receptors, regulation of receptors. drug receptors interactions signal transduction mechanisms, G-protein–coupled receptors, ion channel receptor, transmembrane enzyme linked receptors, transmembrane JAK-STAT binding receptor and receptors that regulate transcription factors, dose response relationship, therapeutic index, combined effects of drugs and factors modifying drug action. b. Adverse drug reactions. c. Drug interactions (pharmacokinetic and pharmacodynamic) d. Drug discovery and clinical evaluation of new drugs -Drug discovery phase, preclinical evaluation phase, clinical trial phase, phases of clinical trials and pharmacovigilance.

Unit III

Pharmacology of drugs acting on peripheral nervous system a. Organization and function of ANS. b.Neurohumoral transmission,co-transmission and classification of neurotransmitters. c. Parasympathomimetics, Parasympatholytics, Sympathomimetics, sympatholytics. d. Neuromuscular blocking agents and skeletal muscle relaxants (peripheral). e. Local anesthetic agents. f. Drugs used in myasthenia gravis and glaucoma

Unit IV

Pharmacology of drugs acting on central nervous system a. Neurohumoral transmission in the C.N.S.special emphasis on importance of various neurotransmitters like with GABA, Glutamate, Glycine, serotonin, dopamine. b. General anesthetics and pre-anesthetics. c. Sedatives, hypnotics and centrally acting muscle relaxants. d. Anti-epileptics e. Alcohols and disulfiram

Unit V

Pharmacology of drugs acting on central nervous system a. Psychopharmacological agents: Antipsychotics, antidepressants, anti-anxiety agents, anti-manics and hallucinogens. b. Drugs used in Parkinsons disease and Alzheimer's disease. c. CNS stimulants and nootropics. d. Opioid analgesics and antagonists e. Drug addiction, drug abuse, tolerance and dependence.

F. Examination Scheme:

Dr. Mohanty

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1.Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology,.Churchil Livingstone Elsevier

2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill

3. Goodman and Gilman's, The Pharmacological Basis of Therapeutics

4. Marry Anne K. K., Lloyd Yee Y., Brian K. A., Robbin L.C., Joseph G. B., Wayne A. K., Bradley R.W., Applied Therapeutics, The Clinical use of Drugs, The Point Lippincott Williams & Wilkins

5. Mycek M.J, Gelnet S.B and Perper M.M. Lippincott's Illustrated Reviews-Pharmacology

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Introduction to Pharmacology- Definition, historical landmarks and scope of pharmacology,	Lecture	Unit-1 CO1	Mid Term-1, Quiz & End Sem Exam
2	Nature and source of drugs, essential drugs concept and routes of drug administration,	Lecture	CO1	Mid Term-1, Quiz & End Sem Exam
3	Agonists, antagonists(competitive and non competitive),	Lecture	CO1	Mid Term-1, Quiz & End Sem Exam
4	spare receptors, addiction, tolerance, dependence, tachyphylaxis, idiosyncrasy, allergy.	Tutorial	CO1	Mid Term-1, Quiz & End Sem Exam
5	Pharmacokinetics- Membrane transport, absorption, distribution, metabolism and excretion of drugs .	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
6	Pharmacokinetics- Membrane transport, absorption, distribution, metabolism and excretion of drugs	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
7	Enzyme induction, enzyme inhibition, kinetics of elimination	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
8	Quiz	Tutorial		Mid Term-1, Quiz & End Sem Exam
9	Pharmacodynamics- Principles and mechanisms of drug action.	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
10	Receptor theories and classification of receptors, regulation of receptors. drug receptors interactions signal transduction mechanisms	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
11	Receptor theories and classification of receptors, regulation of receptors.	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
12	Revision	Tutorial		Mid Term-1, Quiz & End Sem Exam
13	transmembrane enzyme linked receptors, transmembrane JAK-STAT	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam

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	binding receptor and receptors that regulate transcription factors, dose response relationship			
14	therapeutic index, combined effects of drugs and factors modifying drug action.	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
15	therapeutic index, combined effects of drugs and factors modifying drug action.	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
16	Unit test	Tutorial		Mid Term-1, Quiz & End Sem Exam
17	Adverse drug reactions. c. Drug interactions (pharmacokinetic and pharmacodynamic)	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
18	Adverse drug reactions. c. Drug interactions (pharmacokinetic and pharmacodynamic)	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
19	Drug discovery and clinical evaluation of new drugs -Drug discovery phase,	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
20	preclinical evaluation phase, clinical trial phase, phases of clinical trials and pharmacovigilance.	Tutorial	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
21	Organization and function of ANS. b.Neurohumoral transmission,co-transmission and classification of neurotransmitters.	Lecture	Unit-2 CO3	Mid Term-1, Quiz & End Sem Exam
22	Organization and function of ANS. b.Neurohumoral transmission,co-transmission and classification of neurotransmitters.	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
23	. Parasympathomimetics, Parasympatholytics,	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam

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	Sympathomimetics, sympatholytics. d. Neuromuscular blocking agents and skeletal muscle relaxants (peripheral).			
24	Quiz	Tutorial		Mid Term-1, Quiz & End Sem Exam
25	. Parasympathomimetics, Parasympatholytics, Sympathomimetics, sympatholytics. d.	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
26	Neuromuscular blocking agents and skeletal muscle relaxants (peripheral).	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
27	Neuromuscular blocking agents and skeletal muscle relaxants (peripheral).	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
28	Local anesthetic agents. f. Drugs used in myasthenia gravis and glaucoma	Tutorial		Mid Term-1, Quiz & End Sem Exam
29	Local anesthetic agents. f. Drugs used in myasthenia gravis and glaucoma	Lecture	CO1	Mid Term-1, Quiz & End Sem Exam
30	Local anesthetic agents. f. Drugs used in myasthenia gravis and glaucoma	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
31	Local anesthetic agents. f. Drugs used in myasthenia gravis and glaucoma	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
32	Neurohumoral transmission in the C.N.S.special emphasis on importance of various neurotransmitters like with GABA, Glutamate, Glycine, serotonin, dopamine	Tutorial	Unit-3 CO4	Mid Term-2, Quiz & End Sem Exam
33	Neurohumoral transmission in the C.N.S.special emphasis on importance of various neurotransmitters like with GABA, Glutamate, Glycine, serotonin, dopamine	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
34	Neurohumoral transmission in the C.N.S.special emphasis on	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam

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	importance of various neurotransmitters like with GABA, Glutamate, Glycine, serotonin, dopamine			
35	General anesthetics and pre-anesthetics. c. Sedatives, hypnotics and centrally acting muscle relaxants.	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
36	Seminar	Tutorial		Mid Term-2, Quiz & End Sem Exam
37	General anesthetics and pre-anesthetics. c. Sedatives, hypnotics and centrally acting muscle relaxants.	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
38	General anesthetics and pre-anesthetics. c. Sedatives, hypnotics and centrally acting muscle relaxants.	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
39	Anti-epileptics e. Alcohols and disulfiram	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
40	Unit test	Tutorial		Mid Term-2, Quiz & End Sem Exam
41	Anti-epileptics e. Alcohols and disulfiram	Lecture	Unit-4	Mid Term-2, Quiz & End Sem Exam
42	Psychopharmacological agents: Antipsychotics, antidepressants,	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
43	Psychopharmacological agents: Antipsychotics, antidepressants,	Lecture	CO1	Mid Term-2, Quiz & End Sem Exam
44	Seminar	Tutorial		Mid Term-2, Quiz & End Sem Exam
45	anti-anxiety agents, anti-manics and hallucinogens.	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
46	anti-anxiety agents, anti-manics and hallucinogens.	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
47	anti-anxiety agents, anti-manics and hallucinogens.	Lecture	CO1	Quiz & End Sem Exam
48	anti-anxiety agents, anti-manics and hallucinogens.	Tutorial		Quiz & End Sem Exam
49	Drugs used in Parkinsons disease and Alzheimer's	Lecture	Unit-5	Quiz & End Sem Exam

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	disease.			
50	Drugs used in Parkinsons disease and Alzheimer's disease.	Lecture	CO1 CO5	Quiz & End Sem Exam
51	*Drugs used in Parkinsons disease and Alzheimer's disease.*	Lecture	CO1 CO5	Quiz & End Sem Exam
52	*Drugs used in Parkinsons disease and Alzheimer's disease.*	Tutorial	CO1 CO5	Quiz & End Sem Exam
53	*CNS stimulants and nootropics.*	Lecture	CO1 CO5	Quiz & End Sem Exam
54	CNS stimulants and nootropics.	Lecture	CO1 CO5	Quiz & End Sem Exam
55	Opioid analgesics and antagonists	Lecture	CO1 CO5	Quiz & End Sem Exam
56	Unit test	Tutorial		Quiz & End Sem Exam
57	Opioid analgesics and antagonists	Lecture	CO1 CO5	Quiz & End Sem Exam
58	Drug addiction, drug abuse, tolerance and dependence	Lecture	CO1 CO5	Quiz & End Sem Exam
59	Drug addiction, drug abuse, tolerance and dependence	Lecture	CO1 CO5	Quiz & End Sem Exam
60	Unit test	Tutorial		Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP404T.1	Understand the pharmacological actions of different	3	-	-	-	2	2	1	-	-	-	-		3	2	1

	categories of drugs															
BP404T.2.	Explain the mechanism of drug action at organ system/sub cellular/ macromolecular levels.	3	-	-	1	-	2	-	-	-	-	3		2	3	1
BP404T.3.	Apply the basic pharmacological knowledge in the prevention and treatment of various diseases.	3	2	-	3	-	2	-	-	-	-	3		1	2	3
BP404T.4.	Observe the effect of drugs on animals by simulated experiments	2	2	3	3	-	1	-	-	-	-	3		2	3	2
BP404T.5.	Appreciate correlation of pharmacology with other bio medical science	3	-	2	-	2	-	-	-	-	-	3		2	3	3

Sample Question Paper

Amity Institute of Pharmacy
Department of Pharmacology
I MID-SEMESTER (SEM –IVth) 2020-21

Class: B.Pharm, IV Semester

Subject Name: BP404T Pharmacology-I Theory	Time: 1 Hrs	Max. Marks: 30

Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,2,4,10	Q.8,9,6	Q.5,3	Q.7		

Student will be able to

CO1.

Understand the pharmacological actions of different categories of drugs. Explain the mechanism of drug action at organ system/sub cellular/ macromolecular levels

CO2.

Apply the basic pharmacological knowledge in the prevention and treatment of various diseases.

CO3.

Observe the effect of drugs on animals by simulated experiments 5. Appreciate correlation of pharmacology with other bio medical sciences

CO Map	Question No.	Question	Marks
CO1	Q.1	What is agonist and antagonist.	2
CO1	Q.2	Define tachyphylaxis and idiosyncrasy.	2
CO1	Q.3	Make use of clinical pharmacology.	2
CO2	Q.4	Define therapeutic index.	2
CO2 CO3	Q.5	What is drug tolerance.	2
	Q.6	Explain Neurohumoral transmission.	10
CO2	Q.7	Write combined effects of drugs and factors modifying drug action.	10
CO2	Q.8	Give Drug discovery and clinical evaluation of new drugs	5
CO3	Q.9	Give the Neuromuscular blocking agents and skeletal muscle relaxants	5
CO1	Q.10	What is Adverse drug reactions.	5

CO2			

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

92.6% Percentage of students secured more than 60% marks, so this course Pharmacology I – Theory (BP101T) attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUE OF PHARMACY
DEPARTMENT OF PHARMACOGNOSY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharmacy), Academic Year – 2020-21

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11				
IV SEM	BP405 T	3	2	2	1	-	-	2	-	2	2	1		-	-	-

Mohanty

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACOGNOSY
Course Handout
Course : PHARMACOGNOSY & PHYTOCHEMISTRY I (Theory)
Course Code : BP 405T, Crédits : 04, Session : 2020-21(Even Sem.), Class : B.Pharm. II Year
Faculty Name : Dr. S. Mohana Lakshmi

A. Introduction: This course deals with the fundamentals of analytical chemistry and principles of electrochemical analysis of drugs. It aims to understand the principles of volumetric and electro chemical analysis and carryout various volumetric and electrochemical titrations.

B. Course Outcomes: At the end of the course, students will be:

BP405T.1. Define Pharmacognosy, classify the crude drugs and explain methods of drug evaluation

BP405T.2. Explain the techniques and methods involved in cultivation and collection production of crude drug. Illustrate the plant tissue culture and its applications. Brief note on edible vaccines.

BP405T.3. Explain role of Pharmacognosy in allopathy & traditional system of medicine (Ayurveda, Siddha, Unani & Homeopathy)

BP405T.4. Study of primary & secondary metabolites from natural sources-carbohydrates, proteins, lipids, Alkaloids, Glycosides, steroids, volatile oils, tannins, resins and plant fibre products like Cotton, Jute & Hemp & Hallucinogens, Teratogens, Natural allergens

Dr. Mohana Lakshmi

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis**.**

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2 quiz, assignment, open book test, field work, group discussion and seminar)		
	Seminar/ Assignment/Quiz/ Open book test	S/As/Q/OBT	3%
Interaction	Student-Teacher interaction	ST	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

UNIT-I 10 Hours

Introduction to Pharmacognosy:

(a) Definition, history, scope and development of Pharmacognosy

(b) Sources of Drugs – Plants, Animals, Marine & Tissue culture

(c) Organized drugs, unorganized drugs (dried latex, dried juices, dried extracts, gums and mucilage, oleoresins and oleo- gum -resins).

Classification of drugs:

Alphabetical, morphological, taxonomical, chemical, pharmacological, chemo and serotaxonomical classification of drugs

Quality control of Drugs of Natural Origin:

Adulteration of drugs of natural origin. Evaluation by organoleptic, microscopic, physical, chemical and biological methods and properties.

Quantitative microscopy of crude drugs including lycopodium spore method, leaf constants, camera lucida and diagrams of microscopic objects to scale with camera lucida.

UNIT-II 10 Hours

Cultivation, Collection, Processing and storage of drugs of natural origin:

Cultivation and Collection of drugs of natural origin Factors influencing cultivation of medicinal plants. Plant hormones and their applications.

Polyploidy, mutation and hybridization with reference to medicinal plants

Conservation of medicinal plants

UNIT-III 07 Hours

Plant tissue culture:

Historical development of plant tissue culture, types of cultures, Nutritional requirements, growth and their maintenance.

Applications of plant tissue culture in Pharmacognosy. Edible vaccines

UNIT-IV 10 Hours

Pharmacognosy in various systems of medicine:

Role of Pharmacognosy in allopathy and traditional systems of medicine namely, Ayurveda, Unani, Siddha, Homeopathy and Chinese systems of medicine.

Introduction to secondary metabolites:

Definition, classification, properties and test for identification of Alkaloids, Glycosides, Flavonoids, Tannins, Volatile oil and Resins

UNIT V 8 Hours

Study of biological source, chemical nature and uses of drugs of natural origin containing following drugs

Plant Products:

Fibers - Cotton, Jute, Hemp

Hallucinogens, Teratogens, Natural allergens

Primary metabolites:

General introduction, detailed study with respect to chemistry, sources, preparation, evaluation, preservation, storage, therapeutic used and commercial utility as Pharmaceutical Aids and/or Medicines for the following Primary metabolites:

Carbohydrates: Acacia, Agar, Tragacanth, Honey

Proteins and Enzymes: Gelatin, casein, proteolytic enzymes (Papain, bromelain, serratiopeptidase, urokinase, streptokinase, pepsin).

Lipids (Waxes, fats, fixed oils) : Castor oil, Chaulmoogra oil, Wool Fat, Bees Wax

Marine Drugs:

Novel medicinal agents from marine sources

F. Examination Scheme:

Components	A	ST	CT	S/As/Q/OBT	EE
Weightage (%)	4	3	15	3	75

CT: Class Test, As: Assignment, ST: Student teacher interaction, S/A/Q/OBT: Seminar/ Assignment/Quiz/ Open book test, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. W.C.Evans, Trease and Evans Pharmacognosy, 16th edition, W.B. Sounders & Co., London, 2009.

2. Mohammad Ali. Pharmacognosy and Phytochemistry, CBS Publishers & Distribution, New Delhi.

3. Text book of Pharmacognosy by C.K. Kokate, Purohit, Gokhlae (2007), 37th Edition, Nirali Prakashan, New Delhi.

4. Herbal drug industry by R.D. Choudhary (1996), Ist Edn, Eastern Publisher, New Delhi.

5. Essentials of Pharmacognosy, Dr.SH.Ansari, IInd edition, Birla publications, New Delhi, 2007

6. Herbal Cosmetics by H.Pande, Asia Pacific Business press, Inc, New Delhi.

7. A.N. Kalia, Textbook of Industrial Pharmacognosy, CBS Publishers, New Delhi, 2005.

8. R Endress, Plant cell Biotechnology, Springer-Verlag, Berlin, 1994.

9. Pharmacognosy & Pharmacobiotechnology. James Bobbers, Marilyn KS, VE Tylor.

10. The formulation and preparation of cosmetic, fragrances and flavours.

11. Remington's Pharmaceutical sciences.

12. Text Book of Biotechnology by Vyas and Dixit.

13. Text Book of Biotechnology by R.C. Dubey

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Definition, history, scope and development of Pharmacognosy	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
2	Definition, history, scope and development of Pharmacognosy	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
3	Sources of Drugs – Plants, Animals	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
4	Marine & Tissue culture	Lecture	BP405T.1	Mid Term-1, Assignment ,Quiz & End Sem Exam
5	Organized drugs, unorganized drugs	Tutorial	BP405T.1	Mid Term-1, Quiz & End Sem Exam
6	Practical demonstration of Organized drugs & unorganized drugs differences	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
7	**Classification of drugs: introduction** :	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
8	Alphabetical, morphological	Lecture	BP405T.1	Mid Term-1, Quiz, Class test & End Sem Exam
9	taxonomical, chemical, pharmacological	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
10	chemo and serotaxonomical classification of drugs	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
11	**Quality control of Drugs of Natural Origin: introduction**	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam

12	Adulteration of drugs of natural origin	Lecture	BP405T.1	Mid Term-1, Assignment ,Quiz & End Sem Exam
13	Types of adulteration with examples	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
14	Evaluation by organoleptic, microscopic evaluation	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
15	Physical, chemical and biological methods of evaluation	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
16	Quantitative microscopy of crude drugs	Lecture	BP405T.1	Mid Term-1, Class test, Quiz & End Sem Exam
17	Lycopodium spore method, leaf constants, camera lucida and diagrams of microscopic objects to scale with camera lucida.	Lecture	**BP405T.1**	Mid Term-1, Quiz & End Sem Exam
18	**Cultivation, Collection, Processing and storage of drugs of natural origin – introduction**	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
19	Cultivation and Collection of drugs of natural origin	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
20	Factors influencing cultivation of medicinal plants	Lecture	BP405T.1	Mid Term-1, Assignment,Quiz & End Sem Exam
21	Plant hormones and their applications.	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
22	Polyploidy, mutation	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
23	hybridization with reference to medicinal plants	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
24	Conservation of medicinal plants	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
25	**Plant tissue culture: History and introduction**	Lecture	BP405T.2	Mid Term-1, Quiz & End Sem Exam
26	types of cultures, Nutritional requirements,	Lecture	BP405T.2	Mid Term-1, Quiz &

				End Sem Exam
27	growth and their maintenance of tissue cultured cells	Lecture	BP405T.2	Mid Term-1, Quiz & End Sem Exam
28	Applications of plant tissue culture in Pharmacognosy.	Lecture	BP405T.2	Mid Term-1, Seminar,Quiz & End Sem Exam
29	Edible vaccines 1	Lecture	BP405T.2	Mid Term-1, Quiz & End Sem Exam
30	Edible vaccines 2	Lecture	**BP405T.2**	Mid Term-1, Quiz & End Sem Exam
31	**Pharmacognosy in various systems of medicine:**	Lecture	BP405T.3	Mid Term-2, Quiz & End Sem Exam
32	Role of Pharmacognosy in allopathy	Lecture	BP405T.3	Mid Term-2, Quiz & End Sem Exam
33	UNIT test – Discussion	Tutorial	BP405T.3	Mid Term-2, Quiz & End Sem Exam
34	Role of Pharmacognosy in Ayurveda	Lecture	BP405T.3	Mid Term-2, Quiz & End Sem Exam
35	Role of Pharmacognosy in SIDDHA	Lecture	BP405T.3	Mid Term-2, Quiz & End Sem Exam
36	Role of Pharmacognosy in HOMEOPATHY	Lecture	BP405T.3	Mid Term-2, Assignment ,Quiz & End Sem Exam
37	Role of Pharmacognosy in UNANI	Lecture	BP405T.3	Mid Term-2, Quiz & End Sem Exam
38	**Introduction to plant secondary metabolites**	Lecture	BP405T.3	Mid Term-2, Quiz & End Sem Exam
39	Definition, classification, properties and test for identification of Alkaloids, Glycosides,	Lecture	BP405T.3	Mid Term-2, Quiz & End Sem Exam
40	Quiz	Tutorial		Mid Term-2, Quiz & End Sem Exam
41	Flavonoids, Tannins, Volatile oil and Resins	Lecture	BP405T.3	Mid Term-2, Quiz & End Sem Exam

42	Study of biological source, chemical nature and uses of drugs of natural origin containing following drugs - introduction	Lecture	BP405T.4	Mid Term-2, Quiz & End Sem Exam
43	**Plant Products:** Fibers - Cotton, Jute, Hemp Hallucinogens, Teratogens,	Lecture	BP504T.4	Mid Term-2, Quiz & End Sem Exam
44	Natural allergens	Lecture	BP405T.1	Mid Term-2, Seminar, Quiz & End Sem Exam
45	**Primary metabolites: introduction**	Lecture	BP405T.1	Mid Term-2, Quiz & End Sem Exam
46	General introduction, detailed study with respect to chemistry, sources, preparation, evaluation, preservation, storage, therapeutic used and commercial utility as Pharmaceutical Aids and/or Medicines for the following Primary metabolites:	Lecture	BP405T.1	Mid Term-2, Quiz & End Sem Exam
47	**Carbohydrates:** Acacia, Agar	Tutorial		Mid Term-2, Quiz & End Sem Exam
48	Tragacanth, Honey	Lecture	BP405T.1	Mid Term-2, Seminar, Quiz & End Sem Exam
49	**Proteins and Enzymes**	Lecture	BP405T.1	Mid Term-2, Quiz & End Sem Exam
50	Gelatin,	Lecture	BP405T.1	Mid Term-2, Quiz & End Sem Exam
51	casein, proteolytic enzymes	Lecture	BP405T.1	Mid Term-2, Quiz & End Sem Exam
52	Papain, bromelain, serratiopeptidase, urokinase,	Lecture	BP405T.1	Mid Term-2, Assignment ,Quiz & End Sem Exam
53	Streptokinase, pepsin.	Lecture	BP405T.1	Mid Term-2, Quiz & End Sem Exam
54	**Lipids(Waxes, fats, fixed oils)** :	Tutorial	BP405T.1	Mid Term-2, Quiz & End Sem Exam
55	Castor oil, Chaulmoogra oil Spectroscopic studies, Electrophoresis	Lecture	BP405T.1	Mid Term-2, Quiz & End Sem Exam
56	Wool Fat, Bees Wax	Lecture	BP405T.1	Mid Term-2, Quiz &

				End Sem Exam
57	**Marine Drugs:**	Lecture	BP405T.1	Mid Term-2, Quiz & End Sem Exam
58	Novel medicinal agents from marine sources	Lecture	BP405T.1	Mid Term-2, Quiz & End Sem Exam
59	Revision 1	Lecture	BP405T.1	Mid Term-2, Quiz & End Sem Exam
60	Revision 2	Lecture	BP405T.1	Mid Term-2, Seminar,Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP405T.1.	Define Pharmacognosy, classify the crude drugs and explain methods of drug evaluation	3	2	1	2	1				1		2
BP405T.2.	Explain the techniques and methods involved in cultivation and collection production of crude drug. Illustrate the plant tissue culture and its applications. Brief note on edible vaccines.	3	1	1	1	2				2		2
BP405T.3.	Explain role of Pharmacognosy in allopathy & traditional system of medicine (Ayurveda, Siddha, Unani & Homeopathy)	3	3	2	2	2			2	2		2

BP405T.4	Study of primary & secondary metabolites from natural sources- carbohydrates, proteins, lipids, Alkaloids, Glycosides, steroids, volatile oils, tannins, resins and plant fibre products like Cotton, Jute & Hemp & Hallucinogens, Teratogens, Natural allergens	3	3	2	2	1			2	2		3

Sample Question Paper

Amity Institute of pharmacy Department of Pharmacognosy II MID-SEMESTER (SEM –IV) 2020-21						
Class: B Pharmacy IV Semester						
Subject Name: BP405T PHARMACOGNOSY & PHYTOCHEMISTRY I		Time: 1 Hr			Max. Marks: 30	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping						

Student will be

BP405 CO 1. Define Pharmacognosy, classify the crude drugs and explain methods of drug evaluation

BP 405 CO.2. Explain the techniques and methods involved in cultivation and collection production of crude drug. Illustrate the p*lant tissue culture and its* applications. Brief note on edible vaccines.

BP 405 CO.3. Explain role of Pharmacognosy in allopathy & traditional system of medicine (Ayurveda, Siddha, Unani & Homeopathy)

BP 405 CO.4. Study of primary & secondary metabolites from natural sources-carbohydrates, proteins, lipids, Alkaloids, Glycosides, steroids, volatile oils, tannins, resins and plant fiber products like Cotton, Jute & Hemp & Hallucinogens, Teratogens, Natural allergens

CO Map	Question No.	Question	Marks
	Q.1		
	Q.2		
	Q.3		
	Q.4		
	Q.5		
	Q.6		
	Q.7		
	Q 8		
	Q.9		
	Q 10		

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

92.6 % Percentage of students secured more than 60% marks, so this course Pharmacognosy and Phytochemistry I– Theory (BP405T) attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.),Academic Year – 2020-21

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2].Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMMEARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
IVSEM	-															
	-															
	-															
	-															
	BP406P	3	1	2	1	1	2		2		3	2				
	-															
	-															
	-															

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICAL CHEMISTRY
Course Handout
Course : MEDICINAL CHEMISTRY– I PRACTICAL
Course Code : B406P, Crédits : 02, Session :2020-21 (Odd Sem.), Class : B.Pharm. IIndYear
Faculty Name: Dr. Srabanti Jana

A. **Scope:** This subject is designed to impart fundamental knowledge on the structure, chemistry and therapeutic value of drugs. The subject on synthetic methods of some drugs and assay of some selective drugs.

B. **Course Outcomes:** At the end of the course, students will be able to:

BP406P.1. Preparation of drugs/ intermediates like 1,3-pyrazole, 1,3-oxazole, Benzimidazole, Benztriazole, 2,3- diphenyl quinoxaline, Benzocaine, Phenytoin, Phenothiazine and Barbiturate.

BP406P.2. Assay of Chlorpromazine, Phenobarbitone, Atropine, Ibuprofen, Aspirin and Furosemide.

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2].Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during

daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

C. Assessment Plan:

Component of Evaluation	Description	Code	Weightage %

Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance isrequiredtobemaintainedbyastudentto be qualified for taking up the EndSemester examination. The allowanceof 20%includesalltypesofleaves includingmedicalleaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

D. Syllabus

BP406P.1. Preparation of drugs/ intermediates

1. 1,3-pyrazole
2. 1,3-oxazole
3. Benzimidazole
4. Benztriazole
5. 2,3- diphenyl quinoxaline
6. Benzocaine
7. Phenytoin
8. Phenothiazine
9. Barbiturate.

BP406P.2. Assay of Following drugs

1. Chlorpromazine
2. Phenobarbitone
3. Atropine
4. Ibuprofen
5. Aspirin
6. Furosemide.

BP406P.3. Determination of Partition coefficient for any two drugs

E. Examination Scheme:

Components	A	CT	LR	V	EE
Weightage (%)	2	10	1	2	35

CT: Class Test, LR: Lab Record, V: Viva,EE: End Semester Examination; A: Attendance

F. Suggested Text/Reference Books:

1. Wilson and Giswold's Organic medicinal and Pharmaceutical Chemistry.
2. Foye's Principles of Medicinal Chemistry.
3. Burger's Medicinal Chemistry, Vol I to IV.
4. Introduction to principles of drug design- Smith and Williams.
5. Remington's Pharmaceutical Sciences.
6. Martindale's extra pharmacopoeia.
7.Organic Chemistry by I.L. Finar, Vol. II.
8. The Organic Chemistry of Drug Synthesis by Lednicer, Vol. 1-5.
9. Indian Pharmacopoeia.
10. Text book of practical organic chemistry- A.I.Vogel.

G. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	To Synthesize, submit & report %yield of 1,3-pyrazole.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
2	To Synthesize, submit & report %yield of 1,3-oxazole.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
3	To Synthesize, submit & report %yield of Benzimidazole.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
4	To Synthesize, submit & report %yield Benztriazole.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
5	To Synthesize, submit & report %yield of 2,3- diphenyl quinoxaline.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
6	To Synthesize, submit & report %yield of Benzocaine.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
7	To Synthesize, submit & report %yield of phenytoin.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
8	To Synthesize, submit & report %yield of Phenothiazine.	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
9	To Synthesize, submit & report %yield of Barbiturate.	Practical	CO1, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
10	To perform the assay and report the % purity of Chlorpromazine.	Practical	CO1, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
11	To perform the assay and report the % purity of Phenobarbitone.	Practical	CO1, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam

12	To perform the assay and report the % purity of atropine.	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
13	To perform the assay and report the % purity of ibuprofen.	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
14	To perform the assay and report the % purity of Aspirin.	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
15	To perform the assay and report the % purity of 6 Furosemide	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam

H. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	
BP406P.1	Preparation of drugs/ intermediates like 1,3-pyrazole, 1,3-oxazole, Benzimidazole, Benztriazole, 2,3-diphenyl quinoxaline, Benzocaine, Phenytoin, Phenothiazine and Barbiturate.	3		2	1	2	1	-	2	1	2	1	
BP406P.2.	Assay of Chlorpromazine, Phenobarbitone, Atropine, Ibuprofen, Aspirin and Furosemide.	2	-	-	1	-	1	-	-	-	-	3	

Sample Question Paper

Amity Institute of Pharmacy **Departmentof Pharmaceutical Chemistry** **I MID-SEMESTER(SEM–IV)2020-21**						
Class:B.Pharm, IV-Semester						
SubjectName: **BP406PMedical Chemistry-I Practical**		Time:4Hrs			Max.Marks:40	
Levels of thequestions as perBloomsTaxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
QuestionMapping	Q.1,4	Q.2,3	Q.4	Q.2,5,6		

Student willbeableto

CO.1. To recall the principles used synthesis of different medicinal compounds

CO.2. Operate equipment used in the preparation of compounds.

CO.3. Estimation of different medicinal compounds by titrimetry.

CO.4. Assay and reporting the percentage purity of compounds.

CO.5. Determination of Partition coefficient for any two drugs.

COMap	QuestionNo.	Question	Marks
CO1,2,4	Q.1a	Synopsis-principles in synthesis of benzimidazole.	2
CO1,2,4	Q.1b	Synopsis- principle for assay of ibuprofen.	2
CO1,2,4	Q.1c	Synopsis- principle in preparation of benzocaine.	2
CO1,2,4	Q.1d	Synopsis- principle in preparation of phenetoin.	2
CO1,2,4	Q.1e	Synopsis- Principle in determination of partition-coefficient (logP)	2
CO1,2, 4,5	Q.2	Experiment To Assay and report the percentage purity of Ibuprofen	25
CO1,2,3,4,5	Q.3	Viva	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

100 % Percentage of students secured more than 60% marks, so this course Medicinal Chemistry I – Practical (BP406P) attained Level -3.

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACY
Course Handout
Course : PHYSICAL PHARMACEUTICS II
Course Code : BP407 P, Programme : II.B. Pharmacy IV-Semester **Crédits : 02, Session :2020-21 (Even Sem.)**
Faculty Name : Dr. Neeraj Mishra

A. Scope: The course deals with the various physical and physicochemical properties, and principle involved in dosage forms/formulations. Theory and practical components of the subject help the student to get a better insight into various areas of formulation research and development, and stability studies of pharmaceutical dosage forms.

B. Course Outcome: ***At the end of each course, the student will be able to:***

C407.1	To ddetermine the particle size, particle size distribution using sieving method or microscopic method
C407.2	To uunderstand various physicochemical properties of drug molecules in the designing the dosage forms
C407.3	To know the principles of chemical kinetics & to use them for stability testing and determination of expiry date of formulations
C407.4	To Determine the angle of repose and influence of lubricant on angle of repose
C407.5	To ddetermine of reaction rate constant
C407.6	To demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms.

C. 1.Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices**.**
2. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.
3. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice.
Find, analyze, evaluate and apply information systematically and shall make defensible decisions.
4. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.
5. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well-being.

6. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

7. Pharmaceutical Ethics: Honor personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

8. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

9. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional Pharmacy Practice

10. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

11. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively

D.Programme specific outcomes:

1. Scientific Thinking: Enable student's knowledge in scientific perception to understand the concepts and to solve the problems positively while making pharmaceutical formulations.
2. Analytical Skills: Assimilate and develop analytical skills using advanced equipment to design and evaluate pharmaceutical products, also to assess their quality.
3. Resource Management: Utilize and manage resources from natural, semi synthetic and synthetic origin to develop real time products with utmost benefit and safety.
4.Public Health Care: Promote and empower the healthy living in the community by various means of awareness and health strategies.
5. Entrepreneurship: Acquire and develop entrepreneurship and administration skills to establish community pharmacy, learning and training centers for the long term wellbeing of society.

E. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	LT	10%
	Mid Term 2		
	Practical Records/ Regular viva voce	PR/RVV	1% / 2%
Attendance	A minimum of 80% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

F. Syllabus

1. Determination of particle size, particle size distribution using sieving method
2. Determination of particle size, particle size distribution using microscopic method
3. Determination of bulk density, true density and porosity
4. Determine the angle of repose and influence of lubricant on angle of repose
5. Determination of viscosity of liquid using Ostwald's viscometer
6. Determination sedimentation volume with effect of different suspending agent
7. Determination sedimentation volume with effect of different concentration of single suspending agent
8. Determination of viscosity of semisolid by using Brookfield viscometer
9. Determination of reaction rate constant first order.
10. Determination of reaction rate constant second order
11. Accelerated stability studies

G. Examination Scheme:

Components	A	LT	PR/RVV	EE
Weightage (%)	2	10	½	35

LT: Lab Test, PR/RVV: Practical Records/ Regular viva voce, EE: End Semester Examination; A: Attendance

H. Suggested Text/Reference Books:

1. Physical Pharmacy by Alfred Martin
2. Experimental Pharmaceutics by Eugene, Parott.
3. Tutorial Pharmacy by Cooper and Gunn.
4. Stocklosam J. Pharmaceutical Calculations, Lea &Febiger, Philadelphia.
5. Liberman H.A, Lachman C., Pharmaceutical Dosage forms, Tablets, Volume-1 to 3, MarcelDekkar Inc.
6. Liberman H.A, Lachman C, Pharmaceutical Dosage forms. Disperse systems, volume 1, 2, 3. Marcel Dekkar Inc.
7. Physical Pharmaceutics by Ramasamy C and ManavalanR.
8. Laboratory Manual of Physical Pharmaceutics, C.V.S. Subramanian, J. Thimma settee
9. Physical Pharmaceutics by C.V.S. Subramanyam

I. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Determination of particle size, particle size distribution using sieving method	Practical	C407.1	Mid Term-1, PR/RVV & End Sem Exam
2	Determination of particle size, particle size distribution using Microscopic method	Practical	C407.1, C407.6	Mid Term-1, PR/RVV & End Sem Exam
3	Determination of bulk density, true density and porosity	Practical	C407.2	Mid Term-1, PR/RVV & End Sem Exam
4	Determine the angle of repose and influence of lubricant on angle of repose	Practical	C407.4	Mid Term-1, PR/RVV & End Sem Exam

5	Determination of viscosity of liquid using Ostwald's viscometer	Practical	C407.2& C407.3	Mid Term-1, PR/RVV & End Sem Exam
6	Determination sedimentation volume with effect of different suspending agent	Practical	C407.2& C407.3	Mid Term-1, PR/RVV & End Sem Exam
7	Determination sedimentation volume with effect of different concentration of single suspending agent	Practical	C407.2& C407.3	Mid Term-1, PR/RVV & End Sem Exam
8	Determination of viscosity of semisolid by using Brookfield viscometer	Practical	C407.2& C407.3	Mid Term-1, PR/RVV & End Sem Exam
9	Determination of reaction rate constant first order.	Practical	C407.5	Mid Term-2, PR/RVV & End Sem Exam
10	Determination of reaction rate constant second order	Practical	C407.5& C407.3	Mid Term-2, PR/RVV & End Sem Exam
11	To perform Accelerated stability studies	Practical	C407.3& C407.6	Mid Term-2, PR/RVV & End Sem Exam
12	To classify dispersed systems & their general characteristics, size & shapes of colloidal particles	Practical	C407.2 & C407.3	Mid Term-2, PR/RVV & End Sem Exam
13	To classify of colloids & comparative account of their general properties. Optical, kinetic & electrical properties	Practical	C407.2 & C407.3	Mid Term-2, PR/RVV & End Sem Exam
14	To know newtonian systems, law of flow, kinematic viscosity,	Practical	C407.2& C407.3	Mid Term-2, PR/RVV & End Sem Exam
15	To determine rheological properties of emulsions and emulsion formulation by HLB method.	Practical	C407.2& C407.3	Mid Term-2, PR/RVV & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
C407.1	3	1	2	2	3	2	1	-	-	1	-
C407.2	1	-	3	1	-	-	1	-	2	1	1
C407.3	1	2	-	1	2	-	2	1	-	-	1
C407.4	2	1	1	1	-	1	2	-	1	-	2
C407.5	1	2	2	-	1	-	1	1	1	2	3
C407.6	3	1	1	1	-	1	2	-	1	-	2
Average	1.8	1.16	1.5	1	1.0	0.66	1.3	0.3	0.83	0.66	1.5

Sample Question Paper

Amity Institute of Pharmacy
Department of Pharmaceutics
I MID-SEMESTER (SEM –IV) 2020-21

Class: B.Pharm, IV Semester

Subject Name: BP407P Physical Pharmaceutics-II Practical	Time: 4 Hrs	Max. Marks: 40

Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,4	Q.2,3	Q.4	Q.2,5,6		

Student will be able to

C407.1	To determine the particle size, particle size distribution using sieving method or microscopic method
C407.2	To understand various physicochemical properties of drug molecules in the designing the dosage forms
C407.3	To know the principles of chemical kinetics & to use them for stability testing and determination of expiry date of formulations
C407.4	To Determine the angle of repose and influence of lubricant on angle of repose
C407.5	To determine the reaction rate constant
C407.6	To demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms.

CO Map	Question No.	Question	Marks
C407.1,2, 3	Q.1a	Synopsis- What is angel of repose.	5
C407.1,2, 3	Q.1b	Synopsis- What is bulk density & true density.	5
C407.1,2, 4,6	Q.2	Experiment To determine reaction rate constant for First Order.	25
C407.1,2,3,4, 5,6	Q.3	Viva	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

100 % Percentage of students secured more than 60% marks, so this course Physical Pharmaceutics II – Practical (BP407P) attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOLOGY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-21

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Programme Specific Outcomes:

Programme Specific Outcomes:

PSO 1: This subject is designed to understand what drugs do to the living organisms and how their effects can be applied to therapeutics.

PSO 2: The subject covers the information about the drugs like, mechanism of action, physiological and biochemical effects (pharmacodynamics)

PSO 3: This subject also cover the information about absorption, distribution, metabolism and excretion (pharmacokinetics) along with the adverse effects, clinical uses, interactions, doses, contraindications and routes of administration of different classes of drugs.

PSO 4: The subject provides the basic knowledge required to understand the various disciplines of pharmacy

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
IV SEM	BP408P	3	1	2	-	1	3	2	1	3	2	2				
	-															
	-															
	-															
	-															
	-															
	-															
	-															

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACOLOGY
Course Handout
Course : PHARMACOLOGY – I PRACTICAL
Course Code : BP408P, Crédits : 02, Session :2020-21 (IVth SEM), Class : B.Pharm. 2nd Year
Faculty Name: Dr. Shvetank Bhatt

A. Introduction: This course is designed to impart fundamental knowledge on the structure and functions of the various systems of the human body. It also helps in understanding both homeostatic mechanisms. The subject provides the basic knowledge required to understand the various disciplines of pharmacy.

B. Course Outcomes: At the end of the course, students will be able to:

BP408P.CO1. Introduction to experimental pharmacology.
BP408P.CO2. Study of different routes of drugs administration in mice/rats.
BP408P.CO3. Study of effect of hepatic microsomal enzyme inducers on the phenobarbitone sleeping time in mice.
BP408P.CO4. Effects of skeletal muscle relaxants using rota-rod apparatus.
BP408P.CO5. Study of stereotype and anti-catatonic activity of drugs on rats/mice.
BP408P.CO6. Study of local anesthetics by different methods

Programme Outcomes:

[PO.1]. Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time

management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

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[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

C. Programme Specific Outcomes:

PSO 1: Understand the pharmacological actions of different categories of drugs. Explain the mechanism of drug action at organ system/sub cellular/ macromolecular levels.

PSO 2: Apply the basic pharmacological knowledge in the prevention and treatment of various diseases.

PSO 3: Observe the effect of drugs on animals by simulated experiments

PSO 4: Appreciate correlation of pharmacology with other bio medical sciences

Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

D. Syllabus

1. Introduction to experimental pharmacology.
2. Commonly used instruments in experimental pharmacology.
3. Study of common laboratory animals.
4. Maintenance of laboratory animals as per CPCSEA guidelines.
5. Common laboratory techniques. Blood withdrawal, serum and plasma separation, anesthetics and euthanasia used for animal studies.
6. Study of different routes of drugs administration in mice/rats.
7. Study of effect of hepatic microsomal enzyme inducers on the phenobarbitone sleeping time in mice.
8. Effect of drugs on ciliary motility of frog oesophagus
9. Effect of drugs on rabbit eye.

10. Effects of skeletal muscle relaxants using rota-rod apparatus.
11. Effect of drugs on locomotor activity using actophotometer.
12. Anticonvulsant effect of drugs by MES and PTZ method.
13. Study of stereotype and anti-catatonic activity of drugs on rats/mice.
14. Study of anxiolytic activity of drugs using rats/mice.
15. Study of local anesthetics by different method

Examination Scheme:

Components	A	CT	LR	V	EE
Weightage (%)	2	10	1	2	35

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

E. **Suggested Text/Reference Books:**

1.Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology,.Churchil Livingstone Elsevier
2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill
3. Goodman and Gilman's, The Pharmacological Basis of Therapeutics
4. Marry Anne K. K., Lloyd Yee Y., Brian K. A., Robbin L.C., Joseph G. B., Wayne A. K., Bradley R.W., Applied Therapeutics, The Clinical use of Drugs, The Point Lippincott Williams & Wilkins
5. Mycek M.J, Gelnet S.B and Perper M.M. Lippincott's Illustrated Reviews-Pharmacology
6. SK Kulkarni.

Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Introduction to experimental pharmacology.	Lecture	Unit-1 CO1	Mid Term-1 and 2, Quiz & End Sem Exam
2	Introduction to experimental pharmacology.	Lecture	CO4	Mid Term-1 and 2, Quiz & End Sem Exam
3	Commonly used instruments in experimental pharmacology.	Lecture	CO4	Mid Term-1 and 2, Quiz & End Sem Exam
4	Commonly used instruments in experimental pharmacology.	Tutorial	CO3	Mid Term-1 and 2, Quiz & End Sem Exam
5	Study of common laboratory animals	Lecture	CO3	Mid Term-1 and 2, Quiz & End Sem Exam

6	Maintenance of laboratory animals as per CPCSEA guidelines	Lecture	CO2	Mid Term-1 and 2, Quiz & End Sem Exam
7	Common laboratory techniques. Blood withdrawal, serum and plasma separation, anesthetics and euthanasia used for animal studies.	Lecture	CO5	Mid Term-1 and 2, Quiz & End Sem Exam
8	Study of different routes of drugs administration in mice/rats	Tutorial		Mid Term-1 and 2, Quiz & End Sem Exam
9	Study of effect of hepatic microsomal enzyme inducers on the phenobarbitone sleeping time in mice.	Lecture	CO5	Mid Term-1 and 2, Quiz & End Sem Exam
10	Effect of drugs on ciliary motility of frog oesophagus	Lecture	CO5	Mid Term-1 and 2, Quiz & End Sem Exam
11	Effect of drugs on rabbit	Lecture	CO5	Mid Term-1 and 2, Quiz & End Sem Exam
12	Effects of skeletal muscle relaxants using rota-rod apparatus	Tutorial		Mid Term-1 and 2, Quiz & End Sem Exam
13	Effect of drugs on locomotor activity using actophotometer.	Lecture	CO5	Mid Term-1 and 2, Quiz & End Sem Exam
14	Anticonvulsant effect of drugs by MES and PTZ metho	Lecture	CO5	Mid Term-1 and 2, Quiz & End Sem Exam
15	Study of stereotype and anti-catatonic activity of drugs on rats/mice.	Lecture	CO5	Mid Term-1 and 2, Quiz & End Sem Exam
16	Unit test	Tutorial		Mid Term-1 and 2, Quiz & End Sem Exam
17	Study of anxiolytic activity of drugs using rats/mice.	Lecture	CO6	Mid Term-1 and 2, Quiz & End Sem Exam
18	Study of local anesthetics by different methods	Lecture	CO6	Mid Term-1 and 2, Quiz & End Sem Exam

Dr. Mohanpatyl

F. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP408P.1	1 Introduction to experimental pharmacology. 2. Commonly used instruments in experimental pharmacology. 3. Study of common laboratory animals. 4. Maintenance of laboratory animals as per CPCSEA guidelines.	3	-	-	-	1	2	1	-	-	-	-		3	2	1
BP408P.2.	Common laboratory techniques. Blood withdrawal, serum and plasma separation, anesthetics and euthanasia used for animal studies. 6. Study of different routes of drugs administration in mice/rats. 7. Study of effect of hepatic microsomal enzyme inducers on the phenobarbitone	3	-	-	1	-	1	-	-	-	-	2		2	3	1

	sleeping time in mice.															
BP408P.3.	Effect of drugs on ciliary motility of frog oesophagus 9. Effect of drugs on rabbit eye. 10. Effects of skeletal muscle relaxants using rota-rod apparatus.	3	2	-	3	-	2	-	-	-	-	3		1	2	3
BP408P.4.	Effect of drugs on locomotor activity using actophotometer. 12. Anticonvulsant effect of drugs by MES and PTZ method.	2	2	1	3	-	1	-	-	-	-	2		2	3	2
BP408P.5.	Study of stereotype and anti-catatonic activity of drugs on rats/mice. 14. Study of anxiolytic activity of drugs using rats/mice.	3	-	1	-	2	-	-	-	-	-	2		2	3	3
BP408P.6	Study of local anesthetics by different methods.	3			1							1		3	1	2

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacology I MID-SEMESTER (SEM –IV) 2020-21						
Class: B.Pharm, IV Semester						
Subject Name: BP408P Pharmacology-I		Time: 4 Hrs			Max. Marks: 40	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,2,	Q.3,4	Q.5,6	Q.7		

Student will be able to

CO1.

1. Introduction to experimental pharmacology.
2. Commonly used instruments in experimental pharmacology.
3. Study of common laboratory animals.

CO 2

4. Maintenance of laboratory animals as per CPCSEA guidelines.
5. Common laboratory techniques. Blood withdrawal, serum and plasma separation, anesthetics and euthanasia used for animal studies.
6. Study of different routes of drugs administration in mice/rats.

CO 3

7. Study of effect of hepatic microsomal enzyme inducers on the phenobarbitone sleeping time in mice.
8. Effect of drugs on ciliary motility of frog oesophagus
9. Effect of drugs on rabbit eye.

CO 4

10. Effects of skeletal muscle relaxants using rota-rod apparatus.
11. Effect of drugs on locomotor activity using actophotometer.
12. Anticonvulsant effect of drugs by MES and PTZ method.

CO5

13. Study of stereotype and anti-catatonic activity of drugs on rats/mice.
14. Study of anxiolytic activity of drugs using rats/mice.

CO6

15. Study of local anesthetics by different method

Demonstration of total blood count by cell analyser Permanent slides of vital organs and gonads			
CO Map	Question No.	Question	Marks
CO4	Q.1a	*What is CPCSEA*	2
CO2	Q.1b	Define Pharmacokintics.	2
CO2	Q.1c	Make use of animal anaesthetics.	2
CO3	Q.1d	What are different routes of blood withdrawal.	2
CO2 CO3	Q.1e	Give the use of rotarod.	2
	Q.2	Experiment: Commonly used instruments in experimental pharmacology.	25
	Q.3	Viva	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

100 % Percentage of students secured more than 60% marks, so this course Pharmacology I – Practical (BP408P) attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOGNOSY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-21

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
IV SEM	-	3	1	3	2	1	2	2	2	2	2	3				
	-															
	-															
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	-															
	-															
	-															
	-															

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACOGNOSY
Course Handout
Course : PHARMACOGNOSY AND PHYTOCHEMISTRY – I PRACTICAL
Course Code : BP409P, Crédits : 02, Session :2020-21 (Even Sem.), Class : B.Pharm. 2nd Year
Faculty Name: Dr. Jovita Kanoujia

A. Introduction: The subject involves the fundamentals of Pharmacognosy like scope, classification of crude drugs, their identification and evaluation, phytochemicals present in them and their medicinal properties

B. Course Outcomes: At the end of the course, students will be able to:

BP409P.1. To know the techniques in the cultivation and production of crude drugs

BP409P.2. To know the crude drugs, their uses and chemical nature

BP409P.3. To know the evaluation techniques for the herbal drugs

BP409P.4. To carry out the microscopic and morphological evaluation of crude drugs

BP409P.5. To know the classification ,identification and medicinal properties of herbal drugs

C. Programme Outcomes:

[PO.1]. Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

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[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

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[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

E. Syllabus

1. Analysis of crude drugs by chemical tests: **(**i)Tragaccanth (ii) Acacia (iii)Agar (iv)

Gelatin (v) starch (vi) Honey (vii) Castor oil
2. Determination of stomatal number and index
3. Determination of vein islet number, vein islet termination and paliside ratio.
4. Determination of size of starch grains, calcium oxalate crystals by eye piece micrometer
5. Determination of Fiber length and width
6. Determination of number of starch grains by Lycopodium spore method
7. Determination of Ash value
8. Determination of Extractive values of crude drugs
9. Determination of moisture content of crude drugs
10. Determination of swelling index and foaming

F. Examination Scheme:

Components	A	CT	LR	V	EE
Weightage (%)	2	10	1	2	35

CT: Class Test, LR: Lab Record, V: Viva, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

- W.C.Evans, Trease and Evans Pharmacognosy, 16th edition, W.B. Sounders & Co., London, 2009.
- 2. Tyler, V.E., Brady, L.R. and Robbers, J.E., Pharmacognosy, 9th Edn., Lea and Febiger, Philadelphia, 1988.
- 3. Text Book of Pharmacognosy by T.E. Wallis
- 4. Mohammad Ali. Pharmacognosy and Phytochemistry, CBS Publishers & Distribution, New Delhi.
- 5. Text book of Pharmacognosy by C.K. Kokate, Purohit, Gokhlae (2007), 37th Edition, Nirali Prakashan, New Delhi.
- 6. Herbal drug industry by R.D. Choudhary (1996), Ist Edn, Eastern Publisher, New Delhi.
- 7. Essentials of Pharmacognosy, Dr.SH.Ansari, IInd edition, Birla publications, New Delhi, 2007
- 8. Practical Pharmacognosy: C.K. Kokate, Purohit, Gokhlae
- 9. Anatomy of Crude Drugs by M.A. Iyengar

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	To Perform Morphological study and Chemical Identification test for Tragaccanth , Acacia and Benzoin	Practical	CO 1,2, 3,4, 5	Mid Term-1, Quiz & End Sem Exam
2	To Perform Morphological study and Chemical Identification test for Agar , Gelatin and Starch	Practical	CO1, 2,3, 4, 5	Mid Term-1, Quiz & End Sem Exam
3	To Perform Morphological	Practical	CO1, 2,3,	Mid Term-1, Quiz

	study and Chemical Identification test for Castor oil , Asafoetida and Honey		4, 5	& End Sem Exam
4	Determination of stomatal number and index	Practical	CO1, 2, 3,4, 5	Mid Term-1, Quiz & End Sem Exam
5	Determination of vein islet number, vein islet termination and paliside ratio	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
6	Determination of size of starch grains, calcium oxalate crystals by eye piece Micrometer	Practical	CO, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
7	Determination of Fiber length and width	Practical	CO, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
8	Determination of number of starch grains by Lycopodium spore method	Practical	CO, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
9	Determination of total Ash value for given crude drug	Practical	CO, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
10	Determination of acid insoluble Ash value for given crude drug	Practical	CO, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
11	Determination of Extractive values of crude drugs	Practical	CO, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
12	Determination of moisture content of crude drugs	Practical	CO, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
13	Determination of swelling index and foaming index of crude drug	Practical	CO, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
14	To perform morphological and microscopical evaluation of given crude drug	Practical	CO1, 2,3 4, 5	Mid Term-2, Quiz & End Sem Exam
15	To perform morphological and microscopical evaluation of given crude drug	Practical	CO1, 2,3 4, 5	Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	

BP409P.1	To know the techniques in the cultivation and production of crude drugs	3		2	3	-	1	-	2	1	1	1	
BP409P.2.	To know the crude drugs, their uses and chemical nature	2	-	-	1	-	1	-	-	-	-	3	
BP409P.3.	To know the evaluation techniques for the herbal drugs	3	-	2	3	-	2	1	2	1	1	3	
BP409P.4.	To carry out the microscopic and morphological evaluation of crude drugs	2	-	2	1	-	2	1	2	-	1	3	
BP409P.5.	To know the classification ,identification and medicinal properties of herbal drugs	1	-	1	-	-	1	-	2	-	-	3	

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacognosy I MID-SEMESTER (SEM –IVth) 2022-23						
Class: B.Pharm, IVth Semester						
Subject Name: BP409P Pharmacognosy and phytochemistry-I Practical		Time: 4 Hrs		Max. Marks: 40		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,4	Q.2,3	Q.4	Q.2,5,6		
Student will be able to **CO.1**. . To know the techniques in the cultivation and production of crude drugs **CO.2**. To know the crude drugs, their uses and chemical nature						

CO.3. . To know the evaluation techniques for the herbal drugs
CO.4. To carry out the microscopic and morphological evaluation of crude drugs
CO.5. To know the classification ,identification and medicinal properties of herbal drugs

CO Map	Question No.	Question	Marks
CO1,2,4	Q.1a	Synopsis- What are difference between organized and un organized drugs?	2
CO1,2,4	Q.1b	Synopsis- What is crude drug evaluation?	2
CO1,2,4	Q.1c	Synopsis- Define Terpenoids?	2
CO1,2,4	Q.1d	Synopsis- Give biological source and uses of Tragacanth and Honey?	2
CO1,2,4	Q.1e	Synopsis- What is the classification of aromatic oil?	2
CO1,2, 4,5	Q.2	Experiment Determination of swelling index and foaming index of crude drug	25
CO1,2,3,4,5	Q.3	Viva	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

100% Percentage of students secured more than 60% marks, so this course Pharmacognosy and Phytochemistry I – Practical (BP409P) attained Leve

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AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-21

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I SEM																

II SEM																
III SEM																
IV SEM	-															
	-															
	-															
	-															
	-															
	-															
	-															
	-															
V SEM	BP103T	3	-	2	-	1	3	2	-	-	-	-	-	-	-	-
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VI SEM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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VII SEM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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Dr. Mohanty

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF **PHARMACEUTICAL CHEMISTRY**
Course Handout
Course : MEDICINAL CHEMISTRY – II THEORY
Course Code : BP501T, Crédits : 04, Session : 2020-21 (Odd Sem.), Class : B.Pharm. IIIrd Year
Faculty Name: Dr. Srabanti Jana

A. Introduction: The course is designed to impart fundamental knowledge on the preparatory pharmacy with arts and science of preparing the different conventional dosage forms.

B. Course Outcomes: At the end of the course, students will be able to:

BP501T.1. Understand the chemistry of drugs with respect to their pharmacological activity

BP501T.2. Understand the drug metabolic pathways, adverse effect and therapeutic value of drugs

BP501T.3. Understand the mechanism of action.

BP501T.4. Know the Structural Activity Relationship of different class of drugs.

BP501T.5. Study the chemical synthesis of selected drugs.

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

UNIT – I

Antihistaminic agents: Histamine, receptors and their distribution in the Humanbody .H1–antagonists: Diphenhydramine hydrochloride*, Dimenhydrinate, Doxylamines cuccinate, Clemastine fumarate, Diphenylphyraline hydrochloride, Tripelenamine hydrochloride, Chlorcyclizine hydrochloride, Meclizine hydrochloride, Buclizine hydrochloride, Chlorpheniramine maleate, Triprolidine hydrochloride*, Phenidamine tartarate, Promethazine hydrochloride*, Trimeprazine tartrate, Cyproheptadine hydrochloride, Azatidine maleate, Astemizole, Loratadine, Cetirizine, Levocetrazine Cromolyn sodium

H2-antagonists: Cimetidine*, Famotidine, Ranitidin.

Gastric Proton pump inhibitors: Omeprazole, Lansoprazole, Rabeprazole, Pantoprazole.

Anti-neoplastic agents: Alkylating agents: Meclorethamine*, Cyclophosphamide, Melphalan,

UNIT – II

Anti-anginal: Vasodilators: Amyl nitrite, Nitroglycerin*, Pentaerythritol tetranitrate, Isosorbide dinitrite*, Dipyridamole. Calcium channel blockers: Verapamil, Bepridil hydrochloride, Diltiazem hydrochloride, Nifedipine, Amlodipine, Felodipine, Nicardipine, Nimodipine.

Diuretics: Carbonic anhydrase inhibitors: Acetazolamide*, Methazolamide, Dichlorphenamide.

Thiazides: Chlorthiazide*, Hydrochlorothiazide, Hydroflumethiazide, Cyclothiazide, Loop diuretics: Furosemide*, Bumetanide, Ethacrynic acid. Potassium sparing Diuretics: Spironolactone, Triamterene, Amiloride. Osmotic Diuretics: Mannitol.

Anti-hypertensive Agents: Timolol, Captopril, Lisinopril, Enalapril, Benazepril hydrochloride, Quinapril hydrochloride, Methyldopate hydrochloride,* Clonidine hydrochloride, Guanethidine monosulphate, Guanabenz acetate, Sodium nitroprusside, Diazoxide,Minoxidil, Reserpine, Hydralazine hydrochloride.

UNIT – III

Anti-arrhythmic Drugs: Quinidine sulphate, Procainamide hydrochloride, Disopyramide phosphate*, Phenytoin sodium, Lidocaine hydrochloride, Tocainide hydrochloride, Mexiletine hydrochloride, Lorcainide hydrochloride, Amiodarone, Sotalol.

Anti-hyperlipidemic agents: Clofibrate, Lovastatin, Cholesteramine and Cholestipol

Coagulant & Anticoagulants: Menadione, Acetomenadione, Warfarin*, Anisindione, clopidogrel

Drugs used in Congestive Heart Failure: Digoxin, Digitoxin, Nesiritide, Bosentan, Tezosentan.

UNIT – IV

Drugs acting on Endocrine system: Nomenclature, Stereochemistry and metabolism of steroids Sex hormones: Testosterone, Nandralone, Progestrones, Oestriol, Oestradiol, Oestrione, Diethyl stilbestrol.

Drugs for erectile dysfunction: Sildenafil, Tadalafil. Oral contraceptives: Mifepristone, Norgestril, Levonorgestrol. Corticosteroids: Cortisone, Hydrocortisone, Prednisolone, Betamethasone, Dexamethasone. Thyroid and antithyroid drugs: L-Thyroxine, L-Thyronine, Propylthiouracil, Methimazole.

UNIV – V

Antidiabetic agents Insulin and its preparations Sulfonyl ureas: Tolbutamide*, Chlorpropamide, Glipizide, Glimepiride. Biguanides: Metformin. Thiazolidinediones: Pioglitazone, Rosiglitazone. Meglitinides: Repaglinide, Nateglinide. Glucosidase inhibitors: Acrabose, Voglibose.

Local Anesthetics: SAR of Local anesthetics**.** Benzoic Acid derivatives; Cocaine, Hexylcaine, Meprylcaine, Cyclomethycaine, Piperocaine. Amino Benzoic acid derivatives: Benzocaine*, Butamben, Procaine*, Butacaine, Propoxycaine, Tetracaine, Benoxinate. Lidocaine/Anilide derivatives: Lignocaine, Mepivacaine, Prilocaine, Etidocaine. Miscellaneous: Phenacaine, Diperodon, and Dibucaine.*

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. Wilson and Giswold's Organic medicinal and Pharmaceutical Chemistry.
2. Foye's Principles of Medicinal Chemistry.
3. Burger's Medicinal Chemistry, Vol I to IV.
4. Introduction to principles of drug design- Smith and Williams.
5. Remington's Pharmaceutical Sciences.
6. Martindale's extra pharmacopoeia.
7. Organic Chemistry by I.L. Finar, Vol. II.
8. The Organic Chemistry of Drug Synthesis by Lednicer, Vol. 1to 5.
9. Indian Pharmacopoeia.
10. Text book of practical organic chemistry- A.I.Vogel.

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Antihistaminic agents: Histamine, receptors and their distribution in the Human body.	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
2	1–antagonists: Diphenhydramine hydrochloride*, Dimenhydrinate, Doxylamines cuccinate	Lecture	4,5	Mid Term-1, Quiz & End Sem Exam
3	lemastine fumarate, Diphenylphyraline hydrochloride, Tripelenamine hydrochloride, Chlorcyclizine hydrochloride, Meclizine hydrochloride, Buclizine hydrochloride, Chlorpheniramine maleate	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
4	Triprolidine hydrochloride*, Phenidamine tartarate, Promethazine hydrochloride*, Trimeprazine tartrate	Tutorial	1,2,3	Mid Term-1, Quiz & End Sem Exam
5	Cyproheptadine hydrochloride, Azatidine maleate, Astemizole, Loratadine, Cetirizine, Levocetrazine Cromolyn sodium	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
6	H2-antagonists: Cimetidine*, Famotidine, Ranitidine	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
7	Gastric Proton pump inhibitors: Omeprazole,	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam

	Lansoprazole, Rabeprazole, Pantoprazole.			
8	Anti-neoplastic agents: Alkylating agents: Meclorethamine*, Cyclophosphamide, Melphalan,	Tutorial	1,2,3,4	Mid Term-1, Quiz & End Sem Exam
9	Anti-anginal: Vasodilators: Amyl nitrite, Nitroglycerin*, Pentaerythritol tetranitrate, Isosorbide dinitrite*	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
10	Dipyridamole. Calcium channel blockers: Verapamil, Bepridil hydrochloride, Diltiazem hydrochloride, Nifedipine, Amlodipine, Felodipine, Nicardipine, Nimodipine.	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
11	Diuretics: Carbonic anhydrase inhibitors: Acetazolamide*, Methazolamide, Dichlorphenamide.	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
12	Thiazides: Chlorthiazide*, Hydrochlorothiazide, Hydroflumethiazide, Cyclothiazide, Loop diuretics: Furosemide*	Tutorial	4, 1,2,3	Mid Term-1, Quiz & End Sem Exam
13	Bumetanide, Ethacrynic acid. Potassium sparing Diuretics: Spironolactone, Triamterene, Amiloride. Osmotic Diuretics: Mannitol.	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
14	Anti-hypertensive Agents: Timolol, Captopril, Lisinopril, Enalapril, Benazepril hydrochloride, Quinapril hydrochloride	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
15	Methyldopate hydrochloride,* Clonidine hydrochloride, Guanethidine monosulphate,	Lecture	5,1,2,3	Mid Term-1, Quiz & End Sem Exam
16	Guanabenz acetate, Sodium nitroprusside, Diazoxide,Minoxidil, Reserpine, Hydralazine hydrochloride.	Tutorial	1,2,3	Mid Term-1, Quiz & End Sem Exam
17	Anti-arrhythmic Drugs: Quinidine sulphate, Procainamide	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam

	hydrochloride, , Lorcainide hydrochloride, Amiodarone, Sotalol.			
18	Disopyramide phosphate*, Phenytoin sodium, Lidocaine hydrochloride, Tocainide hydrochloride, Mexiletine hydrochloride	Lecture	5, 1,2,3	Mid Term-2, Quiz & End Sem Exam
19	Anti-hyperlipidemic agents: Clofibrate, Lovastatin, Cholesteramine and Cholestipol	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
20	Coagulant & Anticoagulants: Menadione, Acetomenadione,	Tutorial	1,2,3	Mid Term-2, Quiz & End Sem Exam
21	Warfarin*, Anisindione, clopidogrel	Lecture	5, 1,2,3	Mid Term-2, Quiz & End Sem Exam
22	Drugs used in Congestive Heart Failure	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
23	Digoxin, Digitoxin,	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
24	Nesiritide, Bosentan, Tezosentan.	Tutorial	1,2,3	Mid Term-2, Quiz & End Sem Exam
25	Drugs acting on Endocrine system	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
26	Nomenclature	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
27	Stereochemistry and	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
28	metabolism of steroids Sex hormones	Tutorial	1,2,3	Mid Term-2, Quiz & End Sem Exam
29	Testosterone, Nandralone, Progestrones, Oestriol, Oestradiol, Oestrione, Diethyl stilbestrol.	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
30	Drugs for erectile dysfunction	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
31	Sildenafil, Tadalafil	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
32	Oral contraceptives: Mifepristone, Norgestril, Levonorgestrol.	Tutorial	1,2,3	Mid Term-2, Quiz & End Sem Exam
33	Corticosteroids: Cortisone, Hydrocortisone	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
34	Prednisolone, Betamethasone, Dexamethasone	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
35	Antidiabetic agents	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
36	Insulin and its preparations Sulfonyl ureas:, Glipizide	Tutorial	1,2,3	Mid Term-2, Quiz & End Sem Exam

Dr. Mohanty

37	Tolbutamide*, Chlorpropamide	Lecture	5, 1,2,3	Mid Term-2, Quiz & End Sem Exam
38	Glimepiride. Biguanides: Metformin	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
39	Thiazolidinediones: Pioglitazone, Rosiglitazone.	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
40	Meglitinides: Repaglinide, Nateglinide	Tutorial	1,2,3	Mid Term-2, Quiz & End Sem Exam
41	Glucosidase inhibitors:	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
42	Acrabose, Voglibose	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
43	Local Anesthetics:	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
44	SAR of Local anesthetics.	Tutorial	5	Mid Term-2, Quiz & End Sem Exam
45	Benzoic Acid derivatives	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
46	Cocaine, Hexylcaine	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
47	Meprylcaine, Cyclomethycaine,	Lecture	1,2,3	Quiz & End Sem Exam
48	Piperocaine.	Tutorial	1,2,3	Quiz & End Sem Exam
49	Amino Benzoic acid derivatives:	Lecture	1,2,3	Quiz & End Sem Exam
50	Benzocaine*, Butamben,	Lecture	5	Quiz & End Sem Exam
51	Procaine*, Butacaine,	Lecture	5	Quiz & End Sem Exam
52	Propoxycaine, Tetracaine	Tutorial	1,2,3	Quiz & End Sem Exam
53	Lidocaine/Anilide derivatives	Lecture	1,2,3	Quiz & End Sem Exam
54	Lignocaine, Mepivacaine,	Lecture	1,2,3	Quiz & End Sem Exam
55	*Prilocaine,*	Lecture	1,2,3	Quiz & End Sem Exam
56	Etidocaine.	Tutorial	1,2,3	Quiz & End Sem Exam
57	*Miscellaneous: Phenacaine,*	Lecture	1,2,3	Quiz & End Sem Exam
58	*Diperodon,*	Lecture	1,2,3	Quiz & End Sem Exam
59	*Dibucaine.**	Lecture	5	Quiz & End Sem Exam
60	*Synthesis of Dibucaine.**	Tutorial	5	Quiz & End Sem Exam

Dr. Mohanty

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP501T.1	***BP501T.1.*** Understand the chemistry of drugs with respect to their pharmacological activity	3	-	-	-	2	2	1	-	1	-	-				
BP501T.2.	**BP501T.2.** Understand the drug metabolic pathways, adverse effect and therapeutic value of drugs	3	-	-	1	-	2	-	-	-	-	3				
BP501T.3.	***BP501T.3.*** Understand the mechanism of action.	3	2	-	3	-	2	-	-	-	-	3				
BP501T.4.	**BP501T.4**. Know the Structural Activity Relationship of different class of drugs.	2	2	3	3	-	1	-	-	-	-	3				
BP501T.5.	***BP501T.5***. Study the chemical synthesis of selected drugs.	1	-	3	-	-	-	-	-	-	-	3				

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutical Chemistry I MID-SEMESTER (SEM –Ist) 2020-21						
Class: B.Pharm, V Semester						
Subject Name: BP501T. MEDICINAL CHEMISTRY – II (Theory)		Time: 1 Hrs		Max. Marks: 30		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3,4,5	Q.6,8,9	Q.2	Q.7, 10		

The student will be able to

CO1. Understand the chemistry of drugs with respect to their pharmacological activity

CO2. Understand the drug metabolic pathways, adverse effect and therapeutic value of drugs

CO3. Understand the mechanism of action.

CO.4. Know the Structural Activity Relationship of different class of drugs.

CO.5. Study the chemical synthesis of selected drugs.

CO Map	Question No.	Question	Marks
CO4	Q.1	Define the term anti-arrhythmic agent	2
CO5	Q.2	Draw the chemical structures of Quinidine sulphate, Procainamide hydrochloride along with medicinal uses.	2
CO1	Q.3	Define Anti-hyperlipidemic agents with two suitable drug structural examples.	2
CO2	Q.4	Write the synthetic route chemical reaction of Warfarin	2
CO2	Q.5	Write the chemical structural difference between Menadione and Acetomenadione	2
CO1	Q.6	Write the classification mechanism and the therapeutic uses of anti-arrhythmic agents.	10
CO4	Q.7	Discuss about the classification and mechanism of Anti-hypertensive Agents	10
CO3	Q.8	Write short notes on H2-antagonists	5
CO2	Q.9	scuss about the mechanism and ADR of Carbonic anhydrase inhibitors with suitable chemical structural examples.	5
CO4	Q.10	Write short notes on Levocetrazine and Cromolyn sodium drugs	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

100 % Percentage of students secured more than 60% marks, so this course Medicinal Chemistry III – Theory (BP501T) attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICS

PROGRAMME OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-21

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions

[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess

societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10].**Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11].**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "-"

PROGRAMME ARTICULATION MATRIX												
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
V SEM	BP 502 T	3	3	3	3	1	3	1	-	2	2	2

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICS
Course Handout
Course : INDUSTRIAL PHARMACY-I(Theory)
Course Code : BP502T, Crédits : 04, Session :2020-21 (Odd Sem.), Class : B. Pharm. 3rdYear
Faculty Name : Dr. Neeraj Mishra, Dr. Dr. Jovita Kanoujia

A. Introduction: Course enables the student to understand and appreciate the influence of pharmaceutical additives and various pharmaceutical dosage forms on the performance ofthe drug product.Upon completion of the course, the student shall be able to:

1. Know the various pharmaceutical dosage forms and their manufacturing techniques.
2. Know various considerations in development of pharmaceutical dosage forms
3. Formulate solid, liquid and semisolid dosage forms and evaluate them for their quality

B. Course Outcomes: At the end of the course, students will be able to:

BP502T.1 Outline the assessment of physicochemical properties of drugs as a tool in the optimization of solid, liquid oral and parenteral dosage forms and its impact on stability of dosage forms.

BP502T.2. Demonstrate tablets, capsules, liquid orals, cosmetics using established procedures and technology.

BP502T.3. Examine the facilities and standards necessary for the industrial production of sterile dosage forms and ophthalmic preparations.

BP502T.4. Analyzeappropriate packaging materials for various pharmaceutical dosage forms.

BP502T.5 Identify containers, closures, valves and propellants for different types of aerosol systems.

C. Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

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D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	A minimum of 80% attendance is required to be maintained by a student to be qualified for taking up the Odd Semester examination	A	4 %
	Quiz/ Assignment/Open book test/Field work/Group discussion/ Seminar	Q/A/OBT/FW/GD/S	3%
	Student – Teacher interaction	STA	3%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

Q: Quiz, A: Assignment, OBT: Open book test, FW: Field work, GD: Group discussion, S: Seminar

E. Syllabus

Module I: **Preformulation Studies:**

Introduction to preformulation, goals and objectives, study ofphysicochemical characteristics of drug substances.

a. Physical properties: Physical form (crystal & amorphous), particle size, shape, flowproperties, solubility profile (pKa, pH, partition coefficient), polymorphism

b. Chemical Properties: Hydrolysis, oxidation, reduction, racemisation, polymerizationBCS classification of drugs & its significant

Application of preformulation considerations in the development of solid, liquid oral andparenteral dosage forms and its impact on stability of dosage forms.

Module II: Tablets:

a. Introduction, ideal characteristics of tablets, classification of tablets. Excipients,Formulation of tablets, granulation methods, compression and processing problems.Equipments and tablet tooling.

b. Tablet coating: Types of coating, coating materials, formulation of coatingcomposition, methods ofcoating, equipment employed and defects in coating.

c. Quality control tests: In process and finished product tests

Liquid orals: Formulation and manufacturing consideration of syrups and elixirssuspensions and emulsions; Filling and packaging; evaluation of liquid oralsofficial in pharmacopoeia

Module III: Capsules:

a. Hard gelatin capsules: Introduction, Production of hard gelatin capsule shells. Sizeof capsules, Filling, finishing and special techniques of formulation of hard gelatine capsules, manufacturing defects. In process and final product quality control testsfor capsules.

b. Softgelatin capsules: Nature of shell and capsule content, size ofcapsules,importance of base adsorption and minim/gram factors, production, inprocess and final product quality control tests. Packing, storage and stability testingof soft gelatin capsules and their applications.

Pellets: Introduction, formulation requirements, pelletization process, equipments formanufacture of pellets

Module IV: Parenteral Products:

a. Definition, types, advantages and limitations. Preformulation factors and essentialrequirements, vehicles, additives, importance of isotonicity

b. Production procedure, production facilities and controls,aseptic processing

c. Formulation of injections, sterile powders, large volume parenterals andlyophilized products.

d. Containers and closures selection, filling and sealing of ampoules, vials and infusionfluids. Quality control tests of parenteral products.

Ophthalmic Preparations: Introduction, formulation considerations; formulation of eyedrops, eye ointments and eye lotions; methods of preparation; labeling, containers;evaluation of ophthalmic preparations

Module V: Cosmetics: Formulation and preparation of the following cosmetic preparations:
lipsticks, shampoos, cold cream and vanishing cream, tooth pastes, hair dyes andsunscreens.

Pharmaceutical Aerosols: Definition, propellants, containers, valves, types of aerosolsystems; formulation and manufacture of aerosols; Evaluation of aerosols; Qualitycontrol and stability studies.

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Packaging Materials Science: Materials used for packaging of pharmaceutical products,factors influencing choice of containers, legal and official requirements for containers,stability aspects of packaging materials, quality control tests.

F. Examination Scheme:

Components	CT	A	Q/A/OBT/FW/GD/S	STI	EE
Weightage (%)	15	4	3	3	75

Q: Quiz, A: Assignment, OBT: Open book test, FW: Field work, GD: Group discussion, S: Seminar, STI: Student – Teacher interaction

G. Suggested Text/Reference Books:

1. Pharmaceutical dosage forms - Tablets, volume 1 -3 by H.A. Liberman, Leon Lachman&J.B.Schwartz
2. Pharmaceutical dosage form - Parenteral medication vol- 1&2 by Liberman &Lachman
3. Pharmaceutical dosage form disperse system VOL-1 by Liberman & Lachman
4. Modern Pharmaceutics by Gilbert S. Banker & C.T. Rhodes, 3rd Edition
5. Remington: The Science and Practice of Pharmacy, 20th edition PharmaceuticalScience (RPS)
6. Theory and Practice of Industrial Pharmacy by Liberman & Lachman
7. Pharmaceutics- The science of dosage form design by M.E.Aulton, Churchilllivingstone, Latest edition
8. Introduction to Pharmaceutical Dosage Forms by H. C.Ansel, Lea &Febiger,Philadelphia, 5thedition, 2005
9. Drug stability - Principles and practice by Cartensen& C.J. Rhodes, 3rd Edition,Marcel Dekker Series, Vol 107.
10. Khar RK. Lachman/liebermans: the theory and practice of industrial pharmacy. CBS Publishers & Distribution; 2013.

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1.	Introduction to preformulation, goals and objectives	Lecture	BP502T.1	Mid Term-1, Quiz/ Assignment/Open book test/& End Sem Exam
2.	Study of physicochemical characteristics of drug	Lecture	BP502T.1	Mid Term-1, Quiz/ Assignment/Open book test/& End Sem Exam
3.	Physical form (crystal & amorphous), particle size, shape	Lecture	BP502T.1	Mid Term-1, Quiz/ Assignment/Open book test/& End Sem Exam
4.	Tutorial 1	Tutorial 1	BP502T.1	
5.	Flowproperties, solubility profile (pKa, pH, (Maximum 1000 characters allowed)	Lecture	BP502T.1	Mid Term-1, Quiz/ Assignment/Open book test/& End Sem Exam
6.	Hydrolysis, oxidation, reduction, racemisation,	Lecture	BP502T.1	Mid Term-1, Quiz/ Assignment/Open

	polymerization			book test/& End Sem Exam
7.	Application of preformulation considerations in the development of soliddosage forms and its impact on stability of dosage forms.	Lecture	BP502T.1	Mid Term-1, Quiz/ Assignment/Ope n book test/& End Sem Exam
8.	Tutorial 2	Tutorial 2		
9.	Application of preformulation considerations in the development of liquid oraldosage forms and its impact on stability of dosage forms.	Lecture	BP502T.1	Mid Term-1, Quiz/ Assignment/Ope n book test/& End Sem Exam
10.	Tablets: Introduction, ideal characteristics of tablets. Classification of tablets.	Lecture	BP502T.1	Mid Term-1, Quiz/ Assignment/Open book test/& End Sem Exam
11.	Excipients,Formulation of tablets.	Lecture	BP502T.2	Mid Term-1, Quiz/ Assignment/Open book test/& End Sem Exam
12.	Tutorial 3	Tutorial 3	BP502T.2	
13.	Granulation methods, compression and processing problems	Lecture	BP502T.2	Mid Term-1, Quiz/ Assignment/Open book test/& End Sem Exam
14.	Equipments and tablet tooling.	Lecture	BP502T.2	Mid Term-1, Quiz/ Assignment/Open book test/& End Sem Exam
15.	Tablet coating: Types of coating, coating materials,	Lecture	BP502T.2	Mid Term-1, Quiz/ Assignment/Open book test/& End Sem Exam
16.	Tutorial 4	Tutorial 4	BP502T.2	
17.	Formulation of coating composition, methods of coating,	Lecture	BP502T.2	Mid Term-1, Quiz/ Assignment/Open book test/& End Sem Exam
18.	Equipment employed in coating and defects in coating.	Lecture	BP502T.2	Mid Term-1, Quiz/ Assignment/Open book test/& End Sem Exam
19.	Quality control tests: In process and finished product tests	Lecture	BP502T.2	Mid Term-1, Quiz/ Assignment/Open book test/& End Sem

				Exam
20.	Tutorial 5	Tutorial 5	BP502T.2	
21.	Liquid orals: Formulation and manufacturing consideration of syrups and elixirs. Filling and packaging; evaluation of liquid oralsofficial in pharmacopoeia	Lecture	BP502T.2	Mid Term-1, Quiz/ Assignment/Open book test/& End Sem Exam
22.	Formulation and manufacturing consideration of suspensions and emulsions	Lecture	BP502T.2	Mid Term-1, Quiz/ Assignment/Ope n book test/& End Sem Exam
23.	Filling and packaging;	Lecture	BP502T.2	Mid Term-1, Quiz/ Assignment/Ope n book test/& End Sem Exam
24.	Tutorial 6	Tutorial 6	BP502T.2	
25.	Evaluation of liquid orals official in pharmacopoeia	Lecture	BP502T.2	Mid Term-1, Quiz/ Assignment/Ope n book test/& End Sem Exam
26.	Hard gelatin capsules: Introduction, Production of hard gelatin capsule shells. Size of capsules	Lecture	BP502T.3	Mid Term-1, Quiz/ Assignment/Ope n book test/& End Sem Exam
27.	Filling, finishing and special techniques of formulation of hard gelatin capsules, manufacturing defects.	Lecture	BP502T.3	Mid Term-1, Quiz/ Assignment/Ope n book test/& End Sem Exam
28.	Tutorial 7	Tutorial 7	BP502T.2	
29.	In process and final product quality control tests for capsules.	Lecture	BP502T.3	Mid Term-1, Quiz/ Assignment/Ope n book test/& End Sem Exam
30.	Soft gelatin capsules: Nature of shell and capsule content, size of capsules	Lecture	BP502T.3	Mid Term-1, Quiz/ Assignment/Ope n book test/& End Sem Exam
31.	Importance of base adsorption and minim/gram factors. Production, in process and final product quality control tests.	Lecture	BP502T.3	Mid Term-1, Quiz/ Assignment/Ope n book test/& End Sem Exam
32.	Tutorial 8	Tutorial 8	BP502T.3	

Dr. Mohanty

33.	Packing, storage of soft gelatin capsules. Stability testing of soft gelatin capsules and their applications.	Lecture	BP502T.3	Mid Term-1, Quiz/ Assignment/Ope n book test/& End Sem Exam
34.	Pellets: Introduction, formulation requirements,	Lecture	BP502T.3	Mid Term-1, Quiz/ Assignment/Ope n book test/& End Sem Exam
35.	Pelletization process, equipments for manufacture of pellets	Lecture	BP502T.3	Mid Term-1, Quiz/ Assignment/Ope n book test/& End Sem Exam
36.	Tutorial 9	Tutorial 9	BP502T.3	
37.	Parenteral Products: a. Definition, types, advantages and limitations.	Lecture	BP502T.3	Mid Term-2, Quiz/ Assignment/Open book test/& End Sem Exam
38.	Preformulation factors and essentialrequirements, vehicles, additives, importance of isotonicity	Lecture	BP502T.3	Mid Term-2, Quiz/ Assignment/Open book test/& End Sem Exam
39.	b. Production procedure, production facilities and controls,aseptic processing	Lecture	BP502T.4	Mid Term-2, Quiz/ Assignment/Open book test/& End Sem Exam
40.	Tutorial 10	Tutorial 10	BP502T.4	
41.	Formulation of injections, sterile powders, large volume parenterals andlyophilized products.	Lecture	BP502T.4	Mid Term-2, Quiz/ Assignment/Open book test/& End Sem Exam
42.	Formulation of eye drops, and eye ointments methods of preparation	Lecture	BP502T.4	Mid Term-2, Quiz/ Assignment/Open book test/& End Sem Exam
43.	Containers and closures selection, filling and sealing of ampoules, vials and infusion fluids.	Lecture	BP502T.4	Mid Term-2, Quiz/ Assignment/Open book test/& End Sem Exam
44.	Tutorial 11	Tutorial 11	BP502T.4	
45.	Quality control tests of parenteral products.	Lecture	BP502T.4	Mid Term-2, Quiz/ Assignment/Open book test/& End Sem Exam
46.	Ophthalmic Preparations: Introduction, formulation considerations; formulation of eye drops, eye ointments and eye lotions;	Lecture	BP502T.4	Mid Term-2, Quiz/ Assignment/Open book test/& End Sem Exam

Dr. Mohanty

47.	Methods of preparation; labeling, containers; evaluation of ophthalmic preparations	Lecture	BP502T.4	Mid Term-2, Quiz/ Assignment/Open book test/& End Sem Exam
48.	Tutorial 12	Tutorial 12	BP502T.4	
49.	Cosmetics: Formulation and preparation of the following cosmetic preparations: lipsticks, shampoos,	Lecture	BP502T.5	Mid Term-2, Quiz/ Assignment/Open book test/& End Sem Exam
50.	cold cream and vanishing cream, tooth pastes	Lecture	BP502T.5	Mid Term-2, Quiz/ Assignment/Open book test/& End Sem Exam
51.	Hair dyes andsunscreens.	Lecture	BP502T.5	Mid Term-2, Quiz/ Assignment/Open book test/& End Sem Exam
52.	Tutorial 13	Tutorial 13	BP502T.5	
53.	Pharmaceutical Aerosols: Definition, propellants, containers, valves, types of aerosolsystems	Lecture	BP502T.5	Mid Term-2, Quiz/ Assignment/Open book test/& End Sem Exam
54.	Formulation and manufacture of aerosols	Lecture	BP502T.5	Mid Term-2, Quiz/ Assignment/Open book test/& End Sem Exam
55.	Evaluation of aerosols; Quality control and stability studies.	Lecture	BP502T.5	Mid Term-2, Quiz/ Assignment/Open book test/& End Sem Exam
56.	Tutorial 14	Tutorial 14	BP502T.5	
57.	Packaging Materials Science: Materials used for packaging of pharmaceutical products, factors influencing choice of containers	Lecture	BP502T.5	Mid Term-2, Quiz/ Assignment/Open book test/& End Sem Exam
58.	Legal and official requirements for containers, stability aspects of packaging materials	Lecture	BP502T.5	Mid Term-2, Quiz/ Assignment/Open book test/& End Sem Exam
59.	Quality control tests	Lecture	BP502T.5	Mid Term-2, Quiz/ Assignment/Open book test/& End Sem Exam
60.	Tutorial 15	Tutorial 15	BP502T.5	

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP502T.1	Outline the assessment of physicochemical properties of drugs as a tool in the optimization of solid, liquid oral and parenteral dosage forms and its impact on stability of dosage forms.	3	1	2	3	1	1	2	1	1	2	2
BP502T.2	Demonstrate tablets, capsules, liquid orals, cosmetics using established procedures and technology.	3	2	3	3	2	3	-	1	1	1	1
BP502T.3	Examine the facilities and standards necessary for the industrial production of sterile dosage forms and ophthalmic preparations.	3	3	3	3	2	2	-	2	2	1	1
BP502T.4	Analyze appropriate packaging materials for various pharmaceutical dosage forms.	3	3	2	3	2	1	-	1	1	-	2
BP502T.5	Identify containers, closures, valves and propellants for different types of aerosol systems.	3	3	2	3	3	2	-	1	-	-	-

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutics I MID-SEMESTER (SEM–V) 2020-21						
Class: B. Pharm V Semester						
Subject Name: Industrial Pharmacy I– Theory		Time: 1 Hrs			Max. Marks: 30	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q. 1,3,5	Q. 2,4	Q. 7,8,9		Q. 10	

Student will be able to
CO1: Outline the assessment of physicochemical properties of drugs as a tool in the optimization of solid, liquid oral and parenteral dosage forms and its impact on stability of dosage forms.
CO2: Demonstrate tablets, capsules, liquid orals, cosmetics using established procedures and technology.

CO Map	Question No.	Question	Marks
CO1	Q.1	Define polymorphism with examples.	2
CO2	Q.2	What are dispersible tablet and effervescent tablet?	2
	Q.3	Define tablet excipients with examples.	2
CO2	Q.4	What is base adsorption?	2
CO2	Q.5	Define Bloom strength.	2
CO1	Q.6	Define the term preformulation and explain the physical properties of preformulations.	10
	Q.7	Explain in detail the production of hard gelatin capsule shells.	
CO1	Q.8	Explain the BCS classification of drugs & its significant	5
CO2	Q.9	Explain various advantages and disadvantages of pellets.	5
CO2	Q.10	Evaluate the final product quality control tests for capsules.	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

97.8 % Percentage of students secured more than 60% marks, so this course Industrial Pharmacy I– Theory (BP502T) attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOLOGY

PROGRAMME OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-21

Programme Outcomes:

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1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "-"

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
V SEM	BP 503T	3	3	3	3	2	2	3	1	1	3	1	-	-	-

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACOLOGY
Course Handout
Course : Pharmacology-II (Theory)
Course Code : BP503T, Credits : 04, Session : 2020-21 (Odd Sem.), Class : B. Pharm. 3rd Year
Faculty Name : Dr. Shvetank Bhatt

A. Introduction: This subject is intended to impart the fundamental knowledge on various aspects (classification, mechanism of action, therapeutic effects, clinical uses, side effects and contraindications) of drugs acting on different systems of body and in addition, emphasis the basic concepts of bioassay.:

1. Know the classification of the drugs
2. Understand the mechanism of action, therapeutic uses, clinical uses and side effects of the dugs
3. Know the importance of bio-assays in preclinical drug discovery
4. Understand the pharmacology of drugs act on CVS, autacoids, coagulation, hormones etc.

B. Course Outcomes: At the end of the course, students will be able to:

BP503T.1. Discuss the Pharmacology of the drugs affecting the cardiovascular system.

BP503T.2. Explain the pharmacology of diuretics and anti-coagulants.

BP503T.3. Explain mechanism of actions and pharmacological actions of autacoids.

BP503T.4. Explain the pharmacology of the drugs acting on the endocrine system.

BP503T.5 Describe the various methods and applications of bioassay.

C. Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	A minimum of 80% attendance is required to be maintained by a student to be qualified for taking up the Odd Semester examination	A	4 %
	Quiz/ Assignment/Open book test/ Field work/Group discussion/ Seminar	Q/A/OBT/FW/GD/S	3%
	Student – Teacher interaction	STA	3%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

Q: Quiz, A: Assignment, OBT: Open book test, FW: Field work, GD: Group discussion, S: Seminar

E. Syllabus

Module I: **Pharmacology of drugs acting on cardio vascular system:**

a. Introduction to hemodynamic and electrophysiology of heart; b. Drugs used in congestive heart failure; c. Anti-hypertensive drugs; d. Anti-anginal drugs; e. Anti-arrhythmic drugs; f. Anti-hyperlipidemic drugs.

Module II: Pharmacology of drugs acting on cardio vascular and urinary system:

a. Drug used in the therapy of shock. b. Hematinics, coagulants and anticoagulants. c. Fibrinolytics and anti-platelet drugs d. Plasma volume expanders; a. Diuretics b. Anti-diuretics.

Module III Autocoids and related drugs:

Autocoids and related drugs a. Introduction to autacoids and classification b. Histamine, 5-HT and their antagonists. c. Prostaglandins, Thromboxanes and Leukotrienes. d. Angiotensin, Bradykinin and Substance P. e. Non-steroidal anti-inflammatory agents f. Anti-gout drugs g. Antirheumatic drugs

Module IV: Pharmacology of drugs acting on endocrine system:

Pharmacology of drugs acting on endocrine system a. Basic concepts in endocrine pharmacology. b. Anterior Pituitary hormones- analogues and their inhibitors. c. Thyroid hormones- analogues and their inhibitors. d. Hormones regulating plasma calcium level- Parathormone, Calcitonin and Vitamin-D. d. Insulin, Oral Hypoglycemic agents and glucagon. e. ACTH and corticosteroids

Module V: Pharmacology of drugs acting on endocrine system and bioassay of drugs:

Pharmacology of drugs acting on endocrine system a. Androgens and Anabolic steroids. b. Estrogens, progesterone and oral contraceptives. c. Drugs acting on the uterus; Bioassay a. Principles and applications of bioassay. b.Types of bioassay c. Bioassay of insulin, oxytocin, vasopressin, ACTH,d-tubocurarine,digitalis, histamine and 5-HT.

F. Examination Scheme:

Components	CT	A	Q/A/OBT/FW/GD/S	STI	EE
Weightage (%)	15	4	3	3	75

Q: Quiz, A: Assignment, OBT: Open book test, FW: Field work, GD: Group discussion, S: Seminar, STI: Student – Teacher interaction

G. Suggested Text/Reference Books:

1. Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology, Churchil Livingstone Elsevier
2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill.
3. Goodman and Gilman's, The Pharmacological Basis of Therapeutics
4. Marry Anne K. K., Lloyd Yee Y., Brian K. A., Robbin L.C., Joseph G. B., Wayne A. K., Bradley R.W., Applied Therapeutics, The Clinical use of Drugs, The Point Lippincott Williams & Wilkins.

5. Mycek M.J, Gelnet S.B and Perper M.M. Lippincott's Illustrated Reviews- Pharmacology.
6. K.D.Tripathi. Essentials of Medical Pharmacology, , JAYPEE Brothers Medical Publishers (P) Ltd, New Delhi

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1.	Introduction to hemodynamic and electrophysiology of heart	Lecture	BP503T.1	Mid Term-1, Quiz & End Sem Exam
2.	Drugs used in congestive heart failure	Lecture	BP503T.1	Mid Term-1, Quiz & End Sem Exam
3.	Drugs used in congestive heart failure	Lecture	BP503T.1	Mid Term-1, Quiz & End Sem Exam
4.	Tutorial 01	Tutorial 01		
5.	*Anti-hypertensive drugs*	Lecture	BP503T.1	Mid Term-1, Quiz & End Sem Exam
6.	Anti-anginal drugs	Lecture	BP503T.1	Mid Term-1, Quiz & End Sem Exam
7.	Anti-anginal drugs	Lecture	BP503T.1	Mid Term-1, Quiz & End Sem Exam
8.	Tutorial 02	Tutorial 02		
9.	Anti-arrhythmic drugs	Lecture	BP503T.1	Mid Term-1, Quiz & End Sem Exam
10.	Anti-hyperlipidemic drugs	Lecture	BP503T.1	Mid Term-1, Quiz & End Sem Exam
11.	Anti-hyperlipidemic drugs	Lecture	BP503T.1	Mid Term-1, Quiz & End Sem Exam
12.	Tutorial 03	Tutorial 04		
13.	Hematinics	Lecture	BP503T.2	Mid Term-1, Quiz & End Sem Exam
14.	Drug used in the therapy of shock	Lecture	BP503T.2	Mid Term-1, Quiz & End Sem Exam
15.	Coagulants	Lecture	BP503T.2	Mid Term-1, Quiz & End Sem Exam
16.	Tutorial 04	Tutorial 04		
17.	Anticoagulants	Lecture	BP503T.2	Mid Term-1, Quiz & End Sem Exam
18.	Fibrinolytics	Lecture	BP503T.2	Mid Term-1, Quiz & End Sem Exam
19.	Anti-platelet drugs	Lecture	BP503T.2	Mid Term-1, Quiz & End Sem Exam
20.	Tutorial 05	Tutorial 05		
21.	Plasma volume expanders	Lecture	BP503T.2	Mid Term-1, Quiz & End Sem Exam
22.	Pharmacology of drugs acting on urinary system	Lecture	BP503T.2	Mid Term-1, Quiz & End Sem Exam
23.	Diuretics	Lecture	BP503T.2	Mid Term-1, Quiz & End Sem Exam

24.	Tutorial 06	Tutorial 06		
25.	Anti-diuretic	Lecture	BP503T.2	Mid Term-1, Quiz & End Sem Exam
26.	Introduction to autacoids and classification	Lecture	BP503T.3	Mid Term-1, Quiz & End Sem Exam
27.	Histamine and their antagonists	Lecture	BP503T.3	Mid Term-1, Quiz & End Sem Exam
28.	Tutorial 07	Tutorial 07		
29.	Prostaglandins	Lecture	BP503T.3	Mid Term-1, Quiz & End Sem Exam
30.	Thromboxanes and Leukotrienes.	Lecture	BP503T.3	Mid Term-1, Quiz & End Sem Exam
31.	5-HT and their antagonists	Lecture	BP503T.3	Mid Term-1, Quiz & End Sem Exam
32.	Tutorial 08	Tutorial 08		
33.	Angiotensin, Bradykinin and Substance P	Lecture	BP503T.3	Mid Term-1, Quiz & End Sem Exam
34.	Non-steroidal anti-inflammatory agents	Lecture	BP503T.3	Mid Term-2, Quiz & End Sem Exam
35.	Anti-gout drugs	Lecture	BP503T.3	Mid Term-2, Quiz & End Sem Exam
36.	Tutorial 09	Tutorial 09		
37.	Antirheumatic drugs	Lecture	BP503T.3	Mid Term-2, Quiz & End Sem Exam
38.	Basic concepts in endocrine pharmacology	Lecture	BP503T.4	Mid Term-2, Quiz & End Sem Exam
39.	Anterior Pituitary hormones-analogues and their inhibitors	Lecture	BP503T.4	Mid Term-2, Quiz & End Sem Exam
40.	Tutorial 10	Tutorial 10		
41.	Thyroid hormones-analogues and their inhibitors	Lecture	BP503T.4	Mid Term-2, Quiz & End Sem Exam
42.	Hormones regulating plasma calcium level-Parathormone, Calcitonin and Vitamin-D	Lecture	BP503T.4	Mid Term-2, Quiz & End Sem Exam
43.	Insulin, Oral Hypoglycemic agents and glucagon	Lecture	BP503T.4	Mid Term-2, Quiz & End Sem Exam
44.	Tutorial 11	Tutorial 11		
45.	ACTH and corticosteroids	Lecture	BP503T.4	Mid Term-2, Quiz & End Sem Exam
46.	Pharmacology of drugs acting on endocrine system	Lecture	BP503T.4	Mid Term-2, Quiz & End Sem Exam
47.	Androgens and Anabolic	Lecture	BP503T.4	Mid Term-2, Quiz & End Sem Exam
48.	Tutorial 12	Tutorial 12		
49.	Estrogen and steroids	Lecture	BP503T.5	Mid Term-2, Quiz & End Sem Exam
50.	Estrogens and Progesterone	Lecture	BP503T.5	Mid Term-2, Quiz & End Sem Exam

Dr. Mohammad Ali

51.	Oral contraceptives and Drugs acting on the uterus	Lecture	BP503T.5	Mid Term-2, Quiz & End Sem Exam
52.	Tutorial 13	Tutorial 13		
53.	Basic concepts in endocrine pharmacology	Lecture	BP503T.5	Mid Term-2, Quiz & End Sem Exam
54.	Anterior Pituitary hormones-analogues and their inhibitors	Lecture	BP503T.5	Mid Term-2, Quiz & End Sem Exam
55.	Principles and applications of Bioassay, Types of bioassay	Lecture	BP503T.5	Mid Term-2, Quiz & End Sem Exam
56.	Tutorial 14	Tutorial 14		
57.	Bioassay of insulin, oxytocin, vasopressin, ACTH	Lecture	BP503T.5	Mid Term-2, Quiz & End Sem Exam
58.	Bioassay of d-tubocurarine, digitalis,	Lecture	BP503T.5	Mid Term-2, Quiz & End Sem Exam
59.	Bioassay of histamine and 5-HT	Lecture	BP503T.5	Mid Term-2, Quiz & End Sem Exam
60.	Tutorial 15	Tutorial 15		Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP503T.1	Discuss the drugs acting on the various disorders of cardiovascular system	2	2	3	2	-	1	2	1	-	-	1
BP503T.2	Discuss the drugs acting on the various disorders of cardiovascular system including diuretics and drugs acts on coagulation and antiplatelet aggregatory drugs	2	2	2	3	-	1	1	1	-	-	1
BP503T.3	Describe the complete pharmacology of autacoids, NSAIDs and drugs act on inflammatory disorders like gout and rheumatoid arthritis	2	1	1	-	-	1	3	2	-	-	-
BP503T.4	Explain the mechanism of action and Pharmacology of drugs acting on endocrine system	2	2	2	1	-	1	-	-	-	-	-
BP503T.5	Explain the mechanism of action and Pharmacology of drugs acting on endocrine system including male and female sex hormones & describe the importance of bioassays	2	1	-	-	-	2	1	1	-	-	1

Sample Question Paper

Amity School of Pharmacy Department of Pharmacology I MID-SEMESTER(SEM–V)2020-21						
Class: B.Pharm. V Semester						
Subject Name: Pharmacology-II Theory		Time:1 Hrs		Max.Marks:30		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,4	Q.2,3	Q.4	Q.2,5,6		

CO Map	Question No.	Question	Marks
CO1	Q.1	Write down any four applications of bioassays.	2
CO1	Q.2	List out any two functions of seratonin.	2
	Q.3	Write note on Testosterone Hormones	2
	Q.4	Write down the mechanism of action of COX pathway	
	Q.5	Write down the mechanism of action of biguanides	
CO1	Q.6	Explain the pharmacological actions of Thromboxanes	6
CO2	Q.7	Discuss about anti-diabetic agents and mechanism of action of sulfonylureas	10
CO2	Q.8	Explain the pharmacological actions of prostaglandins	5
	Q.9	Explain the bioassays methods of Acetylcholine.	5
CO2	Q.10	Classify the anti-gout drugs and anti-rheumatic drugs	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

97.8 % Percentage of students secured more than 60% marks, so this course Pharmacology II- Theory (BP503T) attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOGNOSY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-21

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
V SEM	-	3	1	1	1	3	2	2	2	2	3	2	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACONOSY
Course Handout
Course : Pharmacognosy and Phytochemistry–2nd THEORY
Course Code : BP504T Crédits : 04, Session :2022-23 (Even Sem.), Class : B.Pharm. 3rd Year
Faculty Name: Dr Naveen Sharma

A. Introduction: The course is designed to impart fundamental knowledge on the preparatory
pharmacy with arts and science of preparing the different conventional dosage forms.

B. Course Outcomes: At the end of the course, students will be able to:

BP504T.1. . To know the modern extraction techniques, characterization and identification of the
herbal drugs and phytoconstituents

BP504T.2. To understand the preparation and development of herbal formulation

BP504T.3. To understand the herbal drug interactions

BP504T.4. To carryout isolation and identification of phytoconstituents

BP504T.5. To impart the students the knowledge of how the
secondary metabolites are produced in the crude drugs, how to isolate and identify

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills.

Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	Description	Code	Weightage %
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

UNIT – I

Metabolic pathways in higher plants and their determination
a) Brief study of basic metabolic pathways and formation of different secondary metabolites
through these pathways- Shikimic acid pathway, Acetate pathways and Amino acid pathway. b) Study of utilization of radioactive isotopes in the investigation of biogenetic studies.

UNIT – II

General introduction, composition, chemistry & chemical classes, biosources, therapeutic
uses and commercial applications of following
secondary metabolites:
Alkaloids: Vinca, Rauwolfia, Belladonna, Opium,
Phenylpropanoids and Flavonoids: Lignans, Tea, Ruta
Steroids, Cardiac Glycosides & Triterpenoids: Liquorice, Dioscorea, Digitalis
Volatile oils: Mentha, Clove, Cinnamon, Fennel, Coriander,

Tannins: Catechu, Pterocarpus
Resins: Benzoin, Guggul, Ginger, Asafoetida, Myrrh, Colophony
Glycosides: Senna, Aloes, Bitter Almond
Iridoids, Other terpenoids & Naphthaquinones: Gentian, Artemisia, taxus, carotenoids

UNIT – III

Isolation, Identification and Analysis of Phytoconstituents

a) Terpenoids: Menthol, Citral, Artemisin
b) Glycosides: Glycyrhetinic acid & Rutin
c) Alkaloids: Atropine,Quinine,Reserpine,Caffeine
d) Resins: Podophyllotoxin, Curcumin

UNIT – IV Industrial production, estimation and utilization of the following phytoconstituents:
Forskolin, Sennoside, Artemisinin, Diosgenin, Digoxin, Atropine, Podophyllotoxin, Caffeine, Taxol, Vincristine and Vinblastine

UNIT – V Basics of Phytochemistry
Modern methods of extraction, application of latest techniques like Spectroscopy, chromatography and electrophoresis in the isolation, purification and identification of crude
drugs**.**

F. Examination Scheme:

Components	**A**	**CT**	**S/V/Q/HA**	**STI**	**EE**
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. W.C.Evans, Trease and Evans Pharmacognosy, 16th edition, W.B. Sounders & Co., London, 2009.

2. Mohammad Ali. Pharmacognosy and Phytochemistry, CBS Publishers & Distribution, New Delhi.

3. Text book of Pharmacognosy by C.K. Kokate, Purohit, Gokhlae (2007), 37th Edition,
Nirali Prakashan, New Delhi.

4. Herbal drug industry by R.D. Choudhary (1996), Ist Edn, Eastern Publisher, New Delhi.

5. Essentials of Pharmacognosy, Dr.SH.Ansari, IInd edition, Birla publications, New Delhi, 2007

6. Herbal Cosmetics by H.Pande, Asia Pacific Business press, Inc, New Delhi.

7. A.N. Kalia, Textbook of Industrial Pharmacognosy, CBS Publishers, New Delhi, 2005.

8. R Endress, Plant cell Biotechnology, Springer-Verlag, Berlin, 1994.

9. Pharmacognosy & Pharmacobiotechnology. James Bobbers, Marilyn KS, VE Tylor.

10. The formulation and preparation of cosmetic, fragrances and flavours. 11. Remington's Pharmaceutical sciences. 12. Text Book of Biotechnology by Vyas and Dixit.

13. Text Book of Biotechnology by R.C. Dubey.

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Brief study of basic metabolic pathways	Lecture	1,5	Mid Term-1, Quiz & End Sem Exam
2	formation of different secondary metabolites	Lecture	1,5	Mid Term-1, Quiz & End Sem Exam
3	Shikimic acid pathway	Lecture	1,5	Mid Term-1, Quiz & End Sem Exam
4	Quiz	Tutorial		Mid Term-1, Quiz & End Sem Exam
5	Acetate pathway	Lecture	1,5	Mid Term-1, Quiz & End Sem Exam
6	Amino acid pathway	Lecture	1,5	Mid Term-1, Quiz & End Sem Exam
7	Utilization of radioactive isotopes	Lecture	1,5	Mid Term-1, Quiz & End Sem Exam
8	Quiz	Tutorial		Mid Term-1, Quiz

				& End Sem Exam
9	Investigation of biogenetic studies	Lecture	1,5	Mid Term-1, Quiz & End Sem Exam
10	Alkaloids	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
11	Vinca, Rauwolfia	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
12	Seminar	Tutorial		Mid Term-1, Quiz & End Sem Exam
13	Belladonna, Opium	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
14	Phenylpropanoids and Flavonoids	Lecture	1,5	Mid Term-1, Quiz & End Sem Exam
15	Lignans, Tea, Rutin	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
16	Unit test	Tutorial		Mid Term-1, Quiz & End Sem Exam
17	Steroids, Cardiac Glycosides	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
18	Triterpenoids: Liquorice, Dioscorea	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
19	Digitalis	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
20	Group discussion on different topics	Tutorial		Mid Term-1, Quiz & End Sem Exam
21	Cinnamon, Fennel	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
22	Coriander and Tannins	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
23	Catechu, Pterocarpus	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
24	Quiz	Tutorial		Mid Term-1, Quiz & End Sem Exam
25	Resins: Benzoin	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
26	Guggul, Ginger	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
27	Asafoetida, Myrrh	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
28	Unit Test	Tutorial		Mid Term-1, Quiz & End Sem Exam
29	Colophony	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
30	Glycosides	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam

31	Senna,Aloe	Lecture	1,3	Mid Term-2, Quiz & End Sem Exam
32	Group discussion	Tutorial		Mid Term-2, Quiz & End Sem Exam
33	Bitter Almond	Lecture	1,3	Mid Term-2, Quiz & End Sem Exam
34	Iridoids, Other terpenoids	Lecture	1,,3	Mid Term-2, Quiz & End Sem Exam
35	Naphthaquinones	Lecture	3	Mid Term-2, Quiz & End Sem Exam
36	Seminar	Tutorial		Mid Term-2, Quiz & End Sem Exam
37	Gentian, Artemisia	Lecture	1,3	Mid Term-2, Quiz & End Sem Exam
38	Taxus, carotenoids	Lecture	1,3	Mid Term-2, Quiz & End Sem Exam
39	Terpenoids: Menthol	Lecture	1,3	Mid Term-2, Quiz & End Sem Exam
40	Unit test	Tutorial		Mid Term-2, Quiz & End Sem Exam
41	Glycosides: Glycyrhetinic acid	Lecture	1,5	Mid Term-2, Quiz & End Sem Exam
42	Alkaloids: Atropine,Quinine	Lecture	1,5	Mid Term-2, Quiz & End Sem Exam
43	Reserpine,Caffeine	Lecture	1,3	Mid Term-2, Quiz & End Sem Exam
44	Seminar	Tutorial		Mid Term-2, Quiz & End Sem Exam
45	Resins: Podophyllotoxin, Curcumin	Lecture	1,4	Mid Term-2, Quiz & End Sem Exam
46	Industrial production, estimation and utilization of the following phytoconstituents: Forskolin, Sennoside	Lecture	2,4	Mid Term-2, Quiz & End Sem Exam
47	Artemisinin, Diosgenin	Lecture	1,2,4	Quiz & End Sem Exam
48	Quiz	Tutorial		Quiz & End Sem Exam
49	Digoxin, Atropine	Lecture	1,2,4	Quiz & End Sem Exam
50	Podophyllotoxin, Caffeine	Lecture	1,2,4	Quiz & End Sem Exam
51	Taxol, Vincristine	Lecture	1,2,4	Quiz & End Sem Exam

52	Group discussion	Tutorial		Quiz & End Sem Exam
53	Modern methods of extraction	Lecture	2	Quiz & End Sem Exam
54	Spectroscopy techniques	Lecture	4,5	Quiz & End Sem Exam
55	Chromatography and electrophoresis	Lecture	4,5	Quiz & End Sem Exam
56	Unit test	Tutorial		Quiz & End Sem Exam
57	Isolation, purification and identification of crude drugs by spectroscopical , chromatography and electrophoresis	Lecture	2,4,5	Quiz & End Sem Exam
58	Basic principles of traditional system of medicine	Lecture	4,5	Quiz & End Sem Exam
59	Vinblastine,Rutin	Lecture	1,4,5	Quiz & End Sem Exam
60	Unit test	Tutorial		Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP504T.1	**BP504T.1**. To know the modern extraction	3	-	-	2	2	2	-	-	-	-	3				

	techniques, characterization and identification of the herbal drugs and phytoconstituents															
BP504T.2.	**BP504T.2**. To understand the preparation and development of herbal formulation	3	-	-	2	-	2	-	-	-	-	3				
BP504T.3.	**BP504T.3**. To understand the herbal drug interactions	3	2	-	2	-	2	-	-	-	-	3				
BP504T.4.	**BP504T.4**. To carryout isolation and identification of phytoconstituents	3	2	-	1	-	1	-	2	2	-	3				
BP504T.5.	**BP504T.5**. . To impart the students the knowledge of how the secondary metabolites are produced in the crude drugs, how to isolate and identify	3	-	-	2	-	-	-	-	-	-	3				

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacognosy I MID-SEMESTER (SEM –5th) 2020-21						
Class: B.Pharm, 6thSemester						
Subject Name: BP603T Herbal Drug Technology Theory		Time: 1 Hrs		Max. Marks: 30		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3,4,5	Q.6,8,9	Q.2	Q.7, 10		

The student will be able to

CO1. . To know the modern extraction techniques, characterization and identification of the herbal drugs and phytoconstituents

CO2. To understand the preparation and development of herbal formulation

CO3. To understand the herbal drug interactions

CO4. To carryout isolation and identification of phytoconstituents

CO5. . To impart the students the knowledge of how the secondary metabolites are produced in the crude drugs, how to isolate and identify

CO Map	Question No.	Question	Marks
CO4	Q.1	Give the source and chemical constituents of cinnamon?	2
CO5	Q.2	Give the applications of HPTLC?	2
CO1	Q.3	Explain Keller Killiani test?	2
CO2	Q.4	Explain Mayer's reagent test ?	2
CO3	Q.5	Give biological source of Aloe and Colophony?	2
CO1	Q.6	Explain industrial method of production and	10

Dr. Mohanty

		estimation of vincristine and diosgenin?	
CO4	Q.7	Explain microwave assisted extraction and solid phase extraction method?	10
CO3	Q.8	Discuss the industrial production and estimation of sennosides?	5
CO2	Q.9	Write a note on shikimic acid pathway and its significance?	5
CO4	Q.10	Write the method of isolation and estimation of caffeine?	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

100% Percentage of students secured more than 60% marks, so this course Pharmacognosy and Phytochemistry II– Theory (BP504T) attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICS

PROGRAMME OUTCOMES AND PROGRAMME-SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-21

Program Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills, and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific inquiry, thinking analytically, clearly, and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership, and team-building when planning changes required for the fulfillment of practice, and professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication, and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Programme Specific Outcomes:

PSO 1: Will be able to design, develop and implement efficient software for a given real life problem.

PSO 2: Will be able to apply knowledge of AI, Machine Learning and Data Mining in analyzing big data forextracting useful information from it and for performing predictive analysis.

PSO 3: Will be able to design, manage and secure wired/ wireless computer networks for transfer and sharing ofinformation.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
V SEM	BP505T	3	-	1	-	2	3	3	-	3	-	-				

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
Course Handout
Course: PHARMACEUTICAL JURISPRUDENCE THEORY
Course Code : BP505T, Crédits : 04, Session :2020-21 (Odd Sem.), Class : B.Pharm. 3rd Year
Faculty Name: Dr. A.N. Nagappa, Dr. Naveen Sharma, Dr. Pawan Kumar Gupta

A. Introduction: This course is designed to impart basic knowledge on important legislations related to the profession of pharmacy

B. Course Outcomes: At the end of the course, students will be able to:

BP505T.1. Interpret the Pharmaceutical legislations and their implications in the development, manufacturing, and marketing of pharmaceuticals.

BP505T.2 Relate Various Indian Pharmaceutical Acts and Laws with the Pharmacy profession

BP505T.3. Identify The regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals.

BP505T.4. Apply The code of ethics during the pharmaceutical practice.

BP505T.5. Make use of guidelines for using animals for experimentation

BP505T.6. Distinguish various types of Intellectual Property Rights.

C. Programme Outcomes:

[PO.1]. Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Programme Specific Outcomes:

PSO 1: Will be able to design, develop and implement efficient software for a given real life problem.

PSO 2: Will be able to apply knowledge of AI, Machine Learning and Data Mining in analyzing big data forextracting useful information from it and for performing predictive analysis.

PSO 3: Will be able to design, manage and secure wired/ wireless computer networks for transfer and sharing ofinformation.

E. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%

End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

F. Syllabus

UNIT – I

Drugs and Cosmetics Act, 1940 and its rules 1945: Objectives, Definitions, Legal definitions of schedules to the Act and Rules Import of drugs – Classes of drugs and cosmetics prohibited from import, Import under license or permit. Offences and penalties. Manufacture of drugs – Prohibition of manufacture and sale of certain drugs, Conditions for grant of license and conditions of license for manufacture of drugs, Manufacture of drugs for test, examination and analysis, manufacture of new drug, loan license and repacking

UNIT – II

Detailed study of Schedule G, H, M, N, P,T,U, V, X, Y, Part XII B, Sch F & DMR (OA) Sale of Drugs – Wholesale, Retail sale and Restricted license. Offences and penalties Labeling & Packing of drugs- General labeling requirements and specimen labels for drugs and cosmetics, List of permitted colors. Offences and penalties. Administration of the Act and Rules – Drugs Technical Advisory Board, Central drugs Laboratory, Drugs Consultative Committee, Government drug analysts, Licensing authorities, controlling authorities, Drugs Inspectors

UNIT – III

Pharmacy Act –1948: Objectives, Definitions, Pharmacy Council of India; its constitution and functions, Education Regulations, State and Joint state pharmacy councils; constitution and functions, Registration of Pharmacists, Offences and Penalties

Medicinal and Toilet Preparation Act –1955: Objectives, Definitions, Licensing, Manufacture In bond and Outside bond, Export of alcoholic preparations, Manufacture of Ayurvedic, Homeopathic, Patent & Proprietary Preparations. Offences and Penalties.

Narcotic Drugs and Psychotropic substances Act-1985 and Rules: Objectives, Definitions, Authorities and Officers, Constitution and Functions of narcotic & Psychotropic Consultative Committee, National Fund for Controlling the Drug Abuse, Prohibition, Control and Regulation, opium poppy cultivation and production of poppy straw, manufacture, sale and export of opium, Offences and Penalties

UNIT – IV

Study of Salient Features of Drugs and Magic Remedies Act and its rules: Objectives, Definitions, Prohibition of certain advertisements, Classes of Exempted advertisements, Offences and Penalties

Prevention of Cruelty to animals Act-1960: Objectives, Definitions, Institutional Animal Ethics Committee, CPCSEA guidelines for Breeding and Stocking of Animals, Performance of Experiments, Transfer and acquisition of animals for experiment, Records, Power to suspend or revoke registration, Offences and Penalties

National Pharmaceutical Pricing Authority: Drugs Price Control Order (DPCO)- 2013. Objectives, Definitions, Sale prices of bulk drugs, Retail price of formulations, Retail price and ceiling price of scheduled formulations, National List of Essential Medicines (NLEM)

UNIV – V

Pharmaceutical Legislations – A brief review, Introduction, Study of drugs enquiry committee, Health survey and development committee, Hathi committee and Mudaliar committee

Code of Pharmaceutical ethics Definition, Pharmacist in relation to his job, trade, medical profession and his profession, Pharmacist's oath •

Medical Termination of Pregnancy Act

- Right to Information Act
- Introduction to Intellectual Property Rights (IPR)

G. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

H. Suggested Text/Reference Books:

1. Forensic Pharmacy by B. Sures
2. Text book of Forensic Pharmacy by B.M. Mithal .
3. Handbook of drug law-by M.L. Mehra
4. A textbook of Forensic Pharmacy by N.K. Jain
5. Drugs and Cosmetics Act/Rules by Govt. of India publications.
6. Medicinal and Toilet preparations act 1955 by Govt. of India publications.
7. Narcotic drugs and psychotropic substances act by Govt. of India publications
8. Drugs and Magic Remedies act by Govt. of India publication
9. Bare Acts of the said laws published by Government. Reference books (Theory)

I. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	**Drugs and Cosmetics Act, 1940 and its rules 1945:** Objectives, Definitions, Legal definitions of schedules to the Act and	Lecture	1,2	Mid Term-1, Quiz & End Sem Exam
2	Rules Import of drugs – Classes of drugs and cosmetics prohibited from import,	Lecture	1,2	Mid Term-1, Quiz & End Sem Exam
3	Import under license or permit. Offenses and penalties.	Lecture	1,2	Mid Term-1, Quiz & End Sem Exam
4	Discussion on basics of Drugs and Cosmetics Act, 1940 and its rules 1945	Tutorial	1,2	Mid Term-1, Quiz & End Sem Exam
5	Manufacture of drugs – Prohibition of manufacture and sale of certain drugs,	Lecture	1,2	Mid Term-1, Quiz & End Sem Exam
6	Conditions for grant of license and conditions of license for manufacture of drugs,	Lecture	1,2	Mid Term-1, Quiz & End Sem Exam
7	Manufacture of drugs for test, examination and analysis,	Lecture	1,2	Mid Term-1, Quiz & End Sem Exam

8	Doubt clearing session	Tutorial	1,2,3	Mid Term-1, Quiz & End Sem Exam
9	manufacture of new drug, loan license and repacking license.	Lecture	1,2	Mid Term-1, Quiz & End Sem Exam
10	**Drugs and Cosmetics Act, 1940 and its rules 1945.** Detailed study of Schedule G, H, M, N, P,T,U, V, X, Y, Part XII B, Sch F & DMR (OA)	Lecture	1,2	Mid Term-1, Quiz & End Sem Exam
11	Detailed study of Schedule G, H, M, N, P,T,U, V, X, Y, Part XII B, Sch F & DMR (OA)	Lecture	1,2	Mid Term-1, Quiz & End Sem Exam
12	Revision of all schedules	Tutorial		Mid Term-1, Quiz & End Sem Exam
13	Sale of Drugs – Wholesale, Retail sale and Restricted license. Offences and penalties	Lecture	1,2	Mid Term-1, Quiz & End Sem Exam
14	Labeling & Packing of drugs- General labeling requirements and specimen labels for drugs and cosmetics	Lecture	1,2	Mid Term-1, Quiz & End Sem Exam
15	List of permitted colors. Offences and penalties. Administration of the Act and Rules – Drugs Technical Advisory Board	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
16	Class test	Tutorial	1,2,3	Mid Term-1, Quiz & End Sem Exam
17	Central drugs Laboratory, Drugs Consultative Committee	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
18	Government drug analysts, Licensing authorities, controlling authorities, Drugs Inspectors	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
19	**Pharmacy Act –1948:** Objectives, Definitions, Pharmacy Council of India; its constitution and functions	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
20	Group discussion on various authorities	Tutorial	1,3	Mid Term-1, Quiz & End Sem Exam
21	Education Regulations, State and Joint state pharmacy councils	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
22	constitution and functions of Education Regulations, State and Joint state pharmacy councils	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
23	Registration of	Lecture	1,2,3	Mid Term-1, Quiz

	Pharmacists, Offences & Penalties			& End Sem Exam
24	Quiz	Tutorial	1,2,3	Mid Term-1, Quiz & End Sem Exam
25	**Medicinal and Toilet Preparation Act –1955:** Objectives, Definitions, Licensing	Lecture	1,2	Mid Term-1, Quiz & End Sem Exam
26	Manufacture In bond and Outside bond, Export of alcoholic preparations	Lecture	1,2	Mid Term-1, Quiz & End Sem Exam
27	Manufacture of Ayurvedic, Homeopathic, Patent & Proprietary Preparations. Offences and Penalties.	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
28	Revision	Tutorial	1,2,3	Mid Term-1, Quiz & End Sem Exam
29	**Narcotic Drugs and Psychotropic substances Act-1985 and Rules:** Objectives, Definitions, Authorities and Officers,	Lecture	1,2	Mid Term-1, Quiz & End Sem Exam
30	Constitution and Functions of narcotic & Psychotropic Consultative Committee, National Fund for Controlling the Drug Abuse	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
31	Prohibition, Control and Regulation, opium poppy cultivation and production of poppy straw	Lecture	1,2	Mid Term-2, Quiz & End Sem Exam
32	Seminar	Tutorial	1,2,3	Mid Term-2, Quiz & End Sem Exam
33	manufacture, sale and export of opium, Offences and Penalties	Lecture	1,2	Mid Term-2, Quiz & End Sem Exam
34	**Study of Salient Features of Drugs and Magic Remedies Act and its rules:** Objectives, Definitions, Prohibition of certain advertisements, Classes of Exempted advertisements, Offences and Penalties	Lecture	1,2	Mid Term-2, Quiz & End Sem Exam
35	**Prevention of Cruelty to animals Act-1960:** Objectives, Definitions, Institutional Animal Ethics Committee,	Lecture	1,2,3,5	Mid Term-2, Quiz & End Sem Exam
36	Group discussion on various guidelines for	Tutorial	1,2,3,4,5	Mid Term-2, Quiz & End Sem Exam

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	utilizing in Prevention of Cruelty to animals Act			
37	CPCSEA guidelines for Breeding and Stocking of Animals,	Lecture	1,2,5	Mid Term-2, Quiz & End Sem Exam
38	Performance of Experiments, Transfer and acquisition of animals for experiment	Lecture	1,2,5	Mid Term-2, Quiz & End Sem Exam
39	Records, Power to suspend or revoke registration, Offences and Penalties	Lecture	1,2,5	Mid Term-2, Quiz & End Sem Exam
40	Seminar	Tutorial	1,2,3,4,5	Mid Term-2, Quiz & End Sem Exam
41	**National Pharmaceutical Pricing Authority:** Drugs Price Control Order (DPCO)- 2013. Objectives, Definitions, Sale prices of bulk drugs,	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
42	Retail price of formulations, Retail price and ceiling price of scheduled formulations, National List of Essential Medicines (NLEM)	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
43	**Pharmaceutical Legislations** – A brief review, Introduction, Study of drugs enquiry committee,	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
44	Revision class	Tutorial	1,2,3,4,5	Mid Term-2, Quiz & End Sem Exam
45	Health survey and development committee, Hathi committee and Mudaliar committee	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
46	**Code of Pharmaceutical ethics** Definition, Pharmacist in relation to his job,	Lecture	1,2,4	Mid Term-2, Quiz & End Sem Exam
47	trade, medical profession and his profession, Pharmacist's oath	Lecture	1,2,4	Quiz & End Sem Exam
48	Doubt clearing session	Tutorial	1,2,3	Quiz & End Sem Exam
49	Medical Termination of Pregnancy Act	Lecture	1,2	Quiz & End Sem Exam
50	Medical Termination of Pregnancy Act	Lecture	1,2	Quiz & End Sem Exam

51	Right to Information A	Lecture	1,2,4	Quiz & End Sem Exam
52	Quiz	Tutorial	1,2,3	Quiz & End Sem Exam
53	Right to Information A	Lecture	1,2,4	Quiz & End Sem Exam
54	Introduction to Intellectual Property Rights (IPR)	Lecture	1,2,5	Quiz & End Sem Exam
55	Introduction to Intellectual Property Rights (IPR)	Lecture	1,2,5	Quiz & End Sem Exam
56	General Discussion on IPR	Tutorial	1,2,3,4,5	Quiz & End Sem Exam
57	Introduction to Intellectual Property Rights (IPR)	Lecture	1,2,5	Quiz & End Sem Exam
58	Introduction to Intellectual Property Rights (IPR)	Lecture	1,2,5	Quiz & End Sem Exam
59	Introduction to Intellectual Property Rights (IPR)	Lecture	1,2,5	Quiz & End Sem Exam
60	Class test	Tutorial	1,2,3,4,5,6	Quiz & End Sem Exam

J. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP505T.1	**Interpret** the Pharmaceutical legislations and their implications in the development, manufacturing, and marketing of pharmaceuticals.	3	-	1	-	2	1	2	-	1	-	-				
BP505T.2.	**Relate** Various Indian Pharmaceutical Acts and Laws with Pharmacy profession	3	-	3	-	2	1	3	-	1	-	2				

BP505T.3.	**Identify** The regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals.	3	-	-	-	1	2	-	-	-	-	-				
BP505T.4.	**Apply** the code of ethics during the pharmaceutical practice.	3	-	3	-	3	3	3	-	3	-	-				
BP505T.5.	**Make use of** guidelines for using animals for experimentation	3	-	2	-	-	2	3	-	1	-	-				
BP505T.6.	**Distinguish** various types of Intellectual Property Rights.	3	-	3	-	-	3	3	-	2	-	-				

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutics I MID-SEMESTER (SEM –Vth) 2020-21						
Class: B.Pharm, Vth Semester						
Subject Name: BP505T Pharmaceutical Jurisprudence Theory		Time: 1 Hr			Max. Marks: 30	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1, 4, 7, 10	Q.2 ,5, 6, 9	Q. 8	Q. 3		

Student will be able to
CO1: List the broad perceptive of cloud architecture and model.CO2:
Apply different cloud programming models as per need.

CO Map	Question No.	Question	Marks
CO1	Q.1	**Define** misbranded drugs & spurious drugs.	2
CO3	Q.2	**What** is the schedule G & U?	2
CO1	Q.3	**Distinguish** between Wholesale & Retail sales..	2
CO2	Q.4	**How** many chapters & sections are there in the Pharmacy act 1948?	2
CO1 CO3	Q.5	**What** are the full forms of CPCSEA & IAEC.	2
	Q.6	**Explain** the manufacturing inside the bond.	10
CO4	Q.7	**Which** types of cosmetics are Prohibited from manufacturing and selling?	10
CO3	Q.8	**List** the various functions of the Pharmacy Council of India in detail.	5
CO3	Q.9	**Write** in detail about classes of drugs and cosmetics totally prohibited from import & which can only be imported under a license.	5
CO1	Q.10	**Outline** the CPCSEA guidelines for Breeding and Stocking of Animals	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

97.8 % Percentage of students secured more than 60% marks, so this course Human Pharmaceutical Jurisprudence – Theory (BP505T) attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICS

PROGRAMME OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-21

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions

[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "-"

PROGRAMME ARTICULATION MATRIX												
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
V SEM	BP 506P	3	3	3	3	1	3	2	1	3	1	2

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICS
Course Handout
Course : INDUSTRIAL PHARMACY-I (Practical)
Course Code : BP506P, Crédits : 02, Session : 2020-21 (Odd Sem.), Class : B. Pharm. 3rd Year
Faculty Name : Dr. Srabanti Jana, Mrs. Monika Kaushik

A. Introduction: This subject is designed to impart fundamental and practical knowledge of pharmaceutical additives and various pharmaceutical dosage forms on the performance of the drug product.

B. Course Outcomes: At the end of the course, students will be able to:

BP506P.1. Understand the various pharmaceutical dosage forms and their manufacturing techniques.

BP506P.2. Recall various considerations required in formulation of pharmaceutical dosage forms

BP506P.3. Formulate solid, liquid and semisolid dosage by using established procedures and technology.

BP506P.4. Conclude the facilities and standards necessary for the industrial production of sterile dosage forms and ophthalmic preparations.

BP506P.5 Select the glass containers required for the storage of the finished products.

C. Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

PR: Practical Records, RV: Regular viva, As: Assignment

E. Syllabus

Module I: **Preformulation Studies:**

1. Preformulation studies on paracetamol/ any other drug
2. Preformulation studies on asp*i*rin/ any other drug

Module II: Tablets, granules and capsules:

3. Preparation and evaluation of Paracetamol tablets
4. Preparation and evaluation of Aspirin tablets
5. Coating of tablets- film coating of tables/granules
6. Quality control test of (as per IP) marketed tablets
7. Quality control test of (as per IP) marketed capsules

Module III: Injection:

8. Preparation of Calcium Gluconate injection
9. Preparation of Ascorbic Acid injection

Module IV: Ophthalmic Preparations:

10. Preparation of Eye drops
11. Preparation of Eye ointments

Module V: Creams & containers:

12. Preparation of cold cream
13. Preparation of vanishing cream
14. Evaluation of Glass containers (as per IP)

F. Examination Scheme:

Components	**A**	**CT**	**LR**	**V**	**EE**
Weightage (%)	2	10	1	2	35

PR: Practical Records, RV: Regular viva, As: Assignment

G. Suggested Text/Reference Books:

1. Pharmaceutical dosage forms - Tablets, volume 1 -3 by H.A. Liberman, Leon Lachman & J. B. Schwartz
2. Pharmaceutical dosage form - Parenteral medication vol- 1&2 by Liberman & Lachman
3. Pharmaceutical dosage form disperse system VOL-1 by Liberman & Lachman
4. Modern Pharmaceutics by Gilbert S. Banker & C.T. Rhodes, 3rd Edition
5. Remington: The Science and Practice of Pharmacy, 20th edition Pharmaceutical Science (RPS)
6. Theory and Practice of Industrial Pharmacy by Liberman & Lachman
7. Pharmaceutics- The science of dosage form design by M. E. Aulton, Churchill livingstone, Latest edition
8. Introduction to Pharmaceutical Dosage Forms by H. C. Ansel, Lea & Febiger, Philadelphia, 5thedition, 2005
9. Drug stability - Principles and practice by Cartensen & C.J. Rhodes, 3rd Edition, Marcel Dekker Series, Vol 107.

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1.	Preformulation studies on paracetamol/ any other drug	Practical	BP506P	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
2.	Preformulation studies on aspirin/ any other drug	Practical	BP506P	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
3.	Preparation and evaluation of Paracetamol tablets	Practical	BP506P	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
4.	Preparation and evaluation of Aspirin tablets	Practical	BP506P	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
5.	Coating of tablets- film coating of tables/granules	Practical	BP506P	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
6.	Quality control test of (as per IP) marketed tablets	Practical	BP506P	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
7.	Quality control test of (as per IP) marketed capsules	Practical	BP506P	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
8.	Preparation of Calcium Gluconate injection	Practical	BP506P	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
9.	Preparation of Ascorbic Acid injection	Practical	BP506P	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
10.	Preparation of Eye drops	Practical	BP506P	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
11.	Preparation of Eye ointments	Practical	BP506P	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both

12.	Preparation of cold cream	Practical	BP506P	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
13.	Preparation of vanishing cream	Practical	BP506P	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
14.	Evaluation of Glass containers (as per IP)	Practical	BP506P	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
15.	Evaluation of Glass containers (as per IP)	Practical	BP506P	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP506P.1	Understand the various pharmaceutical dosage forms and their manufacturing techniques.	3	1	3	2	1	-	-	-	3	1	3
BP506P.2	Recall various considerations required in formulation of pharmaceutical dosage forms	3	2	2	2	-	-	-	-	1	-	2
BP506P.3	Formulate solid, liquid and semisolid dosage by using established procedures and technology.	3	1	2	2	-	1	-	-	2	-	1
BP506P.4	Conclude the facilities and standards necessary for the industrial production of sterile dosage forms and ophthalmic preparations.	3	1	2	2	-	1	-	1	-	-	1
BP506P.5	Select the glass containers required for the storage of the finished products.	2	2	2	1	1	1	-	-	-	-	1

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacy I MID-SEMESTER (SEM–V) 2020-21						
Class: B. Pharm V Semester						
Subject Name: BP 506 P. Industrial Pharmacy-I (Practical)		Time: 4 Hrs			Max. Marks: 40	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3	Q.2	Q.3	Q.2	Q.2	

Student will be able to
CO1: Understand the various pharmaceutical dosage forms and their manufacturing techniques.
CO2: Recall various considerations required in formulation of pharmaceutical dosage forms.

CO Map	Question No.	Question	Marks
CO1 and CO2	Qs.1	Synopsis	10
CO1	Q.2 a	Perform the preformulation studies on paracetamol	15
CO2	Q.2 b	Carry out the quality control test of (as per IP) marketed tablets	6
CO1 and CO2	Q.3	Viva voce	3

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

100 % Percentage of students secured more than 60% marks, so this course Industrial Pharmacy I – Practical (BP506P) attained Level -3.

Dr. Mohanty

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
AMITY INSTITUTE OF PHARMACY

PROGRAMME OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-21

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

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societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "-"

PROGRAMME ARTICULATION MATRIX												
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
V SEM	BP 507 P	3	3	3	3	1	3	2	1	3	1	2

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACY
Course Handout
Course : Pharmacology-II (Practical)
Course Code : BP507P, Crédits : 02, Session : 2020-21 (Odd Sem.), Class : B. Pharm. 3rd Year
Faculty Name : Dr. Shvetank Bhatt

A. Introduction: This subject is designed to impart fundamental and practical knowledge of pharmaceutical additives and various pharmaceutical dosage forms on the performance of the drug product.

B. Course Outcomes: At the end of the course, students will be able to:

BP507P.1. Understand the various instruments and equipments used in the Pharmacology experiments and in vitro techniques of pharmacology.

BP507P.2. Dose response curve of various drugs such as acetylcholine and histamine

BP507P.3. PA2 and PD2 value determination.

BP507P.4. Bioassay of various drug using ex-pharm software.

BP507P.5 Evaluation of various drugs for their analgesic, anti-inflammatory and diuretic activity.

C. Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	20%
	Mid Term 2		
	A minimum of 80% attendance is required to be maintained by a student to be qualified for taking up the Odd Semester examination	A	4 %
	Practical Records/Regular viva/ Assignment	PR/RV/As	6%
End Semester Examination	End Semester Examination	EE	70%
Total			**100%**

PR: Practical Records, RV: Regular viva, As: Assignment

E. Syllabus

Module I: **Introduction:**

1. Introduction to in-vitro pharmacology and physiological salt solutions.

Module II: Effect of drugs:

2. Effect of drugs on isolated frog heart.
3. Effect of drugs on blood pressure and heart rate of dog.
4. Effect of spasmogens and spasmolytics using rabbit jejunum.
5. Anti-inflammatory activity of drugs using carrageenan induced paw-edema model.
6. Analgesic activity of drug using central and peripheral methods

Module III: DRC:

7. Study of diuretic activity of drugs using rats/mice.
8. DRC of acetylcholine using frog rectus abdominis muscle.
9. Effect of physostigmine and atropine on DRC of acetylcholine using frog rectus abdominis muscle and rat ileum respectively.

Module IV: Bioassays:

10. Bioassay of histamine using guinea pig ileum by matching method.
11. Bioassay of oxytocin using rat uterine horn by interpolation method.
12. Bioassay of serotonin using rat fundus strip by three point bioassay.
13. Bioassay of acetylcholine using rat ileum/colon by four point bioassay.

Module V: Determination of PA2 & PD2 value:

14. Determination of PA2 value of prazosin using rat anococcygeus muscle (by Schilds plot method).
15. Determination of PD2 value using guinea pig ileum.

F. Examination Scheme:

Components	CT	A	PR/RV/As	EE
Weightage (%)	10	4	6	70

PR: Practical Records, RV: Regular viva, As: Assignment

G. Suggested Text/Reference Books:

1. Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology, Churchil Livingstone Elsevier
2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill.
3. Goodman and Gilman's, The Pharmacological Basis of Therapeutics
4. Marry Anne K. K., Lloyd Yee Y., Brian K. A., Robbin L.C., Joseph G. B., Wayne A. K., Bradley R.W., Applied Therapeutics, The Clinical use of Drugs, The Point Lippincott Williams & Wilkins.
5. Mycek M.J, Gelnet S.B and Perper M.M. Lippincott's Illustrated Reviews- Pharmacology.
6. K.D.Tripathi. Essentials of Medical Pharmacology, , JAYPEE Brothers Medical Publishers (P) Ltd, New Delhi.
7. Sharma H. L., Sharma K. K., Principles of Pharmacology, Paras medical publisher
8. Modern Pharmacology with clinical Applications, by Charles R.Craig& Robert.
9. Ghosh MN. Fundamentals of Experimental Pharmacology. Hilton & Company, Kolkata.
10. Kulkarni SK. Handbook of experimental pharmacology. Vallabh Prakashan.

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1.	Introduction to in-vitro pharmacology and physiological salt solutions.	Practical	BP507P	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
2.	Effect of drugs on isolated frog heart.	Practical	BP507P	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
3.	Effect of drugs on blood pressure and heart rate of dog.	Practical	BP507P	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
4.	Study of diuretic activity of drugs using rats/mice.	Practical	BP507P	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
5.	DRC of acetylcholine using frog rectus abdominis muscle.	Practical	BP507P	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
6.	Effect of physostigmine and atropine on DRC of acetylcholine using frog rectus abdominis muscle and rat ileum respectively.	Practical	BP507P	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
7.	Bioassay of histamine using guinea pig ileum by matching method.	Practical	BP507P	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
8.	Bioassay of oxytocin using rat uterine horn by interpolation method.	Practical	BP507P	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
9.	Bioassay of serotonin using rat fundus strip by three point bioassay.	Practical	BP507P	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
10.	Bioassay of acetylcholine using rat ileum/colon by four point bioassay.	Practical	BP507P	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
11.	Determination of PA2 value of prazosin using rat anococcygeus muscle (by Schilds plot method).	Practical	BP507P	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
12.	Determination of PD2 value	Practical	BP507P	Mid Term-2 & End Sem

	using guinea pig ileum.			Exam as Synopsis/ Experiments/ Viva voce for both
13.	Effect of spasmogens and spasmolytics using rabbit jejunum.	Practical	BP507P	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
14.	Anti-inflammatory activity of drugs using carrageenan induced paw-edema model.	Practical	BP507P	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
15.	Analgesic activity of drug using central and peripheral methods	Practical	BP507P	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP506P.1	Understand the various pharmaceutical dosage forms and their manufacturing techniques.	3	1	3	2	1	-	-	-	3	1	3
BP506P.2	Recall various considerations required in formulation of pharmaceutical dosage forms	3	2	2	2	-	-	-	-	1	-	2
BP506P.3	Formulate solid, liquid and semisolid dosage by using established procedures and technology.	3	1	2	2	-	1	-	-	2	-	1
BP506P.4	Conclude the facilities and standards necessary for the industrial production of sterile dosage forms and ophthalmic preparations.	3	1	2	2	-	1	-	1	-	-	1
BP506P.5	Select the glass containers required for the storage of the finished products.	2	2	2	1	1	1	-	-	-	-	1

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacy I MID-SEMESTER (SEM–V) 2020-21						
Class: B. Pharm V Semester						
Subject Name: BP 507 P. Pharmacology-II (Practical)		Time: 4 Hrs			Max. Marks: 40	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3	Q.2	Q.3	Q.2	Q.2	
Student will be able to CO1: Understand the various pharmaceutical Bioassay techniques. CO2: Recall various considerations required in Experimental Pharmacology						

CO Map	Question No.	Question	Marks
CO1 and CO2	Q.1	Synopsis	10
CO1	Q.2	Perform the Bioassay of Histamine by using Three point	25
CO1 and CO2	Q.3	Viva voce	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

100 % Percentage of students secured more than 60% marks, so this course Pharmacology II – Practical (BP507P) attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUE OF PHARMACY
DEPARTMENT OF PHARMACOGNOSY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharmacy), Academic Year – 2020-21

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values,

communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11				
V SEM	BP508P	3	2	2	1	-	-	2	-	2	2	1		-	-	-

Dr. Mohanty

DEPARTMENT OF PHARMACOGNOSY
Course Handout
Course : PHARMACOGNOSY & PHYTOCHEMISTRY II (Practical)
Course Code : BP 508 P, Crédits : 02, Session : 2020-21 (Odd Sem.), Class : B.Pharm. III Year
Faculty Name : Dr. Naveen Sharma

A. Introduction: This course deals with the fundamentals of analytical chemistry and principles of electrochemical analysis of drugs. It aims to understand the principles of volumetric and electro chemical analysis and carryout various volumetric and electrochemical titrations.

B. Course Outcomes: At the end of the course, students will be:

BP508P .1	Identify crude drugs by morphological and microscopical characteristics
BP508P .2	Isolate phytoconstituents from crude drugs, Perform Paper and Thin Layer Chromatography
BP508P .3	Isolate and analyse volatile oils
BP508P .4	Carryout chemical tests for the identification of unorganized crude drugs

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

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D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

E. Syllabus

1. Morphology, histology and powder characteristics & extraction & detection of: Cinchona, Cinnamon, Senna, Clove, Ephedra, Fennel and Coriander
2. Exercise involving isolation & detection of active principles
   a. Caffeine - from tea dust.
   b. Diosgenin from Dioscorea
   c. Atropine from Belladonna
   d. Sennosides from Senna
3. Separation of sugars by Paper chromatography
4. TLC of herbal extract
5. Distillation of volatile oils and detection of phytoconstitutents by TLC
6. Analysis of crude drugs by chemical tests: **(**i) Asafoetida (ii) Benzoin (iii) Colophony (iv) Aloes (v) Myrrh

F. Suggested Book

1. W.C.Evans, Trease and Evans Pharmacognosy, 16th edition, W.B. Sounders & Co., London, 2009.

2. Mohammad Ali. Pharmacognosy and Phytochemistry, CBS Publishers & Distribution, New Delhi.
3. Text book of Pharmacognosy by C.K. Kokate, Purohit, Gokhlae (2007), 37th Edition, Nirali Prakashan, New Delhi.
4. Herbal drug industry by R.D. Choudhary (1996), Ist Edn, Eastern Publisher, New Delhi.
5. Essentials of Pharmacognosy, Dr.SH.Ansari, IInd edition, Birla publications, New Delhi, 2007
6. Herbal Cosmetics by H.Pande, Asia Pacific Business press, Inc, New Delhi.
7. A.N. Kalia, Textbook of Industrial Pharmacognosy, CBS Publishers, New Delhi, 2005.
8. R Endress, Plant cell Biotechnology, Springer-Verlag, Berlin, 1994.
9. Pharmacognosy & Pharmacobiotechnology. James Bobbers, Marilyn KS, VE Tylor.
10. The formulation and preparation of cosmetic, fragrances and flavours.
11. Remington's Pharmaceutical sciences.
12. Text Book of Biotechnology by Vyas and Dixit.
13. Text Book of Biotechnology by R.C. Dubey.

A. Examination Scheme:

Components	A	CT	LR	V	EE
Weightage (%)	2	10	1	2	35

LT: Lab Test,PR/RVV: Practical Records/ Regular viva voce, EE: End Semester Examination; A: Attendance

B. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Morphology, histology and powder characteristics & extraction & detection of: Cinchona,	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
2	Cinnamon	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
3	Senna	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
4	*Clove & Ephedra*	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
5	. Fennel and Coriander	Practical	CO1	Mid Term-2, Quiz & End Sem Exam
6	Exercise involving isolation & detection of active principles Caffeine - from tea dust.	Practical	CO1,2	Mid Term-2, Quiz & End Sem Exam
7	Diosgenin from Dioscorea	Practical	CO1, 2	Mid Term-2,

				Quiz & End Sem Exam
8	Atropine from Belladonna	Practical	CO1, 2	Mid Term-2, Quiz & End Sem Exam
9	Sennosides from Senna	Practical	CO1, 2	Mid Term-2, Quiz & End Sem Exam
10	Separation of sugars by Paper chromatography	Practical	CO2	Mid Term-2, Quiz & End Sem Exam
11	TLC of herbal extract	Practical	CO2	Mid Term-2, Quiz & End Sem Exam
12	Distillation of volatile oils and detection of phytoconstitutents by TLC	Practical	CO3	Mid Term-2, Quiz & End Sem Exam
13	Analysis of crude drugs by chemical tests: (i) Asafoetida (ii) Benzoin (iii)	Practical	CO4	Mid Term-2, Quiz & End Sem Exam
14	Colophony (iv) Aloes (v) Myrrh	Practical	CO4	Mid Term-2, Quiz & End Sem Exam

A. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	
BP508P.1	Identify crude drugs by morphological and microscopical characteristics	3		2	1	2	1	-	2	1	2	1	
BP508P.2	Isolate phytoconstituents from crude drugs, Perform Paper and Thin Layer Chromatography	2	-	-	1	-	1	-	-	-	-	3	

BP508P .3	Isolate and analyse volatile oils	3	2	2	1	-	2	-	2	-	-	3	
BP508P .4	Carryout chemical tests for the identification of unorganized crude drugs	2	2	2	1	-	2	-	2	-	-	3	

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacognosy I MID-SEMESTER (SEM –V) 2020-21						
Class: B.Pharm, V Semester						
Subject Name: BP508 P Pharmacognosy & Phytochemistry II Practical		Time: 4 Hrs		Max. Marks: 40		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,4	Q.2,3	Q.4	Q.2,5,6		

Student will be able to

CO.1.
Identify crude drugs by morphological and microscopical characteristics

CO.2.
Isolate phytoconstituents from crude drugs, Perform Paper and Thin Layer Chromatography

CO.3.
Isolate and analyse volatile oils

CO.4.
Carryout chemical tests for the identification of unorganized crude drugs

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

100% Percentage of students secured more than 60% marks, so this course Pharmacognosy And Phytochemistry II – Practical (BP508P) attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-21

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

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Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

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PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I SEM																

II SEM																
III SEM																
IV SEM	-															
	-															
	-															
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V SEM									-	-	-	-	-	-	-	-
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VI SEM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BP601T	3	-	2	-	1	3	2	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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VII SEM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Dr. Mohanty

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICAL CHEMISTRY
Course Handout
Course : MEDICINAL CHEMISTRY – III THEORY
Course Code : BP601T, Crédits : 04, Session : 2020-21 (Even Sem.), Class : B.Pharm. IV Year
Faculty Name: Dr. Anantha Naik Nagappa, Dr. Srabanti Jana

A. Introduction: The course is designed to impart fundamental knowledge on the preparatory
pharmacy with arts and science of preparing the different conventional dosage forms.

B. Course Outcomes: At the end of the course, students will be able to:

BP501T.1. Understand the chemistry of drugs with respect to their pharmacological activity

BP501T.2. Understand the drug metabolic pathways, adverse effect and therapeutic value of
drugs

BP501T.3. Understand the mechanism of action.

BP501T.4. Know the Structural Activity Relationship of different class of drugs.

BP501T.5. Study the chemical synthesis of selected drugs.

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	Description	Code	Weightage %
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

UNIT – I

Antibiotics

Historical background, Nomenclature, Stereochemistry, Structure activity relationship, Chemical degradation classification and important products of the following classes.

β-Lactam antibiotics: Penicillin, Cepholosporins, β- Lactamase inhibitors, Monobactams

Aminoglycosides: Streptomycin, Neomycin, Kanamycin

Tetracyclines: Tetracycline,Oxytetracycline, Chlortetracycline, Minocycline, Doxycycline

UNIT – II

Antibiotics

Historical background, Nomenclature, Stereochemistry, Structure activity relationship, Chemical degradation classification and important products of the following classes.

Macrolide: Erythromycin Clarithromycin, Azithromycin.

Miscellaneous: Chloramphenicol*, Clindamycin.

Prodrugs: Basic concepts and application of prodrugs design.

Antimalarials: Etiology of malaria.

Quinolines: SAR, Quinine sulphate, Chloroquine*, Amodiaquine, Primaquine phosphate, Pamaquine*, Quinacrine hydrochloride, Mefloquine.

Biguanides and dihydro triazines: Cycloguanil pamoate, Proguanil.
Miscellaneous: Pyrimethamine, Artesunete, Artemether, Atovoquone

UNIT – III

Anti-tubercular Agents

Synthetic anti tubercular agents: Isoniozid*, Ethionamide, Ethambutol, Pyrazinamide, Para amino salicylic acid.* Anti tubercular antibiotics: Rifampicin, Rifabutin, Cycloserine, Streptomycine, Capreomycin sulphate.

Urinary tract anti-infective agents

Quinolones: SAR of quinolones, Nalidixic Acid,Norfloxacin, Enoxacin, Ciprofloxacin*, Ofloxacin, Lomefloxacin, Sparfloxacin, Gatifloxacin,

Moxifloxacin

Miscellaneous: Furazolidine, Nitrofurantoin*, Methanamine.

Antiviral agents:

Amantadine hydrochloride, Rimantadine hydrochloride, Idoxuridine trifluoride, Acyclovir*, Gancyclovir, Zidovudine, Didanosine, Zalcitabine, Lamivudine, Loviride, Delavirding, Ribavirin, Saquinavir, Indinavir, Ritonavir.

UNIT – IV

Antifungal agents:

Antifungal antibiotics: Amphotericin-B, Nystatin, Natamycin, Griseofulvin.
Synthetic Antifungal agents: Clotrimazole, Econazole, Butoconazole, Oxiconazole Tioconozole, Miconazole*, Ketoconazole, Terconazole, Itraconazole, Fluconazole, Naftifine hydrochloride, Tolnaftate*.
Anti-protozoal Agents: Metronidazole*, Tinidazole, Ornidazole, Diloxanide, Iodoquinol, Pentamidine Isethionate, Atovaquone, Eflornithine.
Anthelmintics: Diethylcarbamazine citrate*, Thiabendazole, Mebendazole*, Albendazole, Niclosamide, Oxamniquine, Praziquantal, Ivermectin.

UNIV – V

Introduction to Drug Design

Various approaches used in drug design.
Physicochemical parameters used in quantitative structure activity relationship (QSAR) such as partition coefficient, Hammet's electronic parameter, Tafts steric parameter and Hansch analysis.
Pharmacophore modeling and docking techniques.
Combinatorial Chemistry: Concept and applications chemistry: solid phase and solution phase synthesis of combinatoria

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. Wilson and Giswold's Organic medicinal and Pharmaceutical Chemistry.
2. Foye's Principles of Medicinal Chemistry.
3. Burger's Medicinal Chemistry, Vol I to IV.
4. Introduction to principles of drug design- Smith and Williams.

5. Remington's Pharmaceutical Sciences.
6. Martindale's extra pharmacopoeia.
7. Organic Chemistry by I.L. Finar, Vol. II.
8. The Organic Chemistry of Drug Synthesis by Lednicer, Vol. 1to 5.
9. Indian Pharmacopoeia.
10. Text book of practical organic chemistry- A.I.Vogel.

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	**β-Lactam antibiotics:** Penicillin	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
2	Cepholosporins,	Lecture	4,5	Mid Term-1, Quiz & End Sem Exam
3	β- Lactamase inhibitors	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
4	Monobactams	Tutorial	1,2,3	Mid Term-1, Quiz & End Sem Exam
5	Aminoglycosides	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
6	Streptomycin,	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
7	Neomycin	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
8	Kanamycin	Tutorial	1,2,3,4	Mid Term-1, Quiz & End Sem Exam
9	Tetracyclines	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
10	Tetracycline	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
11	Oxytetracycline,	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
12	Chlortetracycline,	Tutorial	4, 1,2,3	Mid Term-1, Quiz & End Sem Exam
13	Minocycline, Doxycycline dinitrite	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
14	**Macrolide:** Erythromycin	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
15	Clarithromycin, Azithromycin.	Lecture	5,1,2,3	Mid Term-1, Quiz & End Sem Exam
16	**Prodrugs:** Basic concepts	Tutorial	1,2,3	Mid Term-1, Quiz & End Sem Exam
17	Application of prodrugs design.	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
18	**Antimalarials:** Etiology of	Lecture	5, 1,2,3	Mid Term-2, Quiz

	malaria.			& End Sem Exam
19	**Quinolines:** SAR,	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
20	Quinine sulphate, Chloroquine*	Tutorial	1,2,3	Mid Term-2, Quiz & End Sem Exam
21	Amodiaquine, Primaquine phosphate, Pamaquine*	Lecture	5, 1,2,3	Mid Term-2, Quiz & End Sem Exam
22	Quinacrine hydrochloride, Mefloquine	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
23	Digoxin, Digitoxin,	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
24	Biguanides and dihydro triazines: Cycloguanil pamoate, Proguanil.	Tutorial	1,2,3	Mid Term-2, Quiz & End Sem Exam
25	**Miscellaneous:** Pyrimethamine, Artesunete, Artemether, Atovoquone	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
26	**Anti-tubercular Agents Synthetic anti tubercular agents:**	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
27	Isoniozid*, Ethionamide, Ethambutol, Pyrazinamide,	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
28	Para amino salicylic acid.*	Tutorial	1,2,3	Mid Term-2, Quiz & End Sem Exam
29	**Anti tubercular antibiotics:** Rifampicin, Rifabutin,	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
30	Cycloserine Streptomycine, Capreomycin sulphate	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
31	**Urinary tract anti-infective agents**	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
32	**Quinolones:** SAR of quinolones,	Tutorial	1,2,3	Mid Term-2, Quiz & End Sem Exam
33	Nalidixic Acid,Norfloxacin, Enoxacin, Ciprofloxacin*	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
34	Ofloxacin, Lomefloxacin, Sparfloxacin,	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
35	Gatifloxacin, Moxifloxacin	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
36	**Miscellaneous:** Furazolidine, Nitrofurantoin*, Methanamine	Tutorial	1,2,3	Mid Term-2, Quiz & End Sem Exam
37	**Antiviral agents:** Amantadine hydrochloride,	Lecture	5, 1,2,3	Mid Term-2, Quiz & End Sem Exam

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38	Idoxuridine trifluoride, Acyclovir*, Gancyclovir,	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
39	Rimantadine hydrochloride, Zidovudine, Didanosine, Zalcitabine.	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
40	Lamivudine, Loviride, Delavirding	Tutorial	1,2,3	Mid Term-2, Quiz & End Sem Exam
41	Ribavirin, Saquinavir, Indinavir, Ritonavir.	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
42	**Antifungal agents:**	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
43	**Antifungal antibiotics:** Amphotericin-B, Nystatin, Natamycin, Griseofulvin.	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
44	**Sulphonamides and Sulfones**	Tutorial	5	Mid Term-2, Quiz & End Sem Exam
45	**Synthetic Antifungal agents:** Clotrimazole, Econazole, Butoconazole, Oxiconazole Tioconozole,	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
46	Miconazole*, Ketoconazole, Terconazole, Itraconazole	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
47	Fluconazole, Naftifine hydrochloride, Tolnaftate*.	Lecture	1,2,3	Quiz & End Sem Exam
48	**Anti-protozoal Agents:** Metronidazole*, Tinidazole, Ornidazole, Diloxanide, Iodoquinol,	Tutorial	1,2,3	Quiz & End Sem Exam
49	Pentamidine Isethionate, Atovaquone, Eflornithine.	Lecture	1,2,3	Quiz & End Sem Exam
50	**Anthelmintics:** Diethylcarbamazine citrate*, Thiabendazole, Mebendazole*,	Lecture	5	Quiz & End Sem Exam
51	Albendazole, Niclosamide, Oxamniquine, Praziquantal, Ivermectin.	Lecture	5	Quiz & End Sem Exam
52	Historical development, chemistry, Sulfasalazine.	Tutorial	1,2,3	Quiz & End Sem Exam
53	classification and SAR of Sulfonamides:	Lecture	1,2,3	Quiz & End Sem Exam
54	**Folate reductase inhibitors:** Trimethoprim*, Cotrimoxazole. **Sulfones:** Dapsone*., Sulfisoxazole, Sulphamethizine, Sulfacetamide*,	Lecture	1,2,3	Quiz & End Sem Exam

55	Sulphapyridine, Sulfamethoxaole*, Sulphadiazine, Mefenide acetate,	Lecture	1,2,3	Quiz & End Sem Exam
56	**Introduction to Drug Design** Various approaches used in drug design.	Tutorial	1,2,3	Quiz & End Sem Exam
57	Physicochemical parameters used in quantitative structure activity relationship (QSAR) such as partition coefficient, Hammet's electronic *parameter,*	Lecture	1,2,3	Quiz & End Sem Exam
58	Tafts steric parameter and Hansch analysis.	Lecture	1,2,3	Quiz & End Sem Exam
59	Pharmacophore modeling and docking techniques.	Lecture	5	Quiz & End Sem Exam
60	*Combinatorial Chemistry: Concept and applications chemistry: solid phase and solution phase synthesis.*	Tutorial	5	Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP501T.1	***BP501T.1.*** Understand the chemistry of drugs with respect to their pharmacological activity	3	-	-	-	2	2	1	-	1	-	-				

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BP501T.2.	**BP501T.2.** Understand the drug metabolic pathways, adverse effect and therapeutic value of drugs	3	-	-	1	-	2	-	-	-	-	3				
BP501T.3.	***BP501T.3.*** Understand the mechanism of action.	3	2	-	3	-	2	-	-	-	-	3				
BP501T.4.	**BP501T.4**. Know the Structural Activity Relationship of different class of drugs.	2	2	3	3	-	1	-	-	-	-	3				
BP501T.5.	***BP501T.5***. Study the chemical synthesis of selected drugs.	1	-	3	-	-	-	-	-	-	-	3				

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutical Chemistry I MID-SEMESTER (SEM –VI) 2020-21						
Class: B.Pharm, VI Semester						
Subject Name: BP501T. MEDICINAL CHEMISTRY – II (Theory)		Time: 1 Hrs			Max. Marks: 30	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3,4,5	Q.6,8,9	Q.2	Q.7, 10		
The student will be able to **CO1. Understand the chemistry of drugs with respect to their pharmacological activity** **CO2. Understand the drug metabolic pathways, adverse effect and therapeutic value of drugs** **CO3. Understand the mechanism of action.**						

CO.4. Know the Structural Activity Relationship of different class of drugs. **CO.5. Study the chemical synthesis of selected drugs.**			
CO Map	Question No.	Question	Marks
CO4	Q.1	How do aminoglycosides protect against infections?	2
CO5	Q.2	Draw the chemical structures of Streptomycin, Neomycin along with medicinal uses.	2
CO1	Q.3	Define Tetracyclines with two suitable drug structural examples.	2
CO2	Q.4	Write the synthetic route chemical reaction of Chloramphenicol	2
CO2	Q.5	Write the chemical structural difference between Minocycline and Doxycycline.	2
CO1	Q.6	Write the mechanism and classification of aminoglycosides along with structure activity relationship.	10
CO4	Q.7	Discuss about the prodrugs Basic concepts and application of prodrugs design	10
CO3	Q.8	Write short notes on etiology of malaria.	5
CO2	Q.9	Discuss about the mechanism and ADR of biguanides and dihydro triazines with suitable chemical structural examples.	5
CO4	Q.10	Write short notes on furazolidine.	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

100% Percentage of students secured more than 60% marks, so this course Medicinal Chemistry III – Theory (BP601T) attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
AMITY INSTITUTE OF PHARMACY

PROGRAMME OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-21

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge asscoited with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions

[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess

societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "-"

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
VI SEM	BP 602T	3	3	3	3	2	2	3	1	1	3	1	-	-	-

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACY
Course Handout
Course : Pharmacology-III (Theory)
Course Code : BP602T, Credits : 04, Session : 2020-21 (Even Sem.), Class : B. Pharm. 3rd Year
Faculty Name : Dr.Naveen Sharma, Mrs.Monika Kaushik

A. Introduction: This subject is intended to impart the fundamental knowledge on various aspects
(classification, mechanism of action, therapeutic effects, clinical uses, side effects and
contraindications) of drugs acting on different systems of body and in addition, emphasis
the basic concepts of bioassay.:

1. Know the classification of the drugs
2. Understand the mechanism of action, therapeutic uses, clinical uses and side effects of the dugs
3. Know the importance of bio-assays in preclinical drug discovery
4. Understand the pharmacology of drugs act on CVS, autacoids, coagulation, hormones etc.

B. Course Outcomes: At the end of the course, students will be able to:

BP602T.1. Discuss the Pharmacology of the drugs affecting the Respiratory and GIT system.

BP602T.2. Explain the pharmacology of chemotherapeutic agents

BP602T.3. Explain the pharmacology of mechanism of chemotherapeutic agents.

BP602T.4. Explain the pharmacology of immunopharmacological agents.

BP602T.5 Describe the various methods and applications of bioassay.

C. Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

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D. Assessment Plan:

Component of Evaluation	Description	Code	Weightage %
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	A minimum of 80% attendance is required to be maintained by a student to be qualified for taking up the Odd Semester examination	A	4 %
	Quiz/ Assignment/Open book test/ Field work/Group discussion/ Seminar	Q/A/OBT/FW/GD/S	3%
	Student – Teacher interaction	STA	3%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

Q: Quiz, A: Assignment, OBT: Open book test, FW: Field work, GD: Group discussion, S: Seminar

E. Syllabus

UNIT-I 10hours 1. Pharmacology of drugs acting on Respiratory system a. Anti -asthmatic drugs b. Drugs used in the management of COPD c. Expectorants and antitussives d. Nasal decongestants e. Respiratory stimulants 2. Pharmacology of drugs acting on the Gastrointestinal Tract a. Antiulcer agents. b. Drugs for constipation and diarrhoea. c. Appetite stimulants and suppressants. d. Digestants and carminatives. e. Emetics and anti-emetics.

UNIT-II 10hours 3. Chemotherapy a. General principles of chemotherapy. b. Sulfonamides and cotrimoxazole. c. Antibiotics- Penicillins, cephalosporins, chloramphenicol, macrolides, quinolones and fluoroquinolins, tetracycline and aminoglycosides

UNIT-III 10hours 3. Chemotherapy a. Antitubercular agents b. Antileprotic agents 131 c. Antifungal agents d. Antiviral drugs e.Anthelmintics f. Antimalarial drugs g. Antiamoebic agents

UNIT-IV 08hours 3. Chemotherapy l. Urinary tract infections and sexually transmitted diseases. m. Chemotherapy of malignancy. 4. Immunopharmacology a. Immunostimulants b. Immunosuppressant Protein drugs, monoclonal antibodies, target drugs to antigen, biosimilars

UNIT-V 07hours 5. Principles of toxicology a. Definition and basic knowledge of acute, subacute and chronic toxicity. b. Definition and basic knowledge of genotoxicity, carcinogenicity, teratogenicity and mutagenicity c. General principles of treatment of poisoning d. Clinical symptoms and management of barbiturates, morphine, organophosphosphorus compound and lead, mercury and arsenic poisoning. 6. Chronopharmacology a. Definition of rhythm and cycles. b. Biological clock and their significance leading to chronotherapy

F. Examination Scheme:

Components	CT	A	Q/A/OBT/FW/GD/S	STI	EE
Weightage (%)	15	4	3	3	75

Q: Quiz, A: Assignment, OBT: Open book test, FW: Field work, GD: Group discussion, S: Seminar, STI: Student – Teacher interaction

G. Suggested Text/Reference Books:

1. Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology, Churchil Livingstone Elsevier
2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill.
3. Goodman and Gilman's, The Pharmacological Basis of Therapeutics
4. Marry Anne K. K., Lloyd Yee Y., Brian K. A., Robbin L.C., Joseph G. B., Wayne A. K., Bradley R.W., Applied Therapeutics, The Clinical use of Drugs, The Point Lippincott Williams & Wilkins.
5. Mycek M.J, Gelnet S.B and Perper M.M. Lippincott's Illustrated Reviews-Pharmacology.
6. K.D.Tripathi. Essentials of Medical Pharmacology, , JAYPEE Brothers Medical Publishers (P) Ltd, New Delhi

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1.	Pharmacology of drugs acting on Respiratory system	Lecture	BP602T.1	Mid Term-1, Quiz & End Sem Exam
2.	Anti -asthmatic drugs	Lecture	BP602T.1	Mid Term-1, Quiz & End Sem Exam
3.	Drugs used in the management of COPD	Lecture	BP602T.1	Mid Term-1, Quiz & End Sem Exam
4.	Tutorial 01	Tutorial 01		
5.	*Expectorants and antitussives*	Lecture	BP602T.1	Mid Term-1, Quiz & End Sem Exam
6.	Nasal decongestants	Lecture	BP602T.1	Mid Term-1, Quiz

				& End Sem Exam
7.	Drugs for constipation and diarrhoea	Lecture	BP602T.1	Mid Term-1, Quiz & End Sem Exam
8.	Tutorial 02	Tutorial 02		
9.	Respiratory stimulants, Emetics and anti-emetics.	Lecture	BP602T.1	Mid Term-1, Quiz & End Sem Exam
10.	Appetite stimulants and suppressants	Lecture	BP602T.1	Mid Term-1, Quiz & End Sem Exam
11.	Antiulcer agents, Appetite stimulants and suppressants	Lecture	BP602T.1	Mid Term-1, Quiz & End Sem Exam
12.	Tutorial 03	Tutorial 04		
13.	General principles of chemotherapy	Lecture	BP602T.2	Mid Term-1, Quiz & End Sem Exam
14.	Sulfonamides	Lecture	BP602T.2	Mid Term-1, Quiz & End Sem Exam
15.	cotrimoxazole	Lecture	BP602T.2	Mid Term-1, Quiz & End Sem Exam
16.	Tutorial 04	Tutorial 04		
17.	Antibiotics- Penicillins	Lecture	BP602T.2	Mid Term-1, Quiz & End Sem Exam
18.	cephalosporins	Lecture	BP602T.2	Mid Term-1, Quiz & End Sem Exam
19.	chloramphenicol	Lecture	BP602T.2	Mid Term-1, Quiz & End Sem Exam
20.	Tutorial 05	Tutorial 05		
21.	macrolides	Lecture	BP602T.2	Mid Term-1, Quiz & End Sem Exam
22.	quinolones	Lecture	BP602T.2	Mid Term-1, Quiz & End Sem Exam
23.	fluoroquinolins	Lecture	BP602T.2	Mid Term-1, Quiz & End Sem Exam
24.	Tutorial 06	Tutorial 06		
25.	tetracycline	Lecture	BP602T.2	Mid Term-1, Quiz & End Sem Exam
26.	aminoglycosides	Lecture	BP602T.3	Mid Term-1, Quiz & End Sem Exam
27.	Chemotherapy a. Antitubercular agents	Lecture	BP602T.3	Mid Term-1, Quiz & End Sem Exam
28.	Tutorial 07	Tutorial 07		
29.	Antifungal agents	Lecture	BP602T.3	Mid Term-1, Quiz & End Sem Exam
30.	Antiviral drugs	Lecture	BP602T.3	Mid Term-1, Quiz & End Sem Exam
31.	Anthelmintics	Lecture	BP602T.3	Mid Term-1, Quiz

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				& End Sem Exam
32.	Tutorial 08	Tutorial 08		
33.	Antimalarial drugs	Lecture	BP602T.3	Mid Term-1, Quiz & End Sem Exam
34.	Antiamoebic agents	Lecture	BP602T.3	Mid Term-2, Quiz & End Sem Exam
35.	Antiamoebic agents	Lecture	BP602T.3	Mid Term-2, Quiz & End Sem Exam
36.	Tutorial 09	Tutorial 09		
37.	Chemotherapy	Lecture	BP602T.4	Mid Term-2, Quiz & End Sem Exam
38.	Urinary tract infections	Lecture	BP602T.4	Mid Term-2, Quiz & End Sem Exam
39.	sexually transmitted diseases	Lecture	BP602T.4	Mid Term-2, Quiz & End Sem Exam
40.	Tutorial 10	Tutorial 10		
41.	Chemotherapy of malignancy	Lecture	BP602T.4	Mid Term-2, Quiz & End Sem Exam
42.	Immunopharmacology	Lecture	BP602T.4	Mid Term-2, Quiz & End Sem Exam
43.	Immunostimulants	Lecture	BP602T.4	Mid Term-2, Quiz & End Sem Exam
44.	Tutorial 11	Tutorial 11		
45.	Immunosuppressant	Lecture	BP602T.4	Mid Term-2, Quiz & End Sem Exam
46.	Protein drugs, monoclonal antibodies	Lecture	BP602T.4	Mid Term-2, Quiz & End Sem Exam
47.	target drugs to antigen, biosimilars	Lecture	BP602T.4	Mid Term-2, Quiz & End Sem Exam
48.	Tutorial 12	Tutorial 12		
49.	Principles of toxicology	Lecture	BP602T.5	Mid Term-2, Quiz & End Sem Exam
50.	Definition and basic knowledge of acute, subacute and chronic toxicity	Lecture	BP602T.5	Mid Term-2, Quiz & End Sem Exam
51.	Definition and basic knowledge of genotoxicity, carcinogenicity, teratogenicity and mutagenicity	Lecture	BP602T.5	Mid Term-2, Quiz & End Sem Exam
52.	Tutorial 13	Tutorial 13		
53.	General principles of treatment of poisoning	Lecture	BP602T.5	Mid Term-2, Quiz & End Sem Exam
54.	Clinical symptoms and management of barbiturates	Lecture	BP602T.5	Mid Term-2, Quiz & End Sem Exam

55.	Principles and applications of Bioassay, Types of bioassay	Lecture	BP602T.5	Mid Term-2, Quiz & End Sem Exam
56.	Tutorial 14	Tutorial 14		
57.	organophosphosphorus compound and lead, mercury and arsenic poisoning	Lecture	BP602T.5	Mid Term-2, Quiz & End Sem Exam
58.	Chronopharmacology a. Definition of rhythm and cycles	Lecture	BP602T.5	Mid Term-2, Quiz & End Sem Exam
59.	Definition of rhythm and cycles. b. Biological clock and their significance leading to chronotherapy	Lecture	BP602T.5	Mid Term-2, Quiz & End Sem Exam
60.	Tutorial 15	Tutorial 15		Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP602T.1	Discuss the drugs acting on the various disorders of Respiratory and GIT system	2	2	3	2	-	1	2	1	-	-	1
BP602T.2	Explain the pharmacology of chemotherapeutic agents	2	2	2	3	-	1	1	1	-	-	1
BP602T.3	Explain the pharmacology of mechanism of chemotherapeutic agents	2	1	1	-	-	1	3	2	-	-	-
BP602T.4	Explain the pharmacology of immunopharmacological agents.	2	2	2	1	-	1	-	-	-	-	-
BP602T.5	*Explain the mechanism of action and Pharmacology of Toxicological drugs acting on system*	2	1	-	-	-	2	1	1	-	-	1

Sample Question Paper

Dr. Mohanty

Amity School of Pharmacy Department of Pharmacology I MID-SEMESTER(SEM–VI)2020-21						
Class: B.Pharm. VI Semester						
Subject Name: BP602T Pharmacology-III		Time:1 Hrs			Max.Marks:30	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,4	Q.2,3	Q.4	Q.2,5,6		

CO Map	Question No.	Question	Marks
CO1	Q.1	Write a note on Hormones	2
CO1	Q.2	List out any two functions of oxytocin	2
	Q.3	Write down any four applications of chemotherapeutic agents.	2
	Q.4	Write down the formation of HCL in gastric	2
	Q.5	Write down the mechanism of action of Amphotericin	2
CO1	Q.6	Classify the antifungal Drugs	10
CO2	Q.7	Discuss about anti-ulcer agents and mechanism of action of H2 and PPIs	10
CO2	Q.8	Write the Clinical symptoms and management of barbiturates, morphine, organophosphosphorus compound and lead, mercury and arsenic poisoning.	5
	Q.9	Explain the antiviral Drugs.	5
CO2	Q.10	Classify the antimalarialDrugs	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

100 % Percentage of students secured more than 60% marks, so this course Pharmacology III- Theory (BP602T) attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOGNOSY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-21

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

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Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
VI SEM	-	3	1	1	1	3	2	2	2	2	3	2	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACONOSY
Course Handout
Course : HERBAL DRUG TECHNOLOGY – THEORY
Course Code : BP603T Crédits : 04, Session :2020-21 (Even Sem.), Class : B.Pharm. 3rd Year
Faculty Name: Dr. S. Mohana Lakshmi

A. Introduction: The course is designed to impart fundamental knowledge on the preparatory pharmacy with arts and science of preparing the different conventional dosage forms.

B. Course Outcomes: At the end of the course, students will be able to:

BP603T.1. Understand raw material as source of herbal drugs from cultivation to herbal drug product.

BP603T.2. Know the WHO and ICH guidelines for evaluation of Herbal drugs

BP603T.3. Know the herbal cosmetics,natural sweeteners,nutraceuticals.

BP603T.4. Appreciate patenting of herbal drugs,GMP.

BP603T.5. The knowledge of basic understanding of herbal drug industry

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

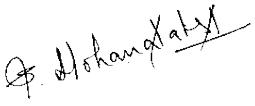
[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).



[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

UNIT – I

Herbs as raw materials

Definition of herb, herbal medicine, herbal medicinal product, herbal drug preparation

Source of Herbs

Selection, identification and authentication of herbal materials

Processing of herbal raw material

Biodynamic Agriculture

Good agricultural practices in cultivation of medicinal plants including Organic farming. Pest and Pest management in medicinal plants: Biopesticides/Bioinsecticides.

Indian Systems of Medicine

a) Basic principles involved in Ayurveda, Siddha, Unani and Homeopathy

b) Preparation and standardization of Ayurvedic formulations viz Aristas and Asawas, Ghutika,Churna, Lehya and Bhasma.

UNIT – II Nutraceuticals

General aspects, Market, growth, scope and types of products available in the market. Health benefits and role of Nutraceuticals in ailments like Diabetes, CVS diseases, Cancer, Irritable bowel syndrome and various Gastro intestinal diseases. Study of following herbs as health food: Alfaalfa, Chicory, Ginger, Fenugreek, Garlic, Honey, Amla, Ginseng, Ashwagandha, Spirulina

Herbal-Drug and Herb-Food Interactions: General introduction to interaction and classification. Study of following drugs and their possible side effects and interactions: Hypercium, kava-kava, Ginkobiloba, Ginseng, Garlic, Pepper & Ephedra

UNIT – III Herbal Cosmetics

Sources and description of raw materials of herbal origin used via, fixed oils, waxes, gums agents colours, perfumes, protective, bleaching agents, antioxidants in products such as skin care, hair care and oral hygiene products. Herbal excipients:

Herbal Excipients – Significance of substances of natural origin as excipients – colorants, sweeteners, binders, diluents, viscosity builders, disintegrants, flavors & perfumes. Herbal formulations : Conventional herbal formulations like syrups, mixtures and tablets and Novel dosage forms like phytosomes

UNIT – IV Evaluation of Drugs

WHO & ICH guidelines for the assessment of herbal drugs

Stability testing of herbal drugs. Patenting and Regulatory requirements of natural products:

a) Definition of the terms: Patent, IPR, Farmers right, Breeder's right, Bioprospecting and Biopiracy

b) Patenting aspects of Traditional Knowledge and Natural Products. Case study of Curcuma & Neem.

Regulatory Issues - Regulations in India (ASU DTAB, ASU DCC), Regulation of manufacture of ASU drugs - Schedule Z of Drugs & Cosmetics Act for ASU drugs.

UNIT – V General Introduction to Herbal Industry

Herbal drugs industry: Present scope and future prospects. A brief account of plant based industries and institutions involved in work on medicinal and aromatic plants in India. Schedule T – Good Manufacturing Practice of Indian systems of medicine

Components of GMP (Schedule – T) and its objectives

Infrastructural requirements, working space, storage area, machinery and equipments,

F. standard operating procedures, health and hygiene, documentation and records

G. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

H. Suggested Text/Reference Books:

1 Textbook of Pharmacognosy by Trease & Evans.

2. Textbook of Pharmacognosy by Tyler, Brady & Robber.

3. Pharmacognosy by Kokate, Purohit and Gokhale

4. Essential of Pharmacognosy by Dr.S.H.Ansari

5. Pharmacognosy & Phytochemistry by V.D.Rangari

6. Pharmacopoeal standards for Ayurvedic Formulation (Council of Research in Indian Medicine & Homeopathy)

7. Mukherjee, P.W. Quality Control of Herbal Drugs: An Approach to Evaluation of Botanicals. Business Horizons Publishers, New Delhi, India, 2002.

I. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Definition of herb, herbal medicine	Lecture	1	Mid Term-1, Quiz & End Sem Exam
2	Herbal medicinal product, herbal drug preparation	Lecture	1	Mid Term-1, Quiz & End Sem Exam
3	Identification and authentication of herbal materials ,Source of Herbs	Lecture	1,5	Mid Term-1, Quiz & End Sem Exam
4	Quiz	Tutorial		Mid Term-1, Quiz & End Sem Exam
5	Processing of herbal raw material	Lecture	1	Mid Term-1, Quiz & End Sem Exam
6	Biodynamic Agriculture	Lecture	1	Mid Term-1, Quiz & End Sem Exam
7	Good agricultural practices in cultivation of medicinal plants including Organic farming.	Lecture	1	Mid Term-1, Quiz & End Sem Exam
8	Quiz	Tutorial		Mid Term-1, Quiz & End Sem Exam
9	Pest and Pest management in medicinal plants: Biopesticides/Bioinsecticides.	Lecture	1	Mid Term-1, Quiz & End Sem Exam
10	Indian Systems of Medicine Basic principles involved in Ayurveda, Siddha, Unani and Homeopathy	Lecture	1	Mid Term-1, Quiz & End Sem Exam
11	Preparation and standardization of Ayurvedic formulations viz Aristas and Asawas, Ghutika,Churna, Lehya and	Lecture	1	Mid Term-1, Quiz & End Sem Exam

	Bhasma			
12	Seminar	Tutorial		Mid Term-1, Quiz & End Sem Exam
13	Nutraceuticals General aspects	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
14	Market, growth, scope and types of products available in the market.	Lecture	1,5	Mid Term-1, Quiz & End Sem Exam
15	Health benefits and role of Nutraceuticals in ailments like Diabetes, CVS diseases, Cancer	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
16	Unit test	Tutorial		Mid Term-1, Quiz & End Sem Exam
17	Role of Nutraceuticals in Irritable bowel syndrome and various Gastro intestinal diseases	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
18	Alfaalfa, Chicory	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
19	Fenugreek, Garlic	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
20	Group discussion on different topics	Tutorial		Mid Term-1, Quiz & End Sem Exam
21	Ginger ,Honey	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
22	Amla, Ginseng	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
23	Ashwagandha, Spirulina	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
24	Quiz	Tutorial		Mid Term-1, Quiz & End Sem Exam
25	Herbal-Drug and Herb-Food Interactions: General introduction to interaction and classification	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
26	Hypercium, kava-kava	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
27	Ginkobiloba, Ginseng	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
28	Unit Test	Tutorial		Mid Term-1, Quiz & End Sem Exam
29	Pepper & Ephedra	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
30	Ginseng, Garlic	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
31	Sources and description of raw materials of herbal origin used via, fixed oils, waxes	Lecture	1,3	Mid Term-2, Quiz & End Sem Exam

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32	Group discussion on herbal drug interactions	Tutorial		Mid Term-2, Quiz & End Sem Exam
33	Gums agents, colours, perfumes	Lecture	1,3	Mid Term-2, Quiz & End Sem Exam
34	Protective, bleaching agents, antioxidants	Lecture	1,,3	Mid Term-2, Quiz & End Sem Exam
35	Herbal Excipients – Significance of substances of natural origin as excipients	Lecture	3	Mid Term-2, Quiz & End Sem Exam
36	Seminar	Tutorial		Mid Term-2, Quiz & End Sem Exam
37	Colorants, sweeteners, binders	Lecture	3	Mid Term-2, Quiz & End Sem Exam
38	Diluents, viscosity builders, disintegrants	Lecture	3	Mid Term-2, Quiz & End Sem Exam
39	Flavours & perfumes.	Lecture	3	Mid Term-2, Quiz & End Sem Exam
40	Unit test	Tutorial		Mid Term-2, Quiz & End Sem Exam
41	Herbal formulations : Conventional herbal formulations like syrups, mixtures and tablets	Lecture	5	Mid Term-2, Quiz & End Sem Exam
42	Novel dosage forms like phytosomes	Lecture	5	Mid Term-2, Quiz & End Sem Exam
43	Evaluation of Drugs WHO & ICH guidelines for the assessment of herbal drugs	Lecture	2	Mid Term-2, Quiz & End Sem Exam
44	Seminar	Tutorial		Mid Term-2, Quiz & End Sem Exam
45	Stability testing of herbal drugs. Patenting and Regulatory requirements of natural products	Lecture	2,4	Mid Term-2, Quiz & End Sem Exam
46	Definition of the terms: Patent, IPR, Farmers right, Breeder's right, Bioprospecting and Biopiracy	Lecture	4	Mid Term-2, Quiz & End Sem Exam
47	Patenting aspects of Traditional Knowledge and Natural Products. Case study of Curcuma & Neem.	Lecture	4	Quiz & End Sem Exam
48	Quiz	Tutorial		Quiz & End Sem Exam

Dr. Mohanty

49	Regulatory Issues - Regulations in India (ASU DTAB, ASU DCC), Regulation of manufacture of ASU drugs - Schedule Z of Drugs & Cosmetics Act for ASU drugs.	Lecture	2,3	Quiz & End Sem Exam
50	General Introduction to Herbal Industry	Lecture	5	Quiz & End Sem Exam
51	A brief account of plant based industries and institutions	Lecture	5	Quiz & End Sem Exam
52	Group discussion on Regulatory issues	Tutorial	4,5	Quiz & End Sem Exam
53	Schedule T – Good Manufacturing Practice of Indian systems of medicine	Lecture	4	Quiz & End Sem Exam
54	Components of GMP (Schedule – T) and its objectives	Lecture	4,5	Quiz & End Sem Exam
55	Infrastructural requirements	Lecture	4,5	Quiz & End Sem Exam
56	Unit test	Tutorial		Quiz & End Sem Exam
57	Working space, storage area	Lecture	4,5	Quiz & End Sem Exam
58	Machinery and equipments	Lecture	4,5	Quiz & End Sem Exam
59	Herbal drugs industry: Present scope and future prospects	Lecture	4,5	Quiz & End Sem Exam
60	Unit test	Tutorial		Quiz & End Sem Exam

J. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PS	PS	PS

		1	2	3	4	5	6	7	8	9	10	11	12	O1	O2	O3
BP603T.1	**BP603T.1**. Understand raw material as source of herbal drugs from cultivation to herbal drug product.	3	-	-	-	2	2	-	-	3	-	3				
BP603T.2.	**BP603T.2**. Know the WHO and ICH guidelines for evaluation of Herbal drugs	3	-	-	1	-	2	-	-	3	-	3				
BP603T.3.	**BP603T.3**. Know the herbal cosmetics,natural sweeteners,nutraceuticals	3	2	-	3	-	2	-	-	2	-	3				
BP603T.4.	**BP603T.4**. Appreciate patenting of herbal drugs,GMP.	2	2	3	3	-	1	-	2	2	-	3				
BP603T.5.	**BP603T.5**. The knowledge of basic understanding of herbal drug industry	1	-	3	-	-	-	-	-	-	-	3				

Dr. Mohan Katyal

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacognosy I MID-SEMESTER (SEM –6th) 2020-21						
Class: B.Pharm, 6thSemester						
Subject Name: BP603T Herbal Drug Technology Theory		Time: 1 Hrs		Max. Marks: 30		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3,4,5	Q.6,8,9	Q.2	Q.7, 10		

The student will be able to

CO1. Understand raw material as source of herbal drugs from cultivation to herbal drug product.

CO2. Know the WHO and ICH guidelines for evaluation of Herbal drugs.

CO3. Know the herbal cosmetics,natural sweeteners, nutraceuticals.

CO4. Appreciate patenting of herbal drugs,GMP.

CO5. The knowledge of basic understanding of herbal drug industry.

CO Map	Question No.	Question	Marks
CO4	Q.1	What are natural sweeteners?	2
CO5	Q.2	Give biological source and uses of ashwagandha?	2
CO1	Q.3	Define herbal medicine with examples?	2
CO2	Q.4	Define shelf life of herbal product?	2
CO3	Q.5	Name any two nutraceuticals and give their biological source?	2
CO1	Q.6	Explain the importance of garbling,drying and preservation in the processing of herbal raw materials?	10
CO4	Q.7	Write a detailed note on WHO and ICH guidelines for evaluation of Herbal drugs ?	10
CO3	Q.8	Write a note on fixed oils and waxes used herbal cosmetics with examples?	5
CO2	Q.9	Write a note on stability testing of herbal drugs?	5
CO4	Q.10	What are the components of GMP?	5

Attainments	**Rubric**

Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

97.8 % Percentage of students secured more than 60% marks, so this course Herbal Drug Technology – Theory (BP603T) attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICS

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-21

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
VI SEM	-	3	1	1	1	3	2	2	2	2	3	2	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICS
Course Handout
Course : BIOPHARMACEUTICS AND PHARMACOKINETICS-THEORY
Course Code : BP604T, Programme : B. Pharmacy VI-Semester **Crédits : 04, Session :2020-21 (Even Sem.)**
Faculty Name : Dr. Jovita Kanoujia

A. Scope: This subject is designed to impart knowledge and skills of Biopharmaceutics and pharmacokinetics and their applications in pharmaceutical development, design of dose and dosage regimen and in solving the problems raised their in

B. Course Outcome: ***At the end of each course, the student will be able to:***

BP604.1	Know [Applying] and understand the processes and terms related to the fate of drug in human body also explain and describe [Remembering] the physicochemical, dosage form and patient related factors affecting absorption, distribution, metabolism and excretion of drugs, Describe [L2: Understanding] the basic concept in Biopharmaceutics and its importance in dosage form design
BP604.2	To analyses the bioavailability of a drug and compare the bioequivalence between formulations, Describe [L1: Remembering] and evaluate [L5: Evaluating] bioavailability, bioequivalence and its regulatory requirements for conducting bioequivalence study
BP604.3	Apply **[L3: Application]** the concept of compartment modelling and estimate [**L5: Evaluating]** the quantity/concentration of drug in body at any point of time.
BP604.4	To evaluate various pharmacokinetic parameters for the drugs exhibiting saturation kinetics.
BP604.5	Apply [L3: Application] Pharmacokinetics in Clinical Situations

C. 1.Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices**.**
2. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

3. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice.
Find, analyze, evaluate and apply information systematically and shall make defensible decisions.
4. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.
5. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well-being.
6. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).
7. Pharmaceutical Ethics: Honor personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.
8. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.
9. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional Pharmacy Practice
10. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
11. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively

D.Programme specific outcomes:

1. Scientific Thinking: Enable student's knowledge in scientific perception to understand the concepts and to solve the problems positively while making pharmaceutical formulations.
2. Analytical Skills: Assimilate and develop analytical skills using advanced equipment to design and evaluate pharmaceutical products, also to assess their quality.
3. Resource Management: Utilize and manage resources from natural, semi synthetic and synthetic origin to develop real time products with utmost benefit and safety.
4.Public Health Care: Promote and empower the healthy living in the community by various means of awareness and health strategies.
5. Entrepreneurship: Acquire and develop entrepreneurship and administration skills to establish community pharmacy, learning and training centers for the long term wellbeing of society.

E. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**

Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2 quiz, assignment, open book test, field work, group discussion and seminar)		
	Seminar/ Assignment/Quiz/ Open book test	S/As/Q/OBT	3%
Interaction	Student-Teacher interaction	ST	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

F. Syllabus

UNIT-I

Introduction Biopharmaceutics to Absorption; Mechanisms of drug absorption through GIT, factors influencing drug absorption though GIT, absorption of drug from Non per oral extra-vascular routes, Distribution Tissue permeability of drugs, binding of drugs, apparent, volume of drug distribution, plasma and tissue protein binding of drugs, factors affecting protein-drug binding. Kinetics of protein binding, Clinical significance of protein binding of drugs

UNIT- II

Elimination: Drug metabolism and basic understanding metabolic pathways renal excretion of drugs, factors affecting renal excretion of drugs, renal clearance, Non renal routes of drug excretion of drugs Bioavailability and Bioequivalence: Definition and Objectives of bioavailability, obsolete and relative bioavailability, measurement of bioavailability, in-vitro drug dissolution models, in-vitro-in-vivo correlations, bioequivalence studies, methods to enhance the dissolution rates and bioavailability of poorly soluble drugs.

UNIT- III

Pharmacokinetics: Definition and introduction to Pharmacokinetics, Compartment models, Non compartment models, physiological models, One compartment open model. (a). Intravenous Injection (Bolus) (b). Intravenous infusion and (c) Extra vascular administrations. Pharmacokinetics parameters - KE ,t1/2,Vd,AUC,Ka, Clt and CLR- definitions methods of eliminations, understanding of their significance and application

UNIT- IV

Multi compartment models: Two compartment open model. IV bolus Kinetics of multiple dosing, steady state drug levels, calculation of loading and maintenance doses and their significance in clinical settings.

UNIT- V

Nonlinear Pharmacokinetics: a. Introduction, b. Factors causing Non-linearity. c. Michaelis-menton method of estimating parameters, Explanation with example of drugs.

G. Examination Scheme:

Components	A	ST	CT	S/As/Q/OBT	EE
Weightage (%)	4	3	15	3	75

CT: Class Test, As: Assignment, ST: Student teacher interaction,
S/A/Q/OBT: Seminar/ Assignment/Quiz/ Open book test, EE: End Semester Examination; A: Attendance

H. Suggested Text/Reference Books:

1. Biopharmaceutics and Clinical Pharmacokinetics by, Milo Gibaldi.

2. Biopharmaceutics and Pharmacokinetics; By Robert F Notari

3. Applied biopharmaceutics and pharmacokinetics, Leon Shargel and Andrew

B.C.YU 4th edition,Prentice-Hall Inernational edition.USA

4. Bio pharmaceutics and Pharmacokinetics-A Treatise, By D. M. Brahmankar and

Sunil B.Jaiswal,Vallabh Prakashan Pitampura, Delhi

5. Pharmacokinetics: By Milo Glbaldi Donald, R. Mercel Dekker Inc.

6. Hand Book of Clinical Pharmacokinetics, By Milo Gibaldi and Laurie Prescott by

ADIS Health Science Press.

7. Biopharmaceutics; By Swarbrick

8. Clinical Pharmacokinetics, Concepts and Applications: ByMalcolm Rowland and

9. Thomas, N. Tozen, Lea and Febrger, Philadelphia, 1995.

10. Dissolution, Bioavailability and Bioequivalence, By Abdou H.M, Mack,

Publishing Company,Pennsylvania 1989.

11. Biopharmaceutics and Clinical Pharmacokinetics-An introduction 4th edition Revised and

expanded by Rebort F Notari Marcel Dekker Inn, New York and Basel, 1987.

12. Remington's Pharmaceutical Sciences, ByMack Publishing Company, Pennsylvnia

I. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Mechanisms of drug absorption through GIT	Lecture	BP604T.1	Mid Term-1, Quiz & End Sem Exam
2	Mechanisms of drug absorption through GIT	Lecture	BP604T.1	Mid Term-1, Quiz & End Sem Exam
3	factors influencing drug absorption though GIT,	Lecture	BP604T.1	Mid Term-1, Quiz & End Sem Exam
4	factors influencing drug absorption though GIT,	Lecture	BP604T.1	Mid Term-1, Quiz & End Sem Exam

5	Tissue permeability of drugs	Lecture	BP604T.1	Mid Term-1, Quiz & End Sem Exam
6	Tissue permeability of drugs	Lecture	BP604T.1	Mid Term-1, Quiz & End Sem Exam
7	binding of drugs	Lecture	BP604T.1	Mid Term-1, Quiz & End Sem Exam
8	binding of drugs	Lecture	BP604T.1	Mid Term-1, Quiz & End Sem Exam
9	apparent, volume of drug distribution,	Lecture	BP604T.1	Mid Term-1, Quiz & End Sem Exam
10	factors affecting protein-drug binding.	Lecture	BP604T.1	Mid Term-1, Quiz & End Sem Exam
11	Kinetics of protein binding, Clinical significance of protein binding of drugs,	Lecture	BP604T.2	Mid Term-1, Quiz & End Sem Exam
12	Drug metabolism and basic understanding metabolic pathways,	Lecture	BP604T.2	Mid Term-1, Quiz & End Sem Exam
13	Drug metabolism and basic understanding metabolic pathways,	Lecture	BP604T.2	Mid Term-1, Quiz & End Sem Exam
14	factors affecting renal excretion of drugs	Lecture	BP604T.2	Mid Term-1, Quiz & End Sem Exam
15	factors affecting renal excretion of drugs	Lecture	BP604T.2	Mid Term-1, Quiz & End Sem Exam
16	renal clearance, Non renal routes of drug excretion of drugs	Lecture	BP604T.2	Mid Term-1, Quiz & End Sem Exam
17	Definition and Objectives of bioavailability ,absolute and relative bioavailability, measurement of bioavailability	Lecture	BP604T.2	Mid Term-1, Quiz & End Sem Exam
18	measurement of bioavailability	Lecture	BP604T.2	Mid Term-1, Quiz & End Sem Exam
19	in-vitro drug dissolution models, in-vitro-in-vivo correlations,	Lecture	BP604T.2	Mid Term-1, Quiz & End Sem Exam
20	in-vitro drug dissolution models, in-vitro-in-vivo correlations,	Lecture	BP604T.2	Mid Term-1, Quiz & End Sem Exam
21	methods to enhance the dissolution rates and bioavailability of poorly soluble drugs.	Lecture	BP604T.2	Mid Term-1, Quiz & End Sem Exam
22	methods to enhance the dissolution rates and bioavailability of poorly soluble drugs	Lecture	BP604T.2	Mid Term-1, Quiz & End Sem Exam
23	Definition and introduction to Pharmacokinetics	Lecture	BP604T.3	Mid Term-1, Quiz & End Sem Exam

Dr. Mohanty

24	Definition and introduction to Pharmacokinetics	Lecture	BP604T.3	Mid Term-1, Quiz & End Sem Exam
25	Compartment models, Non compartment models, physiological models	Lecture	BP604T.3	Mid Term-1, Quiz & End Sem Exam
26	Compartment models, Non compartment models, physiological models	Lecture	BP604T.3	Mid Term-1, Quiz & End Sem Exam
27	One compartment open model. (a). Intravenous Injection (Bolus)	Lecture	BP604T.3	Mid Term-1, Quiz & End Sem Exam
28	(a). Intravenous Injection (Bolus)	Lecture	BP604T.3	Mid Term-2, Quiz & End Sem Exam
29	Intravenous infusion	Lecture	BP604T.3	Mid Term-2, Quiz & End Sem Exam
30	Intravenous infusion	Lecture	BP604T.3	Mid Term-2, Quiz & End Sem Exam
31	Intravenous infusion	Lecture	BP604T.3	Mid Term-2, Quiz & End Sem Exam
32	Extra vascular administrations.	Lecture	BP604T.3	Mid Term-2, Quiz & End Sem Exam
33	Pharmacokinetics parameters	Lecture	BP604T.3	Mid Term-2, Quiz & End Sem Exam
34	Pharmacokinetics parameters	Lecture	BP604T.3	Mid Term-2, Quiz & End Sem Exam
35	Multi compartment models	Lecture	BP604T.4	Mid Term-2, Quiz & End Sem Exam
36	Two compartment open model	Lecture	BP604T.4	Mid Term-2, Quiz & End Sem Exam
37	Two compartment open model	Lecture	BP604T.4	Mid Term-2, Quiz & End Sem Exam
38	IV bolus Kinetics of multiple dosing,	Lecture	BP604T.4	Mid Term-2, Quiz & End Sem Exam
39	IV bolus Kinetics of multiple dosing,	Lecture	BP604T.4	Mid Term-2, Quiz & End Sem Exam
40	steady state drug levels	Lecture	BP604T.4	Mid Term-2, Quiz & End Sem Exam
41	steady state drug levels	Lecture	BP604T.4	Mid Term-2, Quiz & End Sem Exam
42	calculation of loading and maintenance doses	Lecture	BP604T.4	Mid Term-2, Quiz & End Sem Exam
43	calculation of loading and maintenance doses	Lecture	BP604T.4	Mid Term-2, Quiz & End Sem Exam

44	Nonlinear Pharmacokinetics: Introduction	Lecture	BP604T.5	Mid Term-2, Quiz & End Sem Exam
45	Factors causing Non-linearity	Lecture	BP604T.5	Mid Term-2, Quiz & End Sem Exam
46	Factors causing Non-linearity	Lecture	BP604T.5	Mid Term-2, Quiz & End Sem Exam
47	Michaelis-menton method of estimating parameters	Lecture	BP604T.5	Mid Term-2, Quiz & End Sem Exam
48	Michaelis-menton method of estimating parameters	Lecture	BP604T.5	Mid Term-2, Quiz & End Sem Exam
49	IV bolus Kinetics of multiple dosing	Lecture	BP604T.5	Mid Term-2, Quiz & End Sem Exam
50	IV bolus Kinetics of multiple dosing	Lecture	BP604T.5	Mid Term-2, Quiz & End Sem Exam
51	IV bolus Kinetics of multiple dosing	Lecture	BP604T.5	Mid Term-2, Quiz & End Sem Exam
52	IV bolus Kinetics of multiple dosing	Lecture	BP604T.5	Mid Term-2, Quiz & End Sem Exam
53	IV bolus Kinetics of multiple dosing	Lecture	BP604T.5	Mid Term-2, Quiz & End Sem Exam
54	IV bolus Kinetics of multiple dosing	Lecture	BP604T.5	Mid Term-2, Quiz & End Sem Exam
55	IV bolus Kinetics of multiple dosing	Lecture	BP604T.5	Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

(CO) with Program Outcome (PO)											
CO/PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**
CO1	3	1	2	0	0	0	1	3	0	0	3
CO2	3	2	3	0	0	0	1	3	0	0	3
CO3	3	2	3	1	0	0	1	3	0	0	3
CO4	3	2	3	2	0	0	1	3	0	0	3
CO5	3	2	2	2	0	0	1	3	0	0	3

Amity Institute of Pharmacy
Department of Pharmaceutics
MID-SEMESTER (SEM –VI) 2020-21

Class: B.Pharm, VI Semester

Subject Name: BP 604 T Biopharmaceutics And Pharmacokinetics-Theory	Time: 1 Hrs	Max. Marks: 30

Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3,5	Q.4,8, 10	Q.2,3	Q. 9,	Q 6,7	

The student will be able to

C604.1 explain and describe [Remembering] the physicochemical, dosage form and patient related factors affecting absorption, distribution, metabolism and excretion of drugs

C604.2 To analyses the bioavailability of a drug and compare the bioequivalence between formulations, describe [L1: Remembering] and evaluate [L5: Evaluating] bioavailability, bioequivalence and its regulatory requirements for conducting bioequivalence study

C604.3 the concept of compartment modelling and estimate [L5: Evaluating] the quantity/concentration of drug in body at any point of time.

C604.4 To evaluate various pharmacokinetic parameters for the drugs exhibiting saturation kinetics

C605.5 Apply [L3: Application] Pharmacokinetics in Clinical Situations

CO Map	Question No.	Question	Marks
CO2	Q.1	Define bio-equivalence and bio-availability	2
CO2	Q.2	Define absorption	2
CO2	Q.3	Define protein binding	2
CO5	Q.4	Define on set of action, Duration of action and Intensity of action	2
CO2	Q.5	Define Area Under the Curve(AUC)	2
CO2	Q.6	Discuss the method of measuring of bioavailability	10
CO2	Q.7	Explain various methods to enhance the dissolution rates and bioavailability of poorly soluble drugs	10
CO4	Q.8	Explain factors causing non linearity	5
CO2	Q.9	Explain theory of dissolution	5
CO5	Q.10	Explain Michaelis Menten equation for Non-Linear Kinetics.	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

100 % Percentage of students secured more than 60% marks, so this course Biopharmaceutics And Pharmacokinetics Theory (BP604T) attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
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PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-21

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge asscoited with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions

[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
VI SEM	BP605T	3	3	3	3	1	2	2	1	3	1	1	-	-	-

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACY
Course Handout
Course : Pharmaceutical Biotechnology (Theory)
Course Code : BP605T, Crédits : 04, Session : 2021-22 (Even Sem.), Class : B. Pharm. 6th Year
Faculty Name : Dr. Neeraj Mishra & Dr. Ankit Yadav

A. Introduction: This course is designed to impart fundamental knowledge on pharmaceutical product development and translation from laboratory to market. Upon completion of the course, the student shall be able to:

1. Know the process of pilot plant and scale up of pharmaceutical dosage forms
2. Understand the process of technology transfer from lab scale to commercial batch
3. Know different Laws and Acts that regulate pharmaceutical industry
4. Understand the approval process and regulatory requirements for drug products

B. Course Outcomes: At the end of the course, students will be able to:

BP605T.1. Understanding the importance of Immobilized enzymes in Pharmaceutical Industries

BP605T.2. Genetic engineering applications in relation to production of pharmaceuticals

BP605T.3. Importance of Monoclonal antibodies in Industries

BP605T.4. Understand the humoral and cellular immunity

BP605T.5. Discuss the use of microorganisms in fermentation technology

C. Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge associated with the profession of pharmacy, including biomedical

sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

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[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of

technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	10%
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves Including medical leaves.	A	5%
End Semester Examination	End Semester Examination	EE	70%
Total			**100%**

E. Syllabus

Module I

a) Brief introduction to Biotechnology with reference to Pharmaceutical Sciences. b) Enzyme Biotechnology- Methods of enzyme immobilization and applications. c) Biosensors- Working and applications of biosensors in Pharmaceutical Industries. d) Brief introduction to Protein Engineering. e) Use of microbes in industry. Production of Enzymes- General consideration - Amylase, Catalase, Peroxidase, Lipase, Protease, Penicillinase. f) Basic principles of genetic engineering.

Module II

a) Study of cloning vectors, restriction endonucleases and DNA ligase. b) Recombinant DNA technology. Application of genetic engineering in medicine. c) Application of r DNA technology and genetic engineering in the production of: i) Interferon ii) Vaccines-hepatitis- B iii) Hormones-Insulin. d) Brief introduction to PCR

Module III

Types of immunity- humoral immunity, cellular immunity a) Structure of Immunoglobulins b) Structure and Function of MHC c) Hypersensitivity reactions, Immune stimulation and Immune suppressions. d) General method of the preparation of bacterial vaccines, toxoids, viral vaccine, antitoxins, serum-immune blood derivatives and other products relative to immunity. e) Storage conditions and stability of official vaccines f) Hybridoma technology- Production, Purification and Applications g) Blood products and Plasma Substituties.

Module IV

a) Immuno blotting techniques- ELISA, Western blotting, Southern blotting. b) Genetic organization of Eukaryotes and Prokaryotes c) Microbial genetics including transformation, transduction, conjugation, plasmids and transposons. d) Introduction to Microbial biotransformation and applications. e) Mutation: Types of mutation/mutants

Module V

a) Fermentation methods and general requirements, study of media, equipment's, sterilization methods, aeration process, stirring.

b) Large scale production fermenter design and its various controls.

c) Study of the production of - penicillin's, citric acid, Vitamin B12, Glutamic acid, Griseofulvin,

d) Blood Products: Collection, Processing and Storage of whole human blood, dried human plasma, plasma Substitutes.

Examination Scheme:

Components	**A**	**CT**	**S/V/Q/HA**	**EE**
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; A: Attendance

F. Suggested Text/Reference Books:

1. B.R. Glick and J.J. Pasternak: Molecular Biotechnology: Principles and Applications of RecombinantDNA: ASM Press Washington D.C.

2. RA Goldshy et. al., : Kuby Immunology.

3. J.W. Goding: Monoclonal Antibodies.

4. J.M. Walker and E.B. Gingold: Molecular Biology and Biotechnology by Royal7 Society of Chemistry.

5. Zaborsky: Immobilized Enzymes, CRC Press, Degraland, Ohio.

6. S.B. Primrose: Molecular Biotechnology (Second Edition) Blackwell Scientific Publication.

7. Stanbury F., P., Whitakar A., and Hall J., S., Principles of fermentation technology, 2nd edition, Aditya books Ltd., New Delhi

G. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Brief introduction to Biotechnology with reference to Pharmaceutical Sciences.	Lecture	BP605T.1	Mid Term-1, Quiz & End Sem Exam
2	Enzyme Biotechnology-Methods of enzyme immobilization	Lecture	BP605T.1	Mid Term-1, Quiz & End Sem Exam
3	Application of immobilization	Lecture	BP605T.1	Mid Term-1, Quiz & End Sem Exam
4	Working principal of biosensor	Lecture	BP605T.1	Mid Term-1, Quiz & End Sem Exam
5	Applications of biosensors in Pharmaceutical Industries.	Lecture	BP605T.1	Mid Term-1, Quiz & End Sem Exam
6	Brief introduction to Protein Engineering.	Lecture	BP605T.1	Mid Term-1, Quiz & End Sem Exam
7	Brief introduction to	Lecture	BP605T.1	Mid Term-

	Protein Engineering.			1, Quiz & End Sem Exam
8	Use of microbes in industry	Lecture	BP605T.1	Mid Term-1, Quiz & End Sem Exam
9	Production of Enzymes- General consideration – Amylase, Catalase, Peroxidase, Lipase, Protease, Penicillinase.	Lecture	BP605T.1	Mid Term-1, Quiz & End Sem Exam
10	Basic principles of genetic engineering.	Lecture	BP605T.1	Mid Term-1, Quiz & End Sem Exam
11	Basic principles of genetic engineering.	Lecture	BP605T.2	Mid Term-1, Quiz & End Sem Exam
12	Study of cloning vectors,		BP605T.2	
13	Restriction endonucleases	Lecture	BP605T.2	Mid Term-1, Quiz & End Sem Exam
14	DNA ligase.	Lecture	BP605T.2	Mid Term-1, Quiz & End Sem Exam
15	Recombinant DNA technology	Lecture	BP605T.2	Mid Term-1, Quiz & End Sem Exam
16	Application of genetic engineering in medicine	Lecture	BP605T.2	Mid Term-1, Quiz & End Sem Exam
17	Brief introduction to PCR	Lecture	BP605T.2	Mid Term-1, Quiz & End Sem Exam
18	Application of r DNA technology	Lecture	BP605T.2	Mid Term-1, Quiz & End Sem

				Exam
19	Application of r DNA technology	Lecture	BP605T.2	Mid Term-1, Quiz & End Sem Exam
20	Genetic engineering in the production of: i) Interferon ii) Vaccines- hepatitis-B	Lecture	BP605T.2	Mid Term-2, Quiz & End Sem Exam
21	Production of Hormones-Insulin	Lecture	BP605T.2	Mid Term-2, Quiz & End Sem Exam
22	Types of immunity-humoral immunity, cellular immunity	Lecture	BP605T.3	Mid Term-2, Quiz & End Sem Exam
23	a) Structure of Immunoglobulins	Lecture	BP605T.3	Mid Term-2, Quiz & End Sem Exam
24	b) Structure and Function of MHC	Lecture	BP605T.3	Mid Term-2, Quiz & End Sem Exam
25	c) Hypersensitivity reactions, Immune stimulation and Immune suppressions	Lecture	BP605T.3	Mid Term-2, Quiz & End Sem Exam
26	d) General method of the preparation of bacterial vaccines, toxoids, viral vaccine	Lecture	BP605T.3	Mid Term-2, Quiz & End Sem Exam
27	Antitoxins, serum-immune blood derivatives and other products relative to immunity.	Lecture	BP605T.3	Mid Term-2, Quiz & End Sem Exam
28	Storage conditions and stability of official vaccines	Lecture	BP605T.3	Mid Term-2, Quiz & End Sem Exam
29	Hybridoma technology-Production,	Lecture	BP605T.3	Mid Term-2, Quiz &

				End Sem Exam
30	Purification and Applications	Lecture	BP605T.3	Mid Term-2, Quiz & End Sem Exam
31	Blood products	Lecture	BP605T.3	Mid Term-2, Quiz & End Sem Exam
32	Plasma Substituties.	Lecture	BP605T.3	Mid Term-2, Quiz & End Sem Exam
33	Immuno blotting techniques- ELISA,	Lecture	BP605T.4	Mid Term-2, Quiz & End Sem Exam
34	Western blotting, Southern blotting	Lecture	BP605T.4	Mid Term-2, Quiz & End Sem Exam
35	Genetic organization of Eukaryotes and Prokaryotes	Lecture	BP605T.4	Mid Term-2, Quiz & End Sem Exam
36	Microbial genetics including transformation	Lecture	BP605T.4	Mid Term-2, Quiz & End Sem Exam
37	Transduction, conjugation, plasmids and transposons.	Lecture	BP605T.4	Mid Term-2, Quiz & End Sem Exam
38	Introduction to Microbial biotransformation	Lecture	BP605T.4	Mid Term-2, Quiz & End Sem Exam
39	Application of Biotransformation	Lecture	BP605T.4	Mid Term-2, Quiz & End Sem Exam
40	Mutation: Types of mutation/mutants.	Lecture	BP605T.4	Mid Term-2, Quiz & End Sem Exam

41	Fermentation methods and general requirements,	Lecture	BP605T.5	Mid Term-2, Quiz & End Sem Exam
42	Study of media, equipments, sterilization methods, aeration process, stirring.	Lecture	BP605T.5	Mid Term-2, Quiz & End Sem Exam
43	Large scale production fermenter design and its various controls;	Lecture	BP605T.5	Mid Term-2, Quiz & End Sem Exam
44	Study of the production of - penicillins, citric acid; Vitamin B12, Glutamic acid, Griseofulvin,	Lecture	BP605T.5	Mid Term-2, Quiz & End Sem Exam
45	Blood Products: Collection, Processing and Storage of whole human blood, dried human plasma, plasma Substituties	Lecture	BP605T.5	Mid Term-2, Quiz & End Sem Exam

H. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP605T.1	Understanding the importance of Immobilized enzymes in Pharmaceutical Industries	3	3	3	1	-	1	2	1	-	-	1
BP605T.2	Genetic engineering applications in relation to production of pharmaceuticals	2	2	2	3	-	1	1	1	-	-	1

BP605T.3	Importance of Monoclonal antibodies in Industries	2	1	1	-	-	1	3	2	-	-	-
BP605T.4	Understand the humoral and cellular immunity	2	2	2	1	-	1	-	-	-	-	-
BP605T.5	Discuss the use of microorganisms in fermentation technology	2	1	-	-	-	2	1	1	-	-	1

Amity Institute of Pharmacy
Department of Pharmaceutics
I MID-SEMESTER (SEM –VIII) 2020-21

Class: B.Pharm, VII Semester

Subject Name: BP704T.Novel Drug Delivery System (Theory)	Time: 1 Hr	Max. Marks: 30

Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3,4,5	Q.6,8,9	Q.2	Q.7, 10		

The student will be able to

CO1. Understanding the importance of Immobilized enzymes in Pharmaceutical Industries

CO2. Genetic engineering applications in relation to production of pharmaceuticals

CO3. Importance of Monoclonal antibodies in Industries

CO.4. Understand the humoral and cellular immunity

CO.5. Discuss the use of microorganisms in fermentation technology

CO Map	Question No.	Question	Marks
CO3	Q.1	Define the term toxoid and explain its methods of preparation.	2
CO4	Q.2	Discuss the principle of rDNA technology.	2
CO3	Q.3	Define humoral immunity and explain the role of B cell in humoral immunity.	2
CO5	Q.4	Define the term fermentation and discuss type of fermentation.	2

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CO4	Q.5	What are Microbial genetics and discuss it application.	2
CO1 & 2	Q.6	Discuss the applications of immobilization. Explain the role of vectors in rDNA technology.	10
CO5	Q.7	Define fermentation and discuss method of production of Vitamin B12 by fermentation method.	10
CO3	Q.8	Write note on Polymerase chain reaction.	5
CO4	Q.9	Discuss the types of microbial biotransformation reactions.	5
CO4	Q.10	Write note on Types of mutation.	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

97.8 % Percentage of students secured more than 60% marks, so this course Pharmaceutical Biotechnology – Theory (BP605T) attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICS

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
VI SEM																
	BP606T	3	2	3	3	3	2	3	3	1	1	2				
	-															
	-															
	-															
	-															
	-															

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICS
Course Handout
Course : PHARMACEUTICAL QUALITY ASSURANCE THEORY
Course Code : BP606T, Crédits : 04, Session :2021-23 (Even Sem.), Class : B.Pharm. 3rd Year
Faculty Name: Dr. Ankit Yadav & Dr. Satish Shilpi

A. Introduction: This course deals with the various aspects of quality control and quality assurance aspects of pharmaceutical industries. It deals with the important aspects like cGMP, QC tests, documentation, quality certifications and regulatory affairs..

B. Course Outcomes: At the end of the course, students will be able to:

BP606T.1. Understand the cGMP aspects in a pharmaceutical industry.

BP606T.2. Appreciate the importance of documentation.

BP606T.3. Understand the scope of quality certifications applicable to pharmaceutical industries.

BP606T.4. Understand the responsibilities of QA & QC departments.

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

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D. Assessment Plan:

Component of Evaluation	Description	Code	Weightage %

Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

UNIT – I

Quality Assurance and Quality Management concepts: Definition and concept of Quality control, Quality assurance and GMP

Total Quality Management (TQM): Definition, elements, philosophies

ICH Guidelines: purpose, participants, process of harmonization, Brief overview of QSEM, with special emphasis on Q-series guidelines, ICH stability testing guidelines

Quality by design (QbD): Definition, overview, elements of QbD program, tools

ISO 9000 & ISO14000: Overview, Benefits, Elements, steps for registration

NABL accreditation : Principles and procedures

UNIT - II

Organization and personnel: Personnel responsibilities, training, hygiene and personal records.

Premises: Design, construction and plant layout, maintenance, sanitation, environmental control, utilities and maintenance of sterile areas, control of contamination.

Equipments and raw materials: Equipment selection, purchase specifications, maintenance, purchase specifications and maintenance of stores for raw materials.

UNIT – III

Quality Control: Quality control test for containers, rubber closures and secondary packing materials.

Good Laboratory Practices: General Provisions, Organization and Personnel, Facilities, Equipment, Testing Facilities Operation, Test and Control Articles, Protocol for Conduct of a Nonclinical Laboratory Study, Records and Reports, Disqualification of Testing Facilities

UNIT – IV

Complaints: Complaints and evaluation of complaints, Handling of return good, recalling and waste disposal.

Document maintenance in pharmaceutical industry: Batch Formula Record, Master Formula Record, SOP, Quality audit, Quality Review and Quality documentation, Reports and documents, distribution records.

UNIT – V

Calibration and Validation: Introduction, definition and general principles of calibration, qualification and validation, importance and scope of validation, types of validation, validation master plan. Calibration of pH meter, Qualification of UV-Visible spectrophotometer, General principles of Analytical method Validation.

Warehousing: Good warehousing practice, materials management

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. Quality Assurance Guide by organization of Pharmaceutical Products of India.
2. Good Laboratory Practice Regulations, 2nd Edition, Sandy Weinberg Vol. 69.
3. Quality Assurance of Pharmaceuticals- A compendium of Guide lines and Related materials Vol I WHO Publications.
4. A guide to Total Quality Management- Kushik Maitra and Sedhan K Ghosh
5. How to Practice GMP's – P P Sharma.
6. ISO 9000 and Total Quality Management – Sadhank G Ghosh
7. The International Pharmacopoeia – Vol I, II, III, IV- General Methods of Analysis and Quality specification for Pharmaceutical Substances, Excipients and Dosage forms
8. Good laboratory Practices – Marcel Deckker Series
9. ICH guidelines, ISO 9000 and 14000 guidelines

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Quality Assurance and Quality Management concepts: Definition and concept of Quality control	Lecture	1, 4	Mid Term-1, Quiz & End Sem Exam
2	Quality Assurance and Quality Management concepts: Quality assurance	Lecture	1, 4	Mid Term-1, Quiz & End Sem Exam
3	Quality Assurance and Quality Management concepts	Lecture	1, 4	Mid Term-1, Quiz & End Sem Exam
4	Total Quality Management (TQM)	Lecture	1, 4	Mid Term-1, Quiz & End Sem Exam
5	ICH Guidelines: purpose, participants, process of harmonization, Brief overview of QSEM	Lecture	1, 2	Mid Term-1, Quiz & End Sem Exam
6	ICH Guidelines: with special emphasis on Q-series guidelines, ICH stability testing guidelines	Lecture	1, 2	Mid Term-1, Quiz & End Sem Exam
7	Quality by design (QbD): Definition, overview, elements of QbD program	Lecture	1, 2	Mid Term-1, Quiz & End Sem Exam
8	Quality by design (QbD): elements of QbD program, tools	Lecture	1, 2	Mid Term-1, Quiz & End Sem Exam

9	ISO 9000 & ISO14000	Lecture	2, 3	Mid Term-1, Quiz & End Sem Exam
10	NABL accreditation	Lecture	2, 3	Mid Term-1, Quiz & End Sem Exam
11	Quiz	Tutorial		Quiz & End Sem
12	Organization and personnel: Personnel responsibilities, training, hygiene and personal records	Lecture	1, 4	Mid Term-1, Quiz & End Sem Exam
13	Organization and personnel: Personnel responsibilities, training, hygiene and personal records	Lecture	1, 4	Mid Term-1, Quiz & End Sem Exam
14	Premises: Design, construction and plant layout, maintenance	Lecture	1, 4	Mid Term-1, Quiz & End Sem Exam
15	Premises: sanitation, environmental control	Lecture	1, 4	Mid Term-1, Quiz & End Sem Exam
16	Premises: utilities and maintenance of sterile areas, control of contamination	Lecture	1, 4	Mid Term-1, Quiz & End Sem Exam
17	Premises: utilities and maintenance of sterile areas, control of contamination	Lecture	1, 4	Mid Term-1, Quiz & End Sem Exam
18	Equipments and raw materials: Equipment selection	Lecture	1, 3, 4	Mid Term-1, Quiz & End Sem Exam
19	Equipments and raw materials: purchase specifications	Lecture	1, 3, 4	Mid Term-1, Quiz & End Sem Exam
20	Equipments and raw materials: maintenance, purchase specifications	Lecture	1, 3, 4	Mid Term-1, Quiz & End Sem Exam
21	Equipments and raw materials: maintenance of stores for raw materials	Lecture	1, 3, 4	Mid Term-1, Quiz & End Sem Exam
22	Unit test	Tutorial		Mid Term-1, Quiz & End Sem Exam
23	Quality Control: Quality control test for containers	Lecture	4	Mid Term-1, Quiz & End Sem

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				Exam
24	Quality Control: Quality control test for containers	Lecture	4	Mid Term-1, Quiz & End Sem Exam
25	Quality Control: Quality control test for containers	Tutorial	4	Mid Term-1, Quiz & End Sem Exam
26	Quality Control: Quality control test for rubber closures	Lecture	4	Mid Term-1, Quiz & End Sem Exam
27	Quality Control: Quality control test for secondary packing materials	Lecture	4	Mid Term-1, Quiz & End Sem Exam
28	Good Laboratory Practices: General Provisions, organization and Personnel,	Lecture	1, 4	Mid Term-2, Quiz & End Sem Exam
29	Good Laboratory Practices: Facilities, Equipment, Testing Facilities Operation	Lecture	1, 4	Mid Term-2, Quiz & End Sem Exam
30	Good Laboratory Practices: Test and Control Articles,	Lecture	1, 4	Mid Term-2, Quiz & End Sem Exam
31	Good Laboratory Practices: Protocol for Conduct of a Nonclinical Laboratory Study	Lecture	1, 4	Mid Term-2, Quiz & End Sem Exam
32	Good Laboratory Practices: Records and Reports, Disqualification of Testing Facilities	Lecture	1, 4	Mid Term-2, Quiz & End Sem Exam
33	Complaints: Complaints and evaluation of complaints	Lecture	2	Mid Term-2, Quiz & End Sem Exam
34	Complaints: Handling of return good	Lecture	2	Mid Term-2, Quiz & End Sem Exam
35	Complaints: Recalling and waste disposal	Lecture	2	Mid Term-2, Quiz & End Sem Exam
36	Document maintenance in pharmaceutical industry: Batch Formula Record, Master Formula Record	Lecture	2	Mid Term-2 Quiz & End Sem Exam
37	Document maintenance in pharmaceutical industry:	Lecture	2	Mid Term-2, Quiz & End Sem

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	SOP			Exam
38	Document maintenance in pharmaceutical industry: Quality audit	Lecture	2	Mid Term-2, Quiz & End Sem Exam
39	Document maintenance in pharmaceutical industry: Quality Review and Quality documentation	Lecture	2	Mid Term-2, Quiz & End Sem Exam
40	Document maintenance in pharmaceutical industry: Reports and documents, distribution records	Lecture	2	Mid Term-2, Quiz & End Sem Exam
41	Document maintenance in pharmaceutical industry: introduction, definition and general principles of calibration	Lecture	2	Mid Term-2, Quiz & End Sem Exam
42	Document maintenance in pharmaceutical industry: qualification and validation	Lecture	2	Mid Term-2, Quiz & End Sem Exam
43	Document maintenance in pharmaceutical industry: importance and scope of validation, types of validation	Lecture	2	Mid Term-2, Quiz & End Sem Exam
44	Document maintenance in pharmaceutical industry: validation master plan	Lecture	2	Mid Term-2, Quiz & End Sem Exam
45	Document maintenance in pharmaceutical industry: Calibration of pH meter	Lecture	1,4	Mid Term-2, Quiz & End Sem Exam
46	Document maintenance in pharmaceutical industry: Qualification of UV-Visible spectrophotometer	Lecture	1,4	Mid Term-2, Quiz & End Sem Exam
47	Document maintenance in pharmaceutical industry: General principles of Analytical method Validation	Lecture	1,4	Mid Term-2, Quiz & End Sem Exam
48	Quiz	Tutorial		Quiz & End Sem Exam
49	Warehousing: Good warehousing practice, materials management	Lecture	1, 2	Mid Term-2, Quiz & End Sem Exam
50	Stability problems and	Lecture	1, 2, 4	Mid Term-2,

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	methods to overcome			Quiz & End Sem Exam
51	Unit Test	Tutorial		Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP606T.1	**BP606T.1.** understand the cGMP aspects in a pharmaceutical industry.	3	3	2	2	1	1	3	3	1	1	3				
BP606T.2.	**BP606T.2.** appreciate the importance of documentation.	3	2	2	1	-	1	2	3	-	-	3				
BP606T.3.	**BP606T.3.** understand the scope of quality certifications applicable to pharmaceutical industries.	3	3	3	3	-	1	1	1	1	-	3				
BP606T.4.	**BP606T.4.** understand the responsibilities of QA & QC departments.	3	3	3	3	2	2	2	3	2	2	3				

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutics I MID-SEMESTER (SEM – 6th) 2022-23						
Class: B.Pharm, 6th Semester						
Subject Name: BP606T Pharmaceutical Quality Assurance Theory		Time: 1 Hrs		Max. Marks: 30		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,2,6,8	Q. 3,4, 6,8,9	Q.9,6	Q.10		

The student will be able to

CO1. Understand the cGMP aspects in a pharmaceutical industry.

CO2. Appreciate the importance of documentation.

CO3. Understand the scope of quality certifications applicable to pharmaceutical industries.

CO4. understand the responsibilities of QA & QC departments.

CO Map	Question No.	Question	Marks
CO4	Q.1	Why quality control and quality assurance are important?	2
CO3	Q.2	Write ICH guidelines for stability?	2
CO1, 4	Q.3	What is good laboratory practice.	2
CO1	Q.4	Write the philosophies of total quality management?	2
CO1	Q.5	Explain the objectives and scope of GMP?	2
CO3, 2	Q.6	Explain Q series guidelines of ICH. Give brief details on QSEM.	10
CO1	Q.7	Discuss the regulatory requirements for design, construction and plant layout of pharmaceutical manufacturing facility.	10
CO1,2	Q.8	Discuss importance of QbD.	5
CO1	Q.9	Discuss briefly on utilities and maintenance of sterile	5

		areas.	
CO4	Q.10	What is validation? Discuss the three point calibration of pH meter.	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

95.6% Percentage of students secured more than 60% marks, so this course Quality Assurance –Theory (BP606T) attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2020-21

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

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Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I SEM																

II SEM																
III SEM																
IV SEM	-															
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VI SEM	**BP607P**	3	-	3	3	-	-	-	-	-	-	-	-	-	-	-
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VII SEM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICAL CHEMISTRY
Course Handout
Course : **MEDICINAL CHEMISTRY- III** PRACTICAL
Course Code : BP607P, Crédits : 02, Session : 2020-21 (Even Sem.), Class : B.Pharm. III Year
Faculty Name: Mrs. Monika Kaushik

A. Introduction: The course is designed to impart skill development in the arts and science of preparing the different conventional dosage forms.

B. Course Outcomes: At the end of the course, students will be able to:

BP109P.1. To recall the principles used in Preparation of drugs and intermediates and assays

BP109P.2. Perform synthetics of drugs and intermediates by conventional method

BP109P.3. Perform synthetics of drugs and intermediates by microwave irradiation method

BP109P.4. Drawing structures and reactions using chem draw.

BP109P.5. Determination of physicochemical properties drug like moleclues

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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D. Assessment Plan:

Component of Evaluation	Description	Code	Weightage %
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

E. Syllabus

I Preparation of drugs and intermediates
1 Sulphanilamide
2 7-Hydroxy, 4-methyl coumarin
3 Chlorobutanol
4 Triphenyl imidazole
5 Tolbutamide
6 Hexamine
II Assay of drugs
1 Isonicotinic acid hydrazide
2 Chloroquine
3 Metronidazole
4 Dapsone
5 Chlorpheniramine maleate
6 Benzyl penicillin
III Preparation of medicinally important compounds or intermediates by Microwave irradiation technique
IV Drawing structures and reactions using chem draw®
V Determination of physicochemical properties such as logP, clogP, MR, Molecular weight, Hydrogen bond donors and acceptors for class of drugs course content using drug design software Drug likeliness screening (Lipinskies RO5)

F. Examination Scheme:

Components	A	CT	LR	V	EE
Weightage (%)	2	10	1	2	35

CT: Class Test, LR: Lab Record, V: Viva, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. Wilson and Giswold's Organic medicinal and Pharmaceutical Chemistry.
2. Foye's Principles of Medicinal Chemistry.
3. Burger's Medicinal Chemistry, Vol I to IV.
4. Introduction to principles of drug design- Smith and Williams.
5. Remington's Pharmaceutical Sciences.
6. Martindale's extra pharmacopoeia.
7. Organic Chemistry by I.L. Finar, Vol. II.
8. The Organic Chemistry of Drug Synthesis by Lednicer, Vol. 1-5.
9. Indian Pharmacopoeia.
10. Text book of practical organic chemistry- A.I.Vogel.

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	To prepare and submit Sulphanilamide	Practical	CO2	Mid Term-1, Quiz & End Sem Exam
2	To prepare and submit 7-Hydroxy, 4-methyl coumarin	Practical	CO2	Mid Term-1, Quiz & End Sem Exam
3	To prepare and submit Chlorobutanol	Practical	CO2	Mid Term-1, Quiz & End Sem Exam
4	To prepare and submit *Triphenyl imidazole*	Practical	CO2	Mid Term-1, Quiz & End Sem Exam
5	To prepare and submit Triphenyl imidazole	Practical	CO2	Mid Term-1, Quiz & End Sem Exam
6	To prepare and submit Hexamine	Practical	CO2	Mid Term-1, Quiz & End Sem Exam
7	Assay of Isonicotinic acid hydrazide	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
8	Assay of Metronidazole	Practical	CO1	Mid Term-2, Quiz & End Sem Exam
9	Assay of Dapsone	Practical	CO1	Mid Term-2, Quiz & End Sem Exam
10	Assay of Chlorpheniramine maleate	Practical	CO1	Mid Term-2, Quiz & End Sem Exam
11	Assay of Benzyl penicillin	Practical	CO1	Mid Term-2, Quiz & End Sem Exam
12	Assay of Chloroquine	Practical	CO1	Mid Term-2, Quiz & End Sem Exam

13	Preparation of medicinally important compounds or intermediates by Microwave irradiation technique	Practical	CO3	Mid Term-2, Quiz & End Sem Exam
14	Drawing structures and reactions using chem draw®	Practical	CO4	Mid Term-2, Quiz & End Sem Exam
15	Determination of physicochemical properties such as logP, clogP, MR, Molecular weight, Hydrogen bond donors and acceptors for class of drugs course content using drug design software Drug likeliness screening (Lipinskies RO5)	Practical	CO5	Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	
BP109P.1	To recall the principles used in Preparation of drugs and intermediates and assays	3		3	3								
BP109P.2.	Perform synthetics of drugs and intermediates by conventional method	3		3	3								
BP109P.3.	Perform synthetics of drugs and intermediates by microwave irradiation method	3		3	3								
BP109P.4.	Drawing structures and reactions using chem draw	3		3	3								

BP109P.5.	Determination of physicochemical properties drug like molecules	3		3	3							

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutical Chemistry I MID-SEMESTER (SEM –VI) 2020-21						
Class: B.Pharm, VI Semester						
Subject Name: BP607P MEDICINAL CHEMISTRY-III Practical		Time: 4 Hrs			Max. Marks: 40	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,4	Q.2,3	Q.4	Q.2,5,6		

Student will be able to

CO.1. To recall the principles used in Preparation of drugs and intermediates and assays

CO.2. Perform synthetics of drugs and intermediates by conventional method

CO.3. Perform synthetics of drugs and intermediates by microwave irradiation method

CO.4. Drawing structures and reactions using chem draw.

CO.5. Determination of physicochemical properties drug like moleclues

CO Map	Question No.	Question	Marks
CO1,3,4	Q.1a	Synopsis- Write the Lipinskies RO5.	2
CO1,3,4	Q.1b	Synopsis- What are the tools used for drawing structures and reactions by using chem draw.	2
CO1,3,4	Q.1c	Synopsis- Write the principle involved in the assay of dapsone?	2
CO1,3,4	Q.1d	Synopsis- Write the principle involved in the synthesis of sulphonamide drugs?.	2
CO1,3,4	Q.1e	Synopsis- Write the importance of drug assay?	2
CO1,2	Q.2	Experiment Determination of physicochemical properties of given drugs structures such as logP, clogP, MR, Molecular Weight, Hydrogen bond donors and acceptors by using molinspiration drug design software.	25

Dr. Mohanty

CO1,2,3,4,5	Q.3	Viva	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

100% Percentage of students secured more than 60% marks, so this course Medicinal Chemistry III – Practical (BP607P) attained Level -3.

AMITY UNIVERSITY
MADHYA PRADESH
Established vide Government of Madhya Pradesh Act No. 27 of 2010

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR

AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)

Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOLOGY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes (POs):

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

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[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

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[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Programme Specific Outcomes (PSOs):

PSO 1: Will be able to design, develop and implement efficient software for a given real life problem.

PSO 2: Will be able to apply knowledge of AI, Machine Learning and Data Mining in analyzing big data forextracting useful information from it and for performing predictive analysis.

PSO 3: Will be able to design, manage and secure wired/ wireless computer networks for transfer and sharing ofinformation.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I SEM																
	BP101T	3	1	2	-	1	3	2	1	3	2	2				

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Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACOLOGY
Course Handout
Course : HUMAN ANATOMY AND PHYSIOLOGY – I THEORY
Course Code : BP101T, Crédits : 04, Session :2021-22 (Odd Sem.), Class : B.Pharm. 1st Year
Faculty Name: Dr. Naveen Sharma

A. **Introduction:** This course is designed to impart fundamental knowledge on the structure and functions of the various systems of the human body. It also helps in understanding both homeostatic mechanisms. The subject provides the basic knowledge required to understand the various disciplines of pharmacy

B. **Course Outcomes:** At the end of the course, students will be able to:

BP101T.CO1. Explain the gross morphology, structure and functions of various organs of the human body. *Define and explain the anatomy and physiology, various levels of organizations basic homeostatic mechanism.*

BP101T.CO2. Describe the various process of cell communication and homeostatic mechanisms and their imbalances. *Explain the morphology, physiology of skeletal system along with the physiology of muscle contraction in co-ordination with the joints, their articulation and skin.*

BP101T.CO3. Identify the various tissues and organs of different systems of human body and give the protection to human body as integument, support as skeleton system. *Explain and describe the composition, function of various body fluids like blood and lymph, their significance and related disorders.*

BP101T.CO4. Perform the various experiments related to special senses and nervous system. *Classify the peripheral nervous system, nerves and morphology of special senses.*

BP101T.CO5. Appreciate coordinated working pattern of some vital organs of specific system. *Explain the anatomy and physiology and parameters related to CVS and related disorders.*

C. **Programme Outcomes:**

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

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[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Programme Specific Outcomes:

PSO 1: Will be able to understand anatomy and physiology of human body system and how the human body maintain internal environment so that different organs perform work properly.

PSO 2: Will be able to give the information about how the cell communicate and maintain their functions and various disorders of different human organs so that we can give the appropriate therapy.

PSO 3: Will be able to understand organization at the different level of human body.

Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

Unit I

- Introduction to human body Definition and scope of anatomy and physiology, levels of structural organization and body systems, basic life processes, homeostasis, basic anatomical terminology.
- Cellular level of organization Structure and functions of cell, transport across cell membrane, cell division, cell junctions. General principles of cell communication, intracellular signaling pathway activation by extracellular signal molecule, Forms of intracellular signaling: a) Contact-dependent b) Paracrine c) Synaptic d) Endocrine
- Tissue level of organization Classification of tissues, structure, location and functions of epithelial, muscular and nervous and connective tissues.

Unit II

- Integumentary system Structure and functions of skin
- Skeletal system Divisions of skeletal system, types of bone, salient features and functions of bones of axial and appendicular skeletal system Organization of skeletal muscle, physiology of muscle contraction, neuromuscular junction
- Joints Structural and functional classification, types of joints movements and its articulation

Unit III

- Body fluids and blood
- Body fluids, composition and functions of blood, hemopoeisis, formation of hemoglobin, anemia, mechanisms of coagulation, blood grouping, Rh factors, transfusion, its significance and disorders of blood, Reticulo endothelial system.
- Lymphatic system Lymphatic organs and tissues, lymphatic vessels, lymph circulation and functions of lymphatic system

Unit IV

- Peripheral nervous system: Classification of peripheral nervous system: Structure and functions of sympathetic and parasympathetic nervous system. Origin and functions of spinal and cranial nerves.
- Special senses Structure and functions of eye, ear, nose and tongue and their disorders.
-

Unit V

- Cardiovascular system Heart – anatomy of heart, blood circulation, blood vessels, structure and functions of artery, vein and capillaries, elements of conduction system of heart and heart beat, its regulation by autonomic nervous system, cardiac output, cardiac cycle. Regulation of blood pressure, pulse, electrocardiogram and disorders of heart.

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypee brothers medical publishers, New Delhi.
2. Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York
3. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co,Riverview,MI USA
4. Text book of Medical Physiology- Arthur C,Guyton andJohn.E. Hall. Miamisburg, OH, U.S.A.
5. Principles of Anatomy and Physiology by Tortora Grabowski. Palmetto, GA, U.S.A.

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Definition and scope of anatomy and physiology, levels of structural organization and body system.	Lecture	Unit-1 CO1	Mid Term-1, Quiz & End Sem Exam
2	Definition and scope of anatomy and physiology, levels of structural organization and body system.	Lecture	CO1	Mid Term-1, Quiz & End Sem Exam
3	Definition and scope of anatomy and physiology, levels of structural organization and body system.	Lecture	CO1	Mid Term-1, Quiz & End Sem Exam
4	Revision of Definition and scope of anatomy and physiology, levels of structural organization and body system.	Tutorial	CO1	Mid Term-1, Quiz & End Sem Exam
5	basic life processes, homeostasis, basic anatomical terminology.	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
6	basic life processes, homeostasis, basic anatomical terminology.	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
7	basic life processes, homeostasis, basic anatomical terminology.	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam

8	Quiz	Tutorial		Mid Term-1, Quiz & End Sem Exam
9	Structure and functions of cell, transport across cell membrane, cell division, cell junctions.	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
10	Structure and functions of cell, transport across cell membrane, cell division, cell junctions.	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
11	Structure and functions of cell, transport across cell membrane, cell division, cell junctions.	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
12	Revision----Structure and functions of cell, transport across cell membrane, cell division, cell junctions.	Tutorial		Mid Term-1, Quiz & End Sem Exam
13	General principles of cell communication, intracellular signaling pathway activation by extracellular signal molecule, Forms of intracellular signaling: a) Contact-dependent b) Paracrine c) Synaptic d) Endocrine	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
14	General principles of cell communication, intracellular signaling pathway activation by extracellular signal molecule,	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
15	Forms of intracellular signaling: a) Contact-dependent b) Paracrine c) Synaptic d) Endocrine	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
16	Unit test	Tutorial		Mid Term-1, Quiz & End Sem Exam
17	Classification of tissues, structure, location and functions of epithelial	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam

18	Classification of tissues, structure, location and functions of epithelial	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
19	Classification of tissues, structure, location and functions of muscular and nervous.	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
20	Classification of tissues, structure, location and functions of connective tissues.	Tutorial	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
21	Structure and functions of skin	Lecture	Unit-2 CO3	Mid Term-1, Quiz & End Sem Exam
22	Divisions of skeletal system, types of bone	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
23	Divisions of skeletal system, types of bone	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
24	Quiz	Tutorial		Mid Term-1, Quiz & End Sem Exam
25	Salient features and functions of bones of axial and appendicular skeletal system	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
26	Salient features and functions of bones of axial and appendicular skeletal system	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
27	Organization of skeletal muscle, physiology of muscle contraction	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
28	Revision of Bones	Tutorial		Mid Term-1, Quiz & End Sem Exam
29	Neuromuscular junction	Lecture	CO1	Mid Term-1, Quiz & End Sem Exam
30	Structural and functional classification, types of joints movements and its articulation	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
31	Structural and functional classification, types of joints movements and its articulation	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
32	Body fluids, composition and functions of blood	Tutorial	Unit-3 CO4	Mid Term-2, Quiz & End Sem Exam

33	Hemopoeisis, formation of hemoglobin, anemia,	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
34	Mechanisms of coagulation	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
35	Blood grouping, Rh factors	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
36	Seminar	Tutorial		Mid Term-2, Quiz & End Sem Exam
37	Transfusion, its significance and disorders of blood	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
38	Reticulo endothelial system	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
39	Lymphatic organs and tissues, lymphatic vessels, lymph circulation and functions of lymphatic system	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
40	Unit test	Tutorial		Mid Term-2, Quiz & End Sem Exam
41	Classification of peripheral nervous	Lecture	Unit-4	Mid Term-2, Quiz & End Sem Exam
42	Structure and functions of sympathetic and parasympathetic nervous system	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
43	Origin and functions of spinal and cranial nerves	Lecture	CO1	Mid Term-2, Quiz & End Sem Exam
44	Seminar	Tutorial		Mid Term-2, Quiz & End Sem Exam
45	Structure and functions of eye its their disorders.	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
46	Structure and functions of ear its disorders.	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
47	Structure and functions of tongue and its disorders.	Lecture	CO1	Quiz & End Sem Exam
48	Quiz	Tutorial		Quiz & End Sem Exam
49	Heart – anatomy	Lecture	Unit-5	Quiz & End Sem Exam
50	Heart blood circulation	Lecture	CO1 CO5	Quiz & End Sem Exam
51	Blood vessels, structure and functions of artery, vein and capillaries	Lecture	CO1 CO5	Quiz & End Sem Exam

52	Blood vessels, structure and functions of artery, vein and capillaries	Tutorial	CO1 CO5	Quiz & End Sem Exam
53	elements of conduction system of heart and heart beat	Lecture	CO1 CO5	Quiz & End Sem Exam
54	Elements of conduction system of heart and heart beat	Lecture	CO1 CO5	Quiz & End Sem Exam
55	Regulation by autonomic nervous system, cardiac output	Lecture	CO1 CO5	Quiz & End Sem Exam
56	Unit test	Tutorial		Quiz & End Sem Exam
57	Cardiac cycle	Lecture	CO1 CO5	Quiz & End Sem Exam
58	Regulation of blood pressure, pulse, electrocardiogram and disorders of heart.	Lecture	CO1 CO5	Quiz & End Sem Exam
59	Regulation of blood pressure, pulse, electrocardiogram and disorders of heart.	Lecture	CO1 CO5	Quiz & End Sem Exam
60	Unit test	Tutorial		Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP101T.1	Explain the gross morphology, structure and functions of various organs of the human body.	3	-	-	-	2	2	1	-	-	-	-		3	2	1

BP101T.2.	Describe the various process of cell communication and homeostatic mechanisms and their imbalances.	3	-	-	1	-	2	-	-	-	-	3		2	3	1
BP101T.3.	Identify the various tissues and organs of different systems of human body and give the protection to human body as integument, support as skeleton system.	3	2	-	3	-	2	-	-	-	-	3		1	2	3
BP101T.4.	Perform the various experiments related to special senses and nervous system.	2	2	3	3	-	1	-	-	-	-	3		2	3	2
BP101T.5.	Appreciate coordinated working pattern of some vital organs of specific system.	3	-	2	-	2	-	-	-	-	-	3		2	3	3

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacology I MID-SEMESTER (SEM –Ist) 2021-22						
Class: B.Pharm, I Semester						
Subject Name: BP101T Human Anatomy and Physiology-I Theory		Time: 1 Hrs			Max. Marks: 30	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating

Question Mapping	Q.1,2,4,10	Q.8,9,6	Q.5,3	Q.7		

Student will be able to

CO1. Explain the gross morphology, structure and functions of various organs of the human body.

CO2. Describe the various process of cell communication and homeostatic mechanisms and their imbalances.

CO3. Identify the various tissues and organs of different systems of human body and give the protection t human body as integument, support as skeleton system.

CO Map	Question No.	Question	Marks
CO1	Q.1	*What is* structural and functional unit of all living beings	2
CO1	Q.2	Define homeostasis.	2
CO1	Q.3	Make use of cell junctions for the cell.	2
CO2	Q.4	Why is cell communication important for cell.	2
CO2	Q.5	Identify correct location of carpal bones.	2
CO3	Q.6	Explain mechanism of the skeletal muscles contraction.	10
CO2	Q.7	Distinguish different layers of skin.	10
CO1 CO2	Q.8	Compare plant cell and animal cell.	5
CO1 CO3	Q.9	Classify upper and lower limb bones	5
CO1 CO2	Q.10	What are the basic life processes	5

Level 1	IF 60% of students secure more than 60% marks then level 1
Level 2	IF 70% of students secure more than 60% marks then level 2
Level 3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

97.8 % Percentage of students secured more than 60% marks, so this course Human Anatomy And Physiology I- Theory (BP101T) attained Level -3.

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Programme Educational Objectives (PEOs)
Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR

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MADHYA PRADESH

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AMITY INSTITUE OF PHARMACY

DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME-SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharmacy), Academic Year – 2021-22

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

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[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

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[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

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1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11				
I SEM	BP102T	3	3	3	2	-	1	2	2	1	-	1		-	-	-

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICAL CHEMISTRY
Course Handout
Course : PHARMACEUTICAL ANALYSIS (Theory)
Course Code : BP102T , Crédits : 04, Session :2021-22(Odd Sem.), Class : B.Pharm. 1st Year
Faculty Name : Dr. Parameshwar Ravula/Dr. S.Vijayraj

A. Introduction: This course deals with the fundamentals of analytical chemistry and principles of electrochemical analysis of drugs. It aims to understand the principles of volumetric and electro chemical analysis and carryout various volumetric and electrochemical titrations.

B. Course Outcomes: At the end of the course, students will be:

BP102T.1. Able to **discuss** principles of volumetric analysis

BP102T.2. Able to **explain** the basics of different titration methodologies

BP102T.3. Able to **compare** various electrochemical methods of analysis

BP102T.4. Able to **ensure** quality of product by titrations

BP102T.5. Able to **develop** methods for the estimation and determination of drugs and pharmaceuticals

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and

demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2 quiz, assignment, open book test, field work, group discussion and seminar)		
	Seminar/ Assignment/Quiz/ Open book test	S/As/Q/OBT	3%
Interaction	Student-Teacher interaction	ST	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

UNIT I

a) Pharmaceutical analysis- Definition and scope

i. Different techniques of analysis

ii. Methods of expressing concentration

iii. Primary and secondary standards.
iv. Preparation and standardization of various molar and normal solutions-Oxalic acid, sodium hydroxide, hydrochloric acid, sodium thiosulphate, sulphuric acid, potassium permanganate and ceric ammonium sulphate

b) **Errors:** Sources of errors, types of errors, methods of minimizing errors, accuracy, precision and significant figures

c) Pharmacopoeia, Sources of impurities in medicinal agents,limit tests.

UNIT-II

- **Acid base titration**: Theories of acid base indicators, classification of acid base titrations and theory involved in titrations of strong, weak, and very weak acids and bases, neutralization curves
- **Non aqueous titration**: Solvents, acidimetry and alkalimetry titration and estimation of Sodium benzoate and Ephedrine HCl

UNIT-III

- **Precipitation titrations**: Mohr's method, Volhard's, Modified Volhard's, Fajans method, estimation of sodium chloride
- **Complexometric titration**: Classification, metal ion indicators, masking and demasking reagents, estimation of Magnesium sulphate, and calcium gluconate.
- **Gravimetry**: Principle and steps involved in gravimetric analysis. Purity of the precipitate: co-precipitation and post precipitation, Estimation of barium sulphate.

UNIT -IV

Redox titrations

(a) Concepts of oxidation and reduction

(b) Types of redox titrations (Principles and applications)

Cerimetry, Iodimetry, Iodometry, Bromatometry, Dichrometry, Titration with potassium iodate

UNIT-V

Electrochemical methods of analysis

- Conductometry- Introduction, Conductivity cell, Conductometric titrations, applications.
- Potentiometry - Electrochemical cell, construction and working of reference (Standard hydrogen, silver chloride electrode and calomel electrode) and indicator electrodes (metal electrodes and glass electrode), methods to determine end point of potentiometric titration and applications.
- Polarography - Principle, Ilkovic equation, construction and working of dropping mercury electrode and rotating platinum electrode, applications

F. Examination Scheme:

Components	A	ST	CT	S/As/Q/OBT	EE
Weightage (%)	4	3	15	3	75

CT: Class Test, As: Assignment, ST: Student teacher interaction, S/A/Q/OBT: Seminar/ Assignment/Quiz/ Open book test, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

- AA Napoleon, Pharmaceutical Titrimetric Analysis,
- Skoog-Instrumental Analysis and Skoog fundamentals of analytical chemistry.
- AH Beckett & Stenlake Vol. I & II practical pharmaceutical chemistry, Continuum International Publishing Group, Althone.
- Connors, A Textbook of Pharmaceutical Analysis.
- Chatwal & anand, Instrumental methods of Analysis.

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Pharmaceutical analysis- Definition and scope	Lecture	BP102T.1	Mid Term-1, Quiz & End Sem Exam
2	Methods of expressing concentration	Lecture	BP102T.4	Mid Term-1, Quiz & End Sem Exam
3	Primary and secondary standards.	Lecture	BP102T.4	Mid Term-1, Quiz & End Sem Exam
4	Tutorial class Methods of expressing concentration	Lecture	BP102T.4	Mid Term-1, Assignment ,Quiz & End Sem Exam
5	Preparation and standardization of various molar and normal solutions	Lecture	BP102T.4	Mid Term-1, Quiz & End Sem Exam
6	Sources of errors and Types of errors	Lecture	BP102T.4	Mid Term-1, Quiz & End Sem Exam
7	Methods of minimizing errors	Lecture	BP102T.4	Mid Term-1, Quiz & End Sem Exam
8	Tutorial class Sources of errors	Lecture	BP102T.4	Mid Term-1, Quiz, Class test & End Sem Exam
9	Accuracy, precision and significant figures	Lecture	BP102T.4	Mid Term-1, Quiz & End Sem Exam

10	Pharmacopoeia	Lecture	BP102T.5	Mid Term-1, Quiz & End Sem Exam
11	Sources of impurities in medicinal agents	Lecture	BP102T.4	Mid Term-1, Quiz & End Sem Exam
12	*Tutorial class:* Pharmacopoeia	Lecture	BP102T.5	Mid Term-1, Assignment ,Quiz & End Sem Exam
13	Limit tests	Lecture	BP102T.4	Mid Term-1, Quiz & End Sem Exam
14	Theories of acid base indicators	Lecture	BP102T.1 & BP102T.2	Mid Term-1, Quiz & End Sem Exam
15	Classification of acid base titrations	Lecture	BP102T.2	Mid Term-1, Quiz & End Sem Exam
16	*Tutorial class Acid and base*	Lecture	BP102T.1	Mid Term-1, Class test, Quiz & End Sem Exam
17	Theory involved in titrations of strong, weak, and very weak acids and bases,	Lecture	BP102T.1	Mid Term-1, Quiz & End Sem Exam
18	Neutralization curves	Lecture	BP102T.2	Mid Term-1, Quiz & End Sem Exam
19	Non aqueous titration: Solvents	Lecture	BP102T.2	Mid Term-1, Quiz & End Sem Exam
20	*Tutorial class* Neutralization curves	Lecture	BP102T.2	Mid Term-1, Assignment ,Quiz & End Sem Exam
21	Acidimetry and alkalimetry titration	Lecture	BP102T.2	Mid Term-1, Quiz & End Sem Exam
22	Estimation of Sodium benzoate	Lecture	BP102T.5	Mid Term-1, Quiz & End Sem Exam
23	Estimation of	Lecture	BP102T.5	Mid Term-1,

	Ephedrine HCl			Quiz & End Sem Exam
24	*Tutorial class* Acidimetry	Lecture	BP102T.2	Mid Term-1, Quiz & End Sem Exam
25	Mohr's and Volhards method	Lecture	BP102T.1	Mid Term-1, Quiz & End Sem Exam
26	Fajans method	Lecture	BP102T.5	Mid Term-1, Quiz & End Sem Exam
27	Estimation of sodium chloride.	Lecture	BP102T.5	Mid Term-1, Quiz & End Sem Exam
28	*Tutorial class* Volhards method	Lecture	BP102T.5	Mid Term-2, Seminar,Quiz & End Sem Exam
29	Complexometric titration: Classification	Lecture	BP102T.2	Mid Term-2, Quiz & End Sem Exam
30	Metal ion indicators, masking and demasking reagents,	Lecture	BP102T.2	Mid Term-2, Quiz & End Sem Exam
31	Estimation of Magnesium sulphate, and calcium gluconate.	Lecture	BP102T.5	Mid Term-2, Quiz & End Sem Exam
32	*Tutorial class* Estimation of Magnesium sulphate	Lecture	BP102T.5	Mid Term-2, Quiz & End Sem Exam
33	**Gravimetry**: Principle and steps involved in gravimetric analysis.	Lecture	BP102T.1	Mid Term-2, Quiz & End Sem Exam
34	Purity of the precipitate: co-precipitation and post precipitation	Lecture	BP102T.1	Mid Term-2, Quiz & End Sem Exam
35	Estimation of	Lecture	BP102T.5	Mid Term-2,

	barium sulphate			Quiz & End Sem Exam
36	*Tutorial class* Gravimetric analysis.	Lecture	BP102T.1	Mid Term-2, Assignment ,Quiz & End Sem Exam
37	Basic Principles, methods and application of diazotisation titration.	Lecture	BP102T.1	Mid Term-2, Quiz & End Sem Exam
38	Concepts of oxidation	Lecture	BP102T.2	Mid Term-2, Quiz & End Sem Exam
39	Concepts of reduction	Lecture	BP102T.2	Mid Term-2, Quiz & End Sem Exam
40	*Tutorial class* Oxidation and reduction	Lecture	BP102T.2	Mid Term-2, Quiz & End Sem Exam
41	Types of redox titrations (Principles and applications)	Lecture	BP102T.2	Mid Term-2, Quiz & End Sem Exam
42	Cerimetry	Lecture	BP102T.1& BP102T.5	Mid Term-2, Quiz & End Sem Exam
43	Iodimetry	Lecture	BP102T.1& BP102T.5	Mid Term-2, Quiz & End Sem Exam
44	*Tutorial class Redox reactions*	Lecture	BP102T.1& BP102T.5	Mid Term-2, Seminar, Quiz & End Sem Exam
45	Iodometry	Lecture	BP102T.1& BP102T.5	Mid Term-2, Quiz & End Sem Exam
46	Bromatometry	Lecture	BP102T.1& BP102T.5	Mid Term-2, Quiz & End Sem Exam
47	Dichrometry	Lecture	BP102T.1& BP102T.5	Mid Term-2, Quiz & End Sem Exam
48	*Tutorial class* Iodometry	Lecture	BP102T.1& BP102T.5	Mid Term-2, Seminar,

				Quiz & End Sem Exam
49	Titration with potassium iodate	Lecture	BP102T.1& BP102T.5	Mid Term-2, Quiz & End Sem Exam
50	Conductivity cell	Lecture	BP102T.3	Mid Term-2, Quiz & End Sem Exam
51	Conductometric Titrations and applications.	Lecture	BP102T.3	Mid Term-2, Quiz & End Sem Exam
52	*Tutorial class*: Conductometric methods	Lecture	BP102T.3	Mid Term-2, Assignment ,Quiz & End Sem Exam
53	Electrochemica l cell	Lecture	BP102T.3	Mid Term-2, Quiz & End Sem Exam
54	Construction and working of reference (Standard hydrogen, silver chloride electrode and calomel electrode)	Lecture	BP102T.3	Mid Term-2, Quiz & End Sem Exam
55	Indicator electrodes (metal electrodes and glass electrode)	Lecture	BP102T.3	Mid Term-2, Quiz & End Sem Exam
56	*Tutorial class* Standard hydrogen, silver chloride electrode	Lecture	BP102T.3	Mid Term-2, Quiz & End Sem Exam
57	Methods to determine end point of potentiometric titration and applications	Lecture	BP102T.3 and BP102T.5	Mid Term-2, Quiz & End Sem Exam
58	Ilkovic equation	Lecture	BP102T.3	Mid Term-2, Quiz & End Sem Exam
59	Construction and working of dropping mercury electrode and rotating platinum	Lecture	BP102T.3	Mid Term-2, Quiz & End Sem Exam

	electrode and applications			
60	*Tutorial class* End point of potentiometric titration	Lecture	BP102T.3 and BP102T.5	Mid Term-2, Seminar,Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP102T.1.	Able to discuss principles of volumetric analysis	3	3	1	2	1				1		2
BP102T.2.	Able to explain the basics of different titration methodologies	3	3	1	3	2				2		2
BP102T.3.	Able to compare various electrochemical methods of analysis	3	3	2	3	2				3		2
BP102T.4.	Able to ensure quality of product by titrations	3	3	2	2	2			2	2		2
BP102T.5.	Able to develop methods for the estimation and determination of drugs and pharmaceuticals	3	3	2	3	3			2	2		3

Sample Question Paper

Amity Institute of pharmacy
Department of Pharmaceutical Chemistry
II MID-SEMESTER (SEM –I) 2021-22

Class: B.Pharmacy I Semester

Subject Name: BP102T PHARMACEUTICAL ANALYSIS	Time: 1 Hr	Max. Marks: 30

Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3,4	Q.2,5,9,10	Q.6	Q.8		Q.7

Student will be

CO1. Able to **discuss** principles of volumetric analysis

CO.2. Able to **explain** the basics of different titration methodologies

CO.3. Able to **compare** various electrochemical methods of analysis

CO.4. Able to **ensure** quality of product by titrations

CO.5. Able to **develop** methods for the estimation and determination of drugs and Pharmaceuticals

CO Map	Question No.	Question	Marks
CO2	Q. 1	Define Complexometric titration and mention examples of metal ion indicators.	2
CO1	Q.2	Write a note on masking agents	2
	Q.3	Define Co-precipitation and Post-precipitation	2
CO1	Q. 4	What are oxidizing and reducing agents?	2
CO2	Q. 5	Explain the principle of Dichrometry.	2
CO4	Q.6	Distinguish between iodimetry and iodometry	10
	Q.7	Discuss various steps involved in Gravimetric analysis	10
CO2	Q 8	Describe the principle involved in cerimetry and enumerate its advantages over 'permanganate' 'dichromate' methods.	5
CO5	Q. 9	Write a note on Fajan's method.	5
CO3	Q 10	Explain Conductometric titrations with suitable examples.	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

93.3 % Percentage of students secured more than 60% marks, so this course Pharmaceutical Analysis I- Theory (BP102T) attained Level -3.

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AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)
Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

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AMITY UNIVERSITY MADHYA PRADESH, GWALIOR

AMITY INSTITUTE OF PHARMACY

DEPARTMENT OF PHARMACEUTICS

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

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[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I SEM																
	BP103T	3	-	2	-	1	3	2	1	1	-	2				

Dr. Dhananjay

DEPARTMENT OF PHARMACEUTICS
Course Handout
Course : PHARMACEUTICS – I THEORY
Course Code : BP103T, Crédits : 04, Session :2021-22 (Odd Sem.), Class : B.Pharm. 1st Year
Faculty Name: Dr. Jovita Kanoujia

A. Introduction: The course is designed to impart fundamental knowledge on the preparatory pharmacy with arts and science of preparing the different conventional dosage forms.

B. Course Outcomes: At the end of the course, students will be able to:

BP103T.1. Relate pharmacy education, and pharmacy history with pharmacy career options.

BP103T.2. Classify the different types of dosage forms based on uses, physical form, and pharmaceutical incompatibilities.

BP103T.3. Experiment in the development of various conventional dosage forms such as solid, liquid, and semisolid dosage forms.

BP103T.4. Able to analyze the prescription, stability issues in emulsion and suspension.

BP103T.5. Solve the dose calculation, pharmaceutical calculations.

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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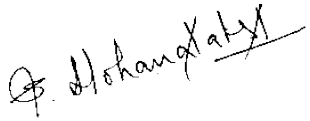
D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**



E. Syllabus

UNIT – I

Historical background and development of profession of pharmacy: History of profession of Pharmacy in India in relation to pharmacy education, industry and organization, Pharmacy as a career, Pharmacopoeias: Introduction to IP, BP, USP and Extra Pharmacopoeia. **Dosage forms:** Introduction to dosage forms, classification and definitions, **Prescription:** Definition, Parts of prescription, handling of Prescription and Errors in prescription. **Posology:** Definition, Factors affecting posology. Pediatric dose calculations based on age, body weight and body surface area.

UNIT – II

Pharmaceutical calculations: Weights and measures – Imperial & Metric system, Calculations involving percentage solutions, alligation, proof spirit and isotonic solutions based on freezing point and molecular weight. **Powders:** Definition, classification, advantages and disadvantages, Simple & compound powders – official preparations, dusting powders, effervescent, efflorescent and hygroscopic powders, eutectic mixtures. Geometric dilutions. **Liquid dosage forms:** Advantages and disadvantages of liquid dosage forms. Excipients used in formulation of liquid dosage forms. Solubility enhancement techniques.

UNIT – III

Monophasic liquids: Definitions and preparations of Gargles, Mouthwashes, Throat Paint, Eardrops, Nasal drops, Enemas, Syrups, Elixirs, Liniments and Lotions.**Biphasic liquids: Suspensions:** Definition, advantages and disadvantages, classifications, Preparation of suspensions; Flocculated and Deflocculated suspension & stability problems and methods to overcome. **Emulsions:** Definition, classification, emulsifying agent, test for the identification of type of Emulsion, Methods of preparation & stability problems and methods to overcome.

UNIT – IV

Suppositories: Definition, types, advantages and disadvantages, types of bases, methods of preparations. Displacement value & its calculations, evaluation of suppositories. **Pharmaceutical incompatibilities**: Definition, classification, physical, chemical and therapeutic incompatibilities with examples.

UNIV – V

Semisolid dosage forms: Definitions, classification, mechanisms and factors influencing dermal penetration of drugs. Preparation of ointments, pastes, creams and gels. Excipients used in semi solid dosage forms. Evaluation of semi solid dosages forms

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

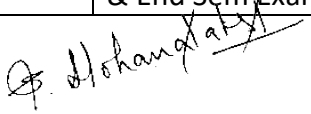
- H.C. Ansel et al., Pharmaceutical Dosage Form and Drug Delivery System, Lippincott Williams and Walkins, New Delhi.
- Carter S.J., Cooper and Gunn's-Dispensing for Pharmaceutical Students, CBS publishers, New Delhi.
- M.E. Aulton, Pharmaceutics, The Science& Dosage Form Design, Churchill Livingstone, Edinburgh.
- Indian pharmacopoeia.

- British pharmacopoeia.

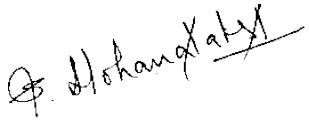
H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	History of profession of Pharmacy in India in relation to pharmacy education	Lecture	1	Mid Term-1, Quiz & End Sem Exam
2	History of profession of Pharmacy in India in relation to pharmacy industry and organization	Lecture	1	Mid Term-1, Quiz & End Sem Exam
3	Pharmacy as a career	Lecture		Mid Term-1, Quiz & End Sem Exam
4	Revision of history of pharmacy	Tutorial	1	Mid Term-1, Quiz & End Sem Exam
5	Introduction to dosage forms	Lecture	2	Mid Term-1, Quiz & End Sem Exam
6	classification and definitions	Lecture	2	Mid Term-1, Quiz & End Sem Exam
7	classification and definitions	Lecture	2	Mid Term-1, Quiz & End Sem Exam
8	Quiz	Tutorial		Mid Term-1, Quiz & End Sem Exam
9	Definition, Parts of prescription,	Lecture	4	Mid Term-1, Quiz & End Sem Exam
10	Handling of Prescription and Errors in prescription.	Lecture	4	Mid Term-1, Quiz & End Sem Exam
11	Definition, Factors affecting posology.	Lecture	5	Mid Term-1, Quiz & End Sem Exam
12	Discussion about posology	Tutorial		Mid Term-1, Quiz & End Sem Exam
13	Pediatric dose calculations based on age, body weight and body surface area.	Lecture	5	Mid Term-1, Quiz & End Sem Exam
14	Weights and measures – Imperial & Metric system,	Lecture	5	Mid Term-1, Quiz & End Sem Exam
15	Calculations involving percentage solutions, alligation, proof spirit	Lecture	5	Mid Term-1, Quiz & End Sem Exam
16	Unit test	Tutorial		Mid Term-1, Quiz & End Sem Exam
17	Calculations involving isotonic solutions based on freezing point and molecular weight.	Lecture	5	Mid Term-1, Quiz & End Sem Exam

18	**Powders:** Definition, classification, advantages and disadvantages, Simple & compound powders	Lecture	2,3	Mid Term-1, Quiz & End Sem Exam
19	Official preparations, dusting powders, effervescent, efflorescent and hygroscopic powders,	Lecture	2,3	Mid Term-1, Quiz & End Sem Exam
20	Group discussion on different topics	Tutorial		Mid Term-1, Quiz & End Sem Exam
21	Eutectic mixtures. Geometric dilutions. Liquid dosage forms	Lecture	2,3	Mid Term-1, Quiz & End Sem Exam
22	Advantages and disadvantages of liquid dosage forms.	Lecture	2,3	Mid Term-1, Quiz & End Sem Exam
23	Excipients used in formulation of liquid dosage forms.	Lecture	2,3	Mid Term-1, Quiz & End Sem Exam
24	Quiz	Tutorial		Mid Term-1, Quiz & End Sem Exam
25	Solubility enhancement techniques.	Lecture	2,3	Mid Term-1, Quiz & End Sem Exam
26	Definitions and preparations of Gargles	Lecture	Unit-3	Mid Term-1, Quiz & End Sem Exam
27	Mouthwashes, Throat Paint	Lecture	2,3	Mid Term-1, Quiz & End Sem Exam
28	Revision of solubility enhancement technique	Tutorial		Mid Term-1, Quiz & End Sem Exam
29	Eardrops, Nasal drops, Enemas	Lecture	2,3	Mid Term-1, Quiz & End Sem Exam
30	Syrups, Elixirs,	Lecture	2,3	Mid Term-1, Quiz & End Sem Exam
31	Liniments and Lotions	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
32	Group discussion on liquid dosage form	Tutorial		Mid Term-2, Quiz & End Sem Exam
33	Definition, advantages and disadvantages, classifications, Preparation of suspensions	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
34	Flocculated and Deflocculated suspension	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
35	Stability problems and methods to overcome	Lecture	4	Mid Term-2, Quiz & End Sem Exam
36	Seminar	Tutorial		Mid Term-2, Quiz & End Sem Exam
37	Definition, classification, emulsifying agent	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
38	Test for identification, type of Emulsion,	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam



39	Methods of preparation	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
40	Unit test	Tutorial		Mid Term-2, Quiz & End Sem Exam
41	Stability problems and methods to overcome	Lecture	4	Mid Term-2, Quiz & End Sem Exam
42	Semisolid dosage forms: Definitions, classification	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
43	Mechanisms and factors influencing dermal penetration of drugs	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
44	Seminar	Tutorial		Mid Term-2, Quiz & End Sem Exam
45	Preparation of ointments	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
46	Preparation of paste	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
47	Preparation of cream & gel	Lecture	2,3	Quiz & End Sem Exam
48	Quiz	Tutorial		Quiz & End Sem Exam
49	Excipients used in semi solid dosage forms	Lecture	2,3	Quiz & End Sem Exam
50	Evaluation of semi solid dosages forms	Lecture	2,3	Quiz & End Sem Exam
51	Semisolid dosage forms: Definitions, classification	Lecture	2,3	Quiz & End Sem Exam
52	Group discussion on semisolid dosage form	Tutorial		Quiz & End Sem Exam
53	Mechanisms and factors influencing dermal penetration of drugs	Lecture	2,3	Quiz & End Sem Exam
54	Preparation of ointments	Lecture	2,3	Quiz & End Sem Exam
55	Preparation of paste	Lecture	2,3	Quiz & End Sem Exam
56	Unit test	Tutorial		Quiz & End Sem Exam
57	Preparation of cream & gel	Lecture	2,3	Quiz & End Sem Exam
58	Excipients used in semi solid dosage forms	Lecture	2,3	Quiz & End Sem Exam
59	Evaluation of semi solid dosages forms	Lecture	2,3	Quiz & End Sem Exam
60	Unit test	Tutorial		Quiz & End Sem Exam



I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP103T.1	**BP103T.1**. Relate pharmacy education, and pharmacy history with pharmacy career options.	3	-	-	-	2	2	1	-	1	-	-				
BP103T.2.	**BP103T.2**. Classify the different types of dosage forms based on uses, physical form, and pharmaceutical incompatibilities.	3	-	-	1	-	2	-	-	-	-	3				
BP103T.3.	**BP103T.3**. Experiment in the development of various conventional dosage forms such as solid, liquid, and semisolid dosage forms.	3	2	-	3	-	2	-	-	-	-	3				
BP103T.4.	**BP103T.4**. Able to analyze the prescription, stability issues in emulsion and suspension.	2	2	3	3	-	1	-	-	-	-	3				
BP103T.5.	**BP103T.5**. Solve the dose calculation, pharmaceutical calculations.	1	-	3	-	-	-	-	-	-	-	3				

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutics I MID-SEMESTER (SEM –Ist) 2021-22						
Class: B.Pharm, I Semester						
Subject Name: BP103T Pharmaceutics-I Theory		Time: 1 Hrs		Max. Marks: 30		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3,4,5	Q.6,8,9	Q.2	Q.7, 10		

The student will be able to

CO1. Relate pharmacy education, and pharmacy history with pharmacy career options.

CO2. Classify the different types of dosage forms based on uses, physical form, and pharmaceutical incompatibilities.

CO3. Experiment in the development of various conventional dosage forms such as solid, liquid, and semisolid dosage forms.

CO4. Able to analyze the prescription, stability issues in emulsion and suspension.

CO5. Solve the dose calculation, pharmaceutical calculations.

CO Map	Question No.	Question	Marks
CO4	Q.1	Enlist the steps of error in the prescription.	2
CO5	Q.2	Apply Clarks formula to calculate the pediatric dose for a 10-year-old child. The adult dose for the same drug is 500mg. What dose should the child be given?	2
CO1	Q.3	Who is the father of Ayurveda?	2
CO2	Q.4	Define and classify divided powder.	2
CO2	Q.5	Write the name of two semisolid dosage forms.	2
CO1	Q.6	Summarize the different jobs available in the field of pharmacy	10
CO4	Q.7	Assume the formulation is having a problem of cracking, how will you solve this issue?	10
CO3	Q.8	Compare effervescent and hygroscopic powder.	5
CO2	Q.9	Illustrate the classification of different dosage forms on the basis of physical form.	5
CO4	Q.10	How to handle the error in prescription?	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

93.3 % Percentage of students secured more than 60% marks, so this course Pharmaceutics I- Theory (BP103T) attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)
Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharmacy), Academic Year – 2021-22

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11				
I SEM	BP104T	3	3	3	3	2		1	2	2	-	2		-	-	-

DEPARTMENT OF PHARMACEUTICAL CHEMISTRY
Course Handout
Course : PHARMACEUTICAL INORGANIC CHEMISTRY(Theory)
Course Code : BP104T , Crédits : 04, Session :2021-22 (Odd Sem.), Class : B.Pharm. 1st Year
Faculty Name : Mr. Avinash Kumar & Dr. Pawan Kumar Gupta

A. Introduction: This course deals with the fundamentals of inorganic chemistry and monograph of inorganic drugs and pharmaceuticals. It aims to understand the preparation assay, properties and medicinal uses of inorganic compounds.

B. Course Outcomes: At the end of the course, students will be:

BP104T.1. Able to discuss the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals.

BP104T.2. Able to Study the monographs of inorganic drugs and pharmaceuticals.

BP104T.3. Able to understand the medicinal and pharmaceutical importance of inorganic compounds.

BP104T.4. Able to learn about preparations, properties, chemical reactions and assay of inorganic compounds

BP104T.5. Able to discuss radio activity, measurement of radioactivity, properties and pharmaceutical applications of radiopharmaceuticals.

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the

limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2 quiz, assignment, open book test, field work, group discussion and seminar)		

	Seminar/ Assignment/Quiz/ Open book test	S/As/Q/OBT	3%
Interaction	Student-Teacher interaction	ST	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

UNIT I

- **Impurities in pharmaceutical substances:** History of Pharmacopoeia, Sources and types of impurities, principle involved in the limit test for Chloride, Sulphate, Iron, Arsenic, Lead and Heavy metals, modified limit test for Chloride and Sulphate
- **General methods of preparation**, assay for the compounds superscripted with **asterisk (*),** properties and medicinal uses of inorganic compounds belonging to the following classes

UNIT II

- **Acids, Bases and Buffers:** Buffer equations and buffer capacity in general, buffers in pharmaceutical systems, preparation, stability, buffered isotonic solutions, measurements of tonicity, calculations and methods of adjusting isotonicity.
- **Major extra and intracellular electrolytes**: Functions of major physiological ions, Electrolytes used in the replacement therapy: Sodium chloride*, Potassium chloride, Calcium gluconate* and Oral Rehydration Salt (ORS), Physiological acid base balance.
- **Dental products**: Dentifrices, role of fluoride in the treatment of dental caries, Desensitizing agents, Calcium carbonate, Sodium fluoride, and Zinc eugenol cement.

UNIT III

- **Gastrointestinal agents**
  Acidifiers: Ammonium chloride* and Dil. HCl
  Antacid: Ideal properties of antacids, combinations of antacids, Sodium Bicarbonate*, Aluminum hydroxide gel, Magnesium hydroxide mixture
  Cathartics: Magnesium sulphate, Sodium orthophosphate, Kaolin and Bentonite
  Antimicrobials: Mechanism, classification, Potassium permanganate, Boric acid, Hydrogen peroxide*, Chlorinated lime*, Iodine and its preparations

UNIT IV

- **Miscellaneous compounds**
  Expectorants: Potassium iodide, Ammonium chloride*.
  Emetics: Copper sulphate*, Sodium potassium tartarate
  Haematinics: Ferrous sulphate*, Ferrous gluconate
  Poison and Antidote: Sodium thiosulphate*, Activated charcoal, Sodium nitrite333
  Astringents: Zinc Sulphate, Potash Alum

UNIT V

- **Radiopharmaceuticals**: Radio activity, Measurement of radioactivity, Properties of α, β, γ radiations, Half-life, radio isotopes and study of radio isotopes - Sodium iodide I131, Storage

conditions, precautions & pharmaceutical application of radioactive substances.

F. Examination Scheme:

Components	A	ST	CT	S/As/Q/OBT	EE
Weightage (%)	4	3	15	3	75

CT: Class Test, As: Assignment, ST: Student teacher interaction, S/A/Q/OBT: Seminar/ Assignment/Quiz/ Open book test, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. E A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, Stahlone Press of University of London, 4th edition
2. A.I. Vogel, Text Book of Quantitative Inorganic analysis
3. P. Gundu Rao, Inorganic Pharmaceutical Chemistry, 3rd Edition
4. M.L Schroff, Inorganic Pharmaceutical Chemistry
5. Bentley and Driver's Textbook of Pharmaceutical Chemistry
6. Anand & Chatwal, Inorganic Pharmaceutical Chemistry
7. Indian Pharmacopoeia

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	History of Pharmacopoeia	Lecture	BP104T.1 & BP104T.2	Mid Term-1, Quiz & End Sem Exam
2	Sources and types of impurities	Lecture	BP104T.1	Mid Term-1, Quiz & End Sem Exam
3	Principle involved in the limit test for Chloride,	Lecture	BP104T.1	Mid Term-1, Quiz & End Sem Exam
4	Tutorial class History of Pharmacopoeia	Lecture	BP104T.1	Mid Term-1, Assignment ,Quiz & End Sem Exam
5	Principle involved in the limit test for Sulphate	Lecture	BP104T.1	Mid Term-1, Quiz & End Sem Exam
6	Principle involved in the limit test for Iron	Lecture	BP104T.1	Mid Term-1, Quiz & End Sem Exam
7	Principle involved in the limit test for Arsenic	Lecture	BP104T.1	Mid Term-1, Quiz & End Sem Exam

8	Tutorial class limit test for Arsenic	Lecture	BP104T.1	Mid Term-1, Quiz, Class test & End Sem Exam
9	Principle involved in the limit test for Lead	Lecture	BP104T.1	Mid Term-1, Quiz & End Sem Exam
10	Heavy metals	Lecture	BP104T.1	Mid Term-1, Quiz & End Sem Exam
11	Modified limit test for Chloride and Sulphate	Lecture	BP104T.1	Mid Term-1, Quiz & End Sem Exam
12	*Tutorial class:* Modified limit test for Chloride	Lecture	BP104T.1	Mid Term-1, Assignment ,Quiz & End Sem Exam
13	Buffer equations and buffer capacity in general	Lecture	BP104T.2& BP104T.4	Mid Term-1, Quiz & End Sem Exam
14	Buffers in pharmaceutical systems, preparation, stability,	Lecture	BP104T.2& BP104T.4	Mid Term-1, Quiz & End Sem Exam
15	Buffered isotonic solutions, measurements of tonicity, calculations	Lecture	BP104T.2& BP104T.4	Mid Term-1, Quiz & End Sem Exam
16	*Tutorial class* Buffered isotonic solutions	Lecture	BP104T.4	Mid Term-1, Class test, Quiz & End Sem Exam
17	Methods of adjusting isotonicity.	Lecture	BP104T.2& BP104T.4	Mid Term-1, Quiz & End Sem Exam
18	Functions of major physiological ions	Lecture	BP104T.2& BP104T.4	Mid Term-1, Quiz & End Sem Exam
19	Electrolytes used in the replacement therapy: Sodium chloride*, Potassium chloride, Calcium gluconate	Lecture	BP104T.2& BP104T.3	Mid Term-1, Quiz & End Sem Exam
20	*Tutorial class* Electrolytes used in the replacement therapy	Lecture	BP104T.2& BP104T.3	Mid Term-1, Assignment ,Quiz & End Sem Exam
21	Oral Rehydration Salt (ORS), Physiological acid base balance.	Lecture	BP104T.2& BP104T.3	Mid Term-1, Quiz & End Sem Exam
22	Dentifrices, role of fluoride in the treatment of dental caries	Lecture	BP104T.2& BP104T.3	Mid Term-1, Quiz & End Sem Exam

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23	Desensitizing agents	Lecture	BP104T.2& BP104T.3	Mid Term-1, Quiz & End Sem Exam
24	*Tutorial class* Desensitizing agents	Lecture	BP104T.2& BP104T.3	Mid Term-1, Quiz & End Sem Exam
25	Calcium carbonate, Sodium fluoride, and Zinc eugenol cement.	Lecture	BP104T.2& BP104T.3	Mid Term-1, Quiz & End Sem Exam
26	**Acidifiers:** Ammonium chloride	Lecture	BP104T.2& BP104T.3	Mid Term-1, Quiz & End Sem Exam
27	Dil. HCl	Lecture	BP104T.2& BP104T.3	Mid Term-1, Quiz & End Sem Exam
28	*Tutorial class* Acidifiers	Lecture	BP104T.2& BP104T.3	Mid Term-1, Seminar,Quiz & End Sem Exam
29	**Antacid:** Ideal properties of antacids, combinations of antacids	Lecture	BP104T.2& BP104T.3	Mid Term-1, Quiz & End Sem Exam
30	Sodium Bicarbonate*, Aluminum hydroxide gel	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
31	Magnesium hydroxide mixture	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
32	*Tutorial class* Magnesium hydroxide mixture	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
33	**Cathartics:** Magnesium sulphate	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
34	Sodium orthophosphate,	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
35	Kaolin and Bentonite	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
36	*Tutorial class* Bentonite	Lecture	BP104T.2& BP104T.3	Mid Term-2, Assignment ,Quiz & End Sem Exam
37	**Antimicrobials**: Mechanism, classification, Potassium permanganate	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
38	Boric acid, Hydrogen peroxide*	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam

39	Chlorinated lime*, Iodine and its preparations	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
40	*Tutorial class* Iodine	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
41	**Expectorants:** Potassium iodide	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
42	Ammonium chloride	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
43	**Emetics**: Copper sulphate*, Sodium potassium tartarate	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
44	*Tutorial class* Copper sulphate	Lecture	BP104T.2& BP104T.3	Mid Term-2, Seminar, Quiz & End Sem Exam
45	**Haematinics:** Ferrous sulphate*, Ferrous gluconate	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
46	**Poison and Antidote:** Sodium thiosulphate*	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
47	Activated charcoal, Sodium nitrite	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
48	*Tutorial class* Activated charcoal	Lecture	BP104T.2& BP104T.3	Mid Term-2, Seminar, Quiz & End Sem Exam
49	**Astringents**: Zinc Sulphate, Potash Alum	Lecture	BP104T.2& BP104T.3	Mid Term-2, Quiz & End Sem Exam
50	**Radiopharmaceuticals**: Radio activity	Lecture	BP104T.5	Mid Term-2, Quiz & End Sem Exam
51	Measurement of radioactivity.	Lecture	BP104T.5	Mid Term-2, Quiz & End Sem Exam
52	*Tutorial class*: Measurement of radioactivity.	Lecture	BP104T.5	Mid Term-2, Assignment ,Quiz & End Sem Exam
53	Properties of α, β, γ radiations, Half-life	Lecture	BP104T.5	Mid Term-2, Quiz & End Sem Exam
54	Radio isotopes	Lecture	BP104T.5	Mid Term-2, Quiz & End

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				Sem Exam
55	study of radio isotopes - Sodium iodide I^{131}	Lecture	BP104T.5	Mid Term-2, Quiz & End Sem Exam
56	*Tutorial class* Sodium iodide I^{131}	Lecture	BP104T.5	Mid Term-2, Quiz & End Sem Exam
57	Storage conditions	Lecture	BP104T.5	Mid Term-2, Quiz & End Sem Exam
58	Precautions of radioactive substances.	Lecture	BP104T.5	Mid Term-2, Quiz & End Sem Exam
59	Pharmaceutical application of radioactive substances.	Lecture	BP104T.5& BP104T.3	Mid Term-2, Quiz & End Sem Exam
60	*Tutorial class* Precautions of radioactive substances.	Lecture	BP104T.5	Mid Term-2, Seminar,Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP104T.1.	Able to discuss the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals	3	3	2	2	2				2		2
BP104T.2.	Able to Study the monographs of inorganic drugs and pharmaceuticals.	3	3	2	3	3				2		3
BP104T.3.	Able to understand the medicinal and pharmaceutical importance of inorganic compounds	3	3	2	3	2				3		2

BP104T.4.	Able to learn about preparations, properties, chemical reactions and assay of inorganic compounds	3	3	2	2	2			2	2		2
BP104T.5.	Able to discuss radio activity, measurement of radioactivity, properties and pharmaceutical applications of radiopharmaceuticals.	3	3	2	3	3			2	2		3

Sample Question Paper

Amity Institute of pharmacy Department of Pharmaceutical Chemistry I MID-SEMESTER (SEM –I) 2021-22						
Class: B.Pharmacy I Semester						
Subject Name: BP104T PHARMACEUTICAL INORGANIC CHEMISTRY		Time: 1 Hr		Max. Marks: 30		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q3,5,7,9	Q1,2,6,8,10				Q4

Student will be

CO.1. Able to discuss the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals.

CO.2. Able to Study the monographs of inorganic drugs and pharmaceuticals.

CO.3. Able to understand the medicinal and pharmaceutical importance of inorganic compounds.

CO.4. Able to learn about preparations, properties, chemical reactions and assay of inorganic compounds

CO.5. Able to discuss radio activity, measurement of radioactivity, properties and pharmaceutical applications of radiopharmaceuticals.

CO Map	Question No.	Question	Marks
CO1	Q.1	Write the recent features in the history of Pharmacopoeia	2
CO1	Q.2	Explain the principle involved in the limit test for Sulphate	2
CO2	Q.3	Define tonicity	2
CO4	Q.4	Write the chemical reaction in the assay of Sodium chloride	2
CO2	Q.5	What are Desensitizing agents	2
CO1	Q.6	Explain the principle and procedure involved in the limit test for lead	10
CO2	Q.7	What are Acidifiers and write a note on dil.HCl	10
CO2	Q 8	Discuss the role of fluoride in the treatment of dental caries	5

CO1 &CO2	Q.9	Write a note on sources and types of impurities	5
CO2	Q 10	Explain the measurements of tonicity	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

87.6 % Percentage of students secured more than 60% marks, so this course Pharmaceutical Inorganic Chemistry -Theory (BP104T) attained Level -3.

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AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)
Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

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AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICS

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honor personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3: Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I SEM																
	BP105T	3	1	2	1	1	3	2	3	1	1	3				

Dr. Mohanty

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DEPARTMENT OF PHARMACEUTICS
Course Handout
Course : Communication skills – Theory
Course Code: BP105T, Credits: 02, Session:2021-22 (Odd Sem.), Class: B.Pharm - 1st Year
Faculty Name: Dr. Bishakha Mandal, Dr. Archana Sharma

A. **Introduction:** This course will prepare the young pharmacy student to interact effectively with doctors, nurses, dentists, physiotherapists and other health workers. At the end of this course the student will get the soft skills set to work cohesively with the team as a team player and will add value to the pharmaceutical business.

B. **Course Outcomes:** At the end of the course, students will be able to:

BP105T: 1. Understand the behavioral needs for a Pharmacist to function effectively in the areas of pharmaceutical operation

BP105T: 2. Communicate effectively (Verbal and Non Verbal)

BP105T: 3. Effectively manage the team as a team player

BP105T: 4. Develop interview skills.

BP105T:5. Develop Leadership qualities and essentials.

C. **Programme Outcomes:**

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily

practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

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[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

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D. Assessment Plan:

Component of Evaluation	Description	Code	Weightage %

Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	1.5%
	Student – Teacher interaction	S-T I	1.5%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

E. Syllabus

UNIT – I 07 Hours

 Communication Skills: Introduction, Definition, The Importance of Communication, The Communication Process – Source, Message, Encoding, Channel, Decoding, Receiver, Feedback, Context

 Barriers to communication: Physiological Barriers, Physical Barriers, Cultural Barriers, Language Barriers, Gender Barriers, Interpersonal Barriers, Psychological Barriers, Emotional barriers

 Perspectives in Communication: Introduction, Visual Perception, Language, Other factors affecting our perspective - Past Experiences, Prejudices, Feelings, Environment

UNIT – II 07 Hours

 Elements of Communication: Introduction, Face to Face Communication - Tone of Voice, Body Language (Non-verbal communication), Verbal Communication, Physical Communication

 Communication Styles: Introduction, The Communication Styles Matrix with example for each -Direct Communication Style, Spirited Communication Style, Systematic Communication Style, Considerate Communication Style

UNIT – III 07 Hours

 Basic Listening Skills: Introduction, Self-Awareness, Active Listening, Becoming an Active Listener, Listening in Difficult Situations

 Effective Written Communication: Introduction, When and When Not to Use Written Communication - Complexity of the Topic, Amount of Discussion' Required, Shades of Meaning, Formal Communication
 Writing Effectively: Subject Lines, Put the Main Point First, Know Your Audience, Organization of the Message

UNIT – IV 05 Hours

 Interview Skills: Purpose of an interview, Do's and Dont's of an interview
 Giving Presentations: Dealing with Fears, Planning your Presentation, Structuring Your Presentation, Delivering Your Presentation, Techniques of Delivery

UNIT – V 04 Hours

 Group Discussion: Introduction, Communication skills in group discussion, Do's and Dont's of group discussion.

A. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	2	10	1.5	1.5	35

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

B. Suggested Text/Reference Books:

1. Basic communication skills for Technology, Andreja. J. Ruther Ford, 2nd Edition, Pearson Education, 2011
2. Communication skills, Sanjay Kumar, Pushpalata, 1stEdition, Oxford Press, 2011
3. Organizational Behaviour, Stephen .P. Robbins, 1stEdition, Pearson, 2013
4. Brilliant- Communication skills, Gill Hasson, 1stEdition, Pearson Life, 2011
5. The Ace of Soft Skills: Attitude, Communication and Etiquette for success, Gopala Swamy Ramesh, 5thEdition, Pearson, 2013
6. Developing your influencing skills, Deborah Dalley, Lois Burton, Margaret, Green hall, 1st Edition Universe of Learning LTD, 2010
7. Communication skills for professionals, Konar nira, 2ndEdition, New arrivals – PHI, 2011
8. Personality development and soft skills, Barun K Mitra, 1stEdition, Oxford Press, 2011
9. Soft skill for everyone, Butter Field, 1st Edition, Cengage Learning india pvt.ltd, 2011
10. Soft skills and professional communication, Francis Peters SJ, 1stEdition, Mc Graw Hill Education, 2011
11. Effective communication, John Adair, 4thEdition, Pan Mac Millan,2009
12. Bringing out the best in people, Aubrey Daniels, 2ndEdition, Mc Graw Hill, 1999

C. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO

1	**Communication Skills:** Introduction, Definition, The Importance of Communication, The Communication Process – Source, Message,	Lecture	1	Mid Term-1, Quiz & End Sem Exam
2	Encoding, Channel, Decoding, Receiver, Feedback, Context	Lecture	1	Mid Term-1, Quiz & End Sem Exam
3	**Barriers to communication:** Physiological Barriers, Physical Barriers, Cultural Barriers, Language Barriers	Lecture	1	Mid Term-1, Quiz & End Sem Exam
4	Gender Barriers, Interpersonal Barriers, Psychological Barriers, Emotional barriers	Lecture	1	Mid Term-1, Quiz & End Sem Exam
5	**Perspectives in Communication:** Introduction, Visual Perception, Language,	Lecture	1	Mid Term-1, Quiz & End Sem Exam
6	Other factors affecting our perspective - Past Experiences, Prejudices, Feelings, Environment	Lecture	1	Mid Term-1, Quiz & End Sem Exam
7	**Elements of Communication:** Introduction, Face to Face Communication - Tone of Voice,	Lecture	2	Mid Term-1, Quiz & End Sem Exam
8	Body Language (Non-verbal communication), Verbal Communication, Physical Communication	Lecture	2	Mid Term-1, Quiz & End Sem Exam
9	**Communication Styles:** Introduction, The Communication Styles Matrix with example for each	Lecture	2	Mid Term-1, Quiz & End Sem Exam
10	Direct Communication Style, Spirited Communication Style	Lecture	2	Mid Term-1, Quiz & End Sem Exam
11	Systematic Communication Style, Considerate Communication Style	Lecture	2	Mid Term-1, Quiz & End Sem Exam
12	**Basic Listening Skills:** Introduction, Self-Awareness, Active Listening	Lecture	2	Mid Term-1, Quiz & End Sem Exam
13	an	Lecture	2	Mid Term-1, Quiz

	Active Listener, Listening in Difficult Situations			& End Sem Exam
14	**Effective Written Communication:** Introduction, When and When Not to Use Written	Lecture	3	Mid Term-2, Quiz & End Sem Exam
15	Communication - Complexity of the Topic,	Lecture	3	Mid Term-2, Quiz & End Sem Exam
16	Amount of Discussion' Required, Shades of Meaning, Formal Communication	Lecture	3	Mid Term-2, Quiz & End Sem Exam
17	**Writing Effectively:** Subject Lines, Put the Main Point First	Lecture	3	Mid Term-2, Quiz & End Sem Exam
18	Know Your Audience, Organization of the Message	Lecture	3	Mid Term-2, Quiz & End Sem Exam
19	Know Your Audience, Organization of the Message	Lecture	3	Mid Term-2, Quiz & End Sem Exam
20	**Interview Skills:** Purpose of an interview, Do's and Dont's of an interview	Lecture	3	Mid Term-2, Quiz & End Sem Exam
21	**Interview Skills:** Purpose of an interview, Do's and Dont's of an interview	Lecture	3	Mid Term-2, Quiz & End Sem Exam
22	**Giving Presentations:** Dealing with Fears, Planning your Presentation	Lecture	4	Mid Term-2, Quiz & End Sem Exam
23	**Giving Presentations:** Dealing with Fears, Planning your Presentation	Lecture	4	Mid Term-2, Quiz & End Sem Exam
24	Structuring Your Presentation, Delivering Your Presentation,	Lecture	4	Mid Term-2, Quiz & End Sem Exam
25	Techniques of Delivery	Lecture	4	Mid Term-2, Quiz & End Sem Exam
26	**Group Discussion:** Introduction, Communication skills in group discussion	Lecture	5	Mid Term-2, Quiz & End Sem Exam
27	**Group Discussion:** Introduction, Communication skills in group discussion	Lecture	5	Mid Term-2, Quiz & End Sem Exam
28	Do's an Dont's of group discussion	Lecture	5	Mid Term-2, Quiz & End Sem Exam

29	Do's and Dont's of group discussion	Lecture	5	Mid Term-2, Quiz & End Sem Exam
30	Do's and Dont's of group discussion	Lecture	5	Mid Term-2, Quiz & End Sem Exam

D. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP105T: 1	**BP105T**: 1. Understand the behavioral needs for a Pharmacist to function effectively in the areas of pharmaceutical operation	0	1	2	1	3	3	-	3	2	-	1				
BP105T: 2	**BP105T:** 2. Communicate effectively (Verbal and Non Verbal)	0	1	2	1	3	3	-	3	2	-	1				
BP105T: 3	**BP105T**: 3. Effectively manage the team as a team player	0	1	2	1	3	3	-	3	2	-	1				
BP105T: 4	**BP105T**: 4. Develop interview skills.	-	-	2	1	3	3	-	3	2	-	1				

BP105T: 5	**BP105T**:5. Develop Leadership qualities and essentials.	2	1	1	1	3	2	1	1	1	1	3				

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutics I MID-SEMESTER (SEM –Ist) 2021-22						
Class: B. Pharm, I Semester						
Subject Name: Communications Skills BP105T-Theory		Time: 1 Hrs			Max. Marks: 30	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1, Q.5, Q.3	Q.2, Q.4				

The student will be able to

BP105T: 1. Understand the behavioral needs for a Pharmacist to function effectively in the areas of pharmaceutical operation

BP105T: 2. Communicate effectively (Verbal and Non Verbal)

BP105T: 3. Effectively manage the team as a team player

CO Map	Question No.	Question	Marks
CO5	Q.1	Importance of communication skills.	5
CO3	Q. 2	Write the barriers to communication.	5
CO3	Q. 3	Compare verbal and non-verbal communication.	5
CO4	Q. 4	What do you understand by communication styles?	5
CO5	Q.5	Write a detailed note on communication style.	10

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

97.8 % Percentage of students secured more than 60% marks, so this course Communication Skills -Theory attained Level -3.

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Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

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AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOLOGY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

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Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3: Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I SEM																
	BP106RBT	3	1	2	3	1	3	2	1	1	3	2				

Dr. Mohanraty M

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DEPARTMENT OF PHARMACOLOGY
Course Handout
Course : REMEDIAL BIOLOGY THEORY
Course Code: BP106RBT, Credits: 02, Session:2021-22 (Odd Sem.), Class: B.Pharm - 1st Year
Faculty Name: Dr. Naveen Sharma/ Ms. Ankita Kisore

A. **Introduction:** This subject deals with learning and understanding the components of living world, structure and functionalmsystem of plant and animal kingdom.

B. **Course Outcomes:** At the end of the course, students will be able to:
BP106RBT: 1. know the classification and salient features of five kingdoms of life
BP106RBT: 2. understand the basic components of anatomy & physiology of plant
BP106RBT: 3. know the basic components of anatomy & physiology animal with special reference to human
BP106RBT: 4. Know about the Essential mineral, macro and micronutrients.
BP106RBT:5. Understand the basics of plant respiration and requirements and procedures of plant growth.

C. **Programme Outcomes:**
[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily

practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

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D. Assessment Plan:

Component of Evaluation	Description	Code	Weightage %
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	1.5%
	Student – Teacher interaction	S-T I	1.5%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

E. Syllabus

UNIT I

Living world:

- Definition and characters of living organisms
- Diversity in the living world
- Binomial nomenclature
- Five kingdoms of life and basis of classification. Salient features of Monera, Potista, Fungi, Animalia and Plantae, Virus,

Morphology of Flowering plants

- Morphology of different parts of flowering plants – Root, stem, inflorescence, flower, leaf, fruit, seed.
- General Anatomy of Root, stem, leaf of monocotyledons & Dicotylidones.

UNIT II

Body fluids and circulation

- Composition of blood, blood groups, coagulation of blood
- Composition and functions of lymph

 Human circulatory system
 Structure of human heart and blood vessels
 Cardiac cycle, cardiac output and ECG

Digestion and Absorption

 Human alimentary canal and digestive glands
 Role of digestive enzymes
 Digestion, absorption and assimilation of digested food

Breathing and respiration

 Human respiratory system
 Mechanism of breathing and its regulation
 Exchange of gases, transport of gases and regulation of respiration
 Respiratory volumes

UNIT III

Excretory products and their elimination

 Modes of excretion
 Human excretory system- structure and function
 Urine formation
 Rennin angiotensin system

Neural control and coordination

 Definition and classification of nervous system
 Structure of a neuron
 Generation and conduction of nerve impulse
 Structure of brain and spinal cord
 Functions of cerebrum, cerebellum, hypothalamus and medulla oblongata

Chemical coordination and regulation

 Endocrine glands and their secretions
 Functions of hormones secreted by endocrine glands

Human reproduction

 Parts of female reproductive system
 Parts of male reproductive system
 Spermatogenesis and Oogenesis
 Menstrual cycle

UNIT IV

Plants and mineral nutrition:

 Essential mineral, macro and micronutrients
 Nitrogen metabolism, Nitrogen cycle, biological nitrogen fixation

Photosynthesis

 Autotrophic nutrition, photosynthesis, Photosynthetic pigments, Factors affecting photosynthesis.

UNIT V

Plant respiration: Respiration, glycolysis, fermentation (anaerobic).

Plant growth and development

 Phases and rate of plant growth, Condition of growth, Introduction to plant growth regulators

Cell - The unit of life

 Structure and functions of cell and cell organelles. Cell division

Tissues

 Definition, types of tissues, location and functions.

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	2	10	1.5	1.5	35

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

a. Text book of Biology by S. B. Gokhale
b. A Text book of Biology by Dr. Thulajappa and Dr. Seetaram.
c. A Text book of Biology by B.V. Sreenivasa Naidu
d. A Text book of Biology by Naidu and Murthy
e. Botany for Degree students By A.C.Dutta.
f. Outlines of Zoology byM. Ekambaranatha ayyer and T. N. Ananthakrishnan.
g. A manual for pharmaceutical biology practical by S.B. Gokhale and C. K. Kokate

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Definition and characters of living organisms	Lecture	1	Mid Term-1, Quiz & End Sem Exam
2	Diversity in the living world Binomial nomenclature	Lecture	1	Mid Term-1, Quiz & End Sem Exam
3	Five kingdoms of life and basis of classification.	Lecture	1	Mid Term-1, Quiz & End Sem Exam
4	Salient features of Monera, Potista, Fungi, Animalia and Plantae, Virus	Lecture	1	Mid Term-1, Quiz & End Sem Exam
5	Morphology of different parts of flowering plants – Root, stem, inflorescence, flower, leaf, fruit, seed.	Lecture	1	Mid Term-1, Quiz & End Sem Exam
6	General Anatomy of Root, stem, leaf of monocotyledons & Dicotylidones	Lecture	1	Mid Term-1, Quiz & End Sem Exam
7	Composition of blood, blood groups, coagulation of blood	Lecture	2	Mid Term-1, Quiz & End Sem Exam
8	Composition and functions of lymph, Human circulatory system	Lecture	2	Mid Term-1, Quiz & End Sem Exam

9	Structure of human heart and blood vessels, Cardiac cycle, cardiac output and ECG	Lecture	2	Mid Term-1, Quiz & End Sem Exam
10	Human alimentary canal and digestive glands	Lecture	2	Mid Term-1, Quiz & End Sem Exam
11	Role of digestive enzymes Digestion, absorption and assimilation of digested food	Lecture	2	Mid Term-1, Quiz & End Sem Exam
12	Human respiratory system, Mechanism of breathing and its regulation	Lecture	2	Mid Term-1, Quiz & End Sem Exam
13	Exchange of gases, transport of gases and regulation of respiration, Respiratory volumes	Lecture	2	Mid Term-1, Quiz & End Sem Exam
14	Modes of excretion, Human excretory system- structure and function,	Lecture	3	Mid Term-2, Quiz & End Sem Exam
15	Urine formation, Rennin angiotensin system	Lecture	3	Mid Term-2, Quiz & End Sem Exam
16	Definition and classification of nervous system, Structure of a neuron, Generation and conduction of nerve impulse	Lecture	3	Mid Term-2, Quiz & End Sem Exam
17	Structure of brain and spinal cord, Functions of cerebrum, cerebellum, hypothalamus and medulla oblongata	Lecture	3	Mid Term-2, Quiz & End Sem Exam
18	Endocrine glands and their secretions	Lecture	3	Mid Term-2, Quiz & End Sem Exam
19	Functions of hormones secreted by endocrine glands	Lecture	3	Mid Term-2, Quiz & End Sem Exam
20	Parts of female reproductive system, Parts of male reproductive system	Lecture	3	Mid Term-2, Quiz & End Sem Exam
21	Spermatogenesis and Oogenesis, Menstrual cycle	Lecture	3	Mid Term-2, Quiz & End Sem Exam
22	Essential mineral, macro and micronutrients	Lecture	4	Mid Term-2, Quiz & End Sem Exam
23	Nitrogen metabolism, Nitrogen cycle, biological nitrogen fixation.	Lecture	4	Mid Term-2, Quiz & End Sem Exam
24	Autotrophic nutrition, photosynthesis,	Lecture	4	Mid Term-2, Quiz & End Sem Exam
25	Photosynthetic pigments, Factors affecting	Lecture	4	Mid Term-2, Quiz & End Sem Exam

	photosynthesis			
26	Plant respiration: Respiration, glycolysis, fermentation (anaerobic).	Lecture	5	Mid Term-2, Quiz & End Sem Exam
27	Plant growth and development, Phases and rate of plant growth,	Lecture	5	Mid Term-2, Quiz & End Sem Exam
28	Condition of growth, Introduction to plant growth regulators	Lecture	5	Mid Term-2, Quiz & End Sem Exam
29	Structure and functions of cell and cell organelles. Cell division	Lecture	5	Mid Term-2, Quiz & End Sem Exam
30	Tissue Definition, types of tissues, location and functions.	Lecture	5	Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP106RBT: 1	**BP106RBT**: 1. know the classification and salient features of five kingdoms of life	3	1	1	1	1	2	1	-	1	-	2				
BP106RBT: 2	**BP106RBT:** 2. understand the basic components of anatomy & physiology of plants.	2	1	2	1	-	2	1	-	1	-	3				
BP106RBT: 3	**BP106RBT:** 3. know the basic components of anatomy & physiology animal with special reference to human.	2	1	2	2	2	2	2	1	2	1	2				
BP106RBT: 4	**BP106RBT**: 4. Know about the Essential mineral, macro and micronutrients.	3	1	1	1	-	2	1	1	1	1	3				
BP106RBT: 5	**BP106RBT**:5. Understand the basics of plant respiration and requirements and procedures of plant growth.	2	1	1	1	2	2	1	1	1	1	3				

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacology I MID-SEMESTER (SEM –Ist) 2021-22						
Class: B. Pharm, I Semester						
Subject Name: Remedial Biology BP106RBT-Theory		Time: 1 Hrs			Max. Marks: 30	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1, Q.5, Q.3	Q.2, Q.4				
The student will be able to **CO.3**. Discuss about role of endocrine glands and their secretions. **CO.4**. Write about Essential mineral, macro and micronutrients for plants growth.						

CO Map	Question No.	Question	Marks
CO5	Q.1	Discuss the role of plant growth Regulators.	5
CO3	Q.2	Discuss the structure and functions of brain.	5
CO3	Q.3	Write the functions of hormones secreted by endocrine glands.	5
CO4	Q.4	Define photosynthesis? Discuss Factors affecting photosynthesis.	5
CO5	Q.5	Write a detailed note on structure and functions of cell and cell organelles.	10

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

84.6 % Percentage of students secured more than 60% marks, so this course Remedial Mathematics – Theory (BP106RMT) attained Level -3

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AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)

Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

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AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOLOGY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Programme Specific Outcomes:

PSO 1: Will be able to design, develop and implement efficient software for a given real life problem.

PSO 2: Will be able to apply knowledge of AI, Machine Learning and Data Mining in analyzing big data forextracting useful information from it and for performing predictive analysis.

PSO 3: Will be able to design, manage and secure wired/ wireless computer networks for transfer and sharing ofinformation.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I SEM																
	BP107P	3	1	2	-	1	3	2	1	3	2	2				

Dr. Mohanty

DEPARTMENT OF PHARMACOLOGY
Course Handout
Course: HUMAN ANATOMY AND PHYSIOLOGY – I PRACTICAL
Course Code : BP107P, Crédits: 02, Session :2021-22 (Odd Sem.), Class : B.Pharm. 1st Year
Faculty Name: Dr. Naveen Sharma, Ms. Ankita Kishore

A. **Introduction:** This course is designed to impart fundamental knowledge on the structure and functions of the various systems of the human body. It also helps in understanding both homeostatic mechanisms. The subject provides the basic knowledge required to understand the various disciplines of pharmacy.

B. **Course Outcomes:** At the end of the course, students will be able to:

BP107P.1 Effectively use the microscope for microscopic study of various tissues.
BP107P.2. Identify axial and appendicular bones of human skeleton.
BP107P.3. Explain the gross morphology, structure and functions of various organs of human body.
BP107P.4 Identify different tissues and organs of different systems of human body.
BP107P.5. Perform the haematological test like CT-BT, blood cell count, haemoglobin estimation, bleeding/clotting time, ESR etc.
BP107P.6 Record the blood pressure, heart rate, pulse rate and respiratory volume.

Programme Outcomes:

[PO.1]. Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

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[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

C. Programme Specific Outcomes:

PSO 1: Practical physiology is complimentary to the theoretical discussions in physiology.
PSO 2: Practical allow the verification of physiological processes discussed in theory classes through experiments on living tissue, intact animals or normal human beings.
PSO 3: This is helpful for developing an insight on the subject.

Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%

End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

D. Syllabus

1. Study of compound microscope.
2. Microscopic study of epithelial and connective tissue
3. Microscopic study of muscular and nervous tissue
4. Identification of axial bones
5. Identification of appendicular bones
6. Introduction to hemocytometry.
7. Enumeration of white blood cell (WBC) count
8. Enumeration of total red blood corpuscles (RBC) count
9. Determination of bleeding time
10. Determination of clotting time
11. Estimation of hemoglobin content
12. Determination of blood group.
13. Determination of erythrocyte sedimentation rate (ESR).
14. Determination of heart rate and pulse rate.
15. Recording of blood pressure. Recommended Books (Latest Edition

E. Examination Scheme:

Components	**A**	**CT**	**LR**	**V**	**EE**
Weightage (%)	2	10	1	2	35

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

F. Suggested Text/Reference Books:

1. Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypee brothers medical publishers, New Delhi.
2. Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York
3. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co,Riverview,MI USA
4. Text book of Medical Physiology- Arthur C,Guyton andJohn.E. Hall. Miamisburg, OH, U.S.A.
5. Principles of Anatomy and Physiology by Tortora Grabowski. Palmetto, GA, U.S.A.

G. Lecture Plan

Lecture	**Topics**	**Mode of Delivery**	**Corresponding CO**	**Mode of Assessing CO**
1	Study of compound microscope.	Practical	Unit-1 CO1	Mid Term-1 and 2, Quiz & End Sem Exam
2	Microscopic study of epithelial and connective tissue	Practical	CO4	Mid Term-1 and 2, Quiz & End Sem Exam
3	Microscopic study of muscular and nervous tissue	Practical	CO4	Mid Term-1 and 2, Quiz & End Sem Exam

4	*Identification of axial bones*	Practical	CO3	Mid Term-1 and 2, Quiz & End Sem Exam
5	Identification of appendicular boneanatomical terminology.	Practical	CO3	Mid Term-1 and 2, Quiz & End Sem Exam
6	Introduction to hemocytometry	Practical	CO2	Mid Term-1 and 2, Quiz & End Sem Exam
7	Enumeration of white blood cell (WBC) count	Practical	CO5	Mid Term-1 and 2, Quiz & End Sem Exam
8	Quiz	Practical		Mid Term-1 and 2, Quiz & End Sem Exam
9	Enumeration of total red blood corpuscles (RBC)	Practical	CO5	Mid Term-1 and 2, Quiz & End Sem Exam
10	Determination of bleeding time	Practical	CO5	Mid Term-1 and 2, Quiz & End Sem Exam
11	Determination of clotting time	Practical	CO5	Mid Term-1 and 2, Quiz & End Sem Exam
12	Revision--	Practical		Mid Term-1 and 2, Quiz & End Sem Exam
13	Estimation of hemoglobin content	Practical	CO5	Mid Term-1 and 2, Quiz & End Sem Exam
14	Determination of blood group	Practical	CO5	Mid Term-1 and 2, Quiz & End Sem Exam
15	Determination of erythrocyte sedimentation rate (ESR).	Practical	CO5	Mid Term-1 and 2, Quiz & End Sem Exam
16	Unit test	Practical		Mid Term-1 and 2, Quiz & End Sem Exam
17	Determination of heart rate and pulse rate.	Practical	CO6	Mid Term-1 and 2, Quiz & End Sem Exam
18	Recording of blood pressure.	Practical	CO6	Mid Term-1 and 2, Quiz & End Sem Exam

H. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP107P.1	Effectively use the microscope for microscopic study of various tissues.	3	-	-	-	1	2	2	-	-	-	-				
BP107P.2.	Identify axial and appendicular bones of human skeleton.	3	-	-	1	-	1	-	-	-	-	2				
BP107P.3.	Explain the gross morphology, structure and functions of various organs of human body.	3	2	-	3	-	2	-	-	-	-	3				
BP107P.4.	Identify different tissues and organs of different systems of human body.	2	2	1	3	-	1	-	-	-	-	2				
BP107P.5.	Perform the haematological test like CT-BT, blood cell count, haemoglobin estimation, bleeding/clotting time, ESR etc.	3	-	1	-	2	-	-	-	-	-	2				
BP10P.6	Record the blood pressure, heart rate, pulse rate and respiratory volume.	3			1							1				

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacology I MID-SEMESTER (SEM –Ist) 2021-22						
Class: B.Pharm, I Semester						
Subject Name: BP107P Human Anatomy and Physiology-I		Time: 4 Hrs		Max. Marks: 40		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,2,4,10	Q.8,9,6	Q.5,3	Q.7		

Student will be able to

CO1. Effectively use the microscope for microscopic study of various tissues.
CO2. Identify axial and appendicular bones of human skeleton.
CO3. Explain the gross morphology, structure and functions of various organs of human body.
CO4. Identify different tissues and organs of different systems of human body.

CO Map	Question No.	Question	Marks
CO1	Q.1a	*What is* different part of microscope	2
CO2	Q.1b	Define facial bones.	2
CO2	Q.1c	Make use of medibular bone.	2
CO4	Q.1d	Why is epithelium tissue work as protective tissue.	2
CO2 CO3	Q.1e	Identify correct location of carpal bones.	2
	Q.2	Experiment: Microscopic study of muscular and nervous tissue	25
	Q.3	Viva	5

Level 1	IF 60% of students secure more than 60% marks then level 1
Level 2	IF 70% of students secure more than 60% marks then level 2
Level 3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

98.9 % Percentage of students secured more than 60% marks, so this course Human Anatomy And Physiology - Practical (BP107P) attained Level -3.

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PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

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AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

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Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I SEM	BP108P	3	1	2	1	1	2		2		2	2				

Dr. Mohanty

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DEPARTMENT OF PHARMACEUTICAL CHEMISTRY
Course Handout
Course : PHARMACEUTICAL ANALYSIS – I PRACTICAL
Course Code : BP108P, Crédits : 02, Session :2021-22 (Odd Sem.), Class : B.Pharm. 1st Year
Faculty Name: Dr. Pawan Kumar Gupta

A. Introduction: The course is designed to impart skill development in the arts and science of preparing the different conventional dosage forms.

B. Course Outcomes: At the end of the course, students will be able to:

BP108P.1. Understand the principles of volumetric and electro chemical analysis

BP108P.2. Operate equipment used in electro chemical analysis

BP108P.3. Carryout various volumetric titrations

BP108P.4. Carryout various electrochemical titrations

BP108P.5. Develop analytical skills

Programme Outcomes:

[PO.1]. Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

C. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal	Mid Term 1	CT	10%
	Mid Term 2		

Evaluation	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

D. Syllabus

I Limit Test of the following

(1) Chloride
(2) Sulphate
(3) Iron
(4) Arsenic

II Preparation and standardization of

(1) Sodium hydroxide
(2) Sulphuric acid
(3) Sodium thiosulfate
(4) Potassium permanganate
(5) Ceric ammonium sulphate

III Assay of the following compounds along with Standardization of Titrant

(1) Ammonium chloride by acid base titration
(2) Ferrous sulphate by Cerimetry
(3) Copper sulphate by Iodometry
(4) Calcium gluconate by complexometry
(5) Hydrogen peroxide by Permanganometry
(6) Sodium benzoate by non-aqueous titration
(7) Sodium Chloride by precipitation titration

IV Determination of Normality by electro-analytical methods

(1) Conductometric titration of strong acid against strong base
(2) Conductometric titration of strong acid and weak acid against strong base
(3) Potentiometric titration of strong acid against strong base

E. Examination Scheme:

Components	**A**	**CT**	**LR**	**V**	**EE**
Weightage (%)	2	10	1	2	35

CT: Class Test, LR: Lab Record, V: Viva, EE: End Semester Examination; A: Attendance

F. Suggested Text/Reference Books:

- A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, StahlonePress of University of London
- A.I. Vogel, Text Book of Quantitative Inorganic analysis
- P. Gundu Rao, Inorganic Pharmaceutical Chemistry
- Bentley and Driver's Textbook of Pharmaceutical Chemistry
- John H. Kennedy, Analytical chemistry principles
- Indian Pharmacopoeia.
    - .

G. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	To study various Glassware used in Pharmaceutical Analysis.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
2	To Calibrate various Glassware used in Pharmaceutical Analysis	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
3	To prepare 0.1 N NaOH Solution and standardize it using 0.1 N Oxalic Acid as standard.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
4	To prepare and standardize 0.1 N Sulphuric Acid using Anhydrous Sodium Carbonate as Standard.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
5	To prepare 0.1 N Sodium Thiosulphate Solution and standardize it by using 0.1 N Potassium Iodide Solution Solution as Standard.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
6	To prepare 0.1 Potassium Permanganate (KMnO4) using 0.1 N Solution of Oxalic Acid (COOH)2 as standard.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam

7	To prepare and standardize 0.1 M Ceric Ammonium Sulphate	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
8	To perform assay of the given sample of Sodium Chloride	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
9	To perform assay of the given sample of Ammonium Chloride.	Practical	CO1, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
10	To perform assay of the given sample of copper sulphate	Practical	CO1, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
11	To perform assay of the given sample of Ferrous Sulphate using standard Potassium Permanganate Solution.	Practical	CO1, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
12	To perform assay of the given sample of H_2O_2.	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
13	To perform assay of the given sample of Sodium Bezoate.	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
14	To perform assay of the given sample of Calcium Gluconate.	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
15	To carry out conductometric titration of strong acid (0.1 N HCl) against strong base (0.1 N NaOH).	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam

H. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	
BP108P.1	Understand the principles of volumetric and electro chemical analysis	3		2	1	2	1	-	2	1	2	1	

BP108P.2.	Operate equipment used in electro chemical analysis	2	-	-	1	-	1	-	-	-	-	3	
BP108P.3.	Carryout various volumetric titrations	3	2	2	1	-	2	-	2	-	-	3	
BP108P 4.	Carryout various electrochemical titrations	2	2	2	1	-	2	-	2	-	-	3	
BP108P.5.	Develop analytical skills	1	2	3	-	-	2	-	2	-	-	3	

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutical Chemistry I MID-SEMESTER (SEM –Ist) 2022-23						
Class: B.Pharm, I Semester						
Subject Name: BP108P Pharmaceutical Analysis-I Practical		Time: 4 Hrs		Max. Marks: 40		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,4	Q.2,3	Q.4	Q.2,5,6		
Student will be able to **CO.1**. Understand the principles of volumetric and electro chemical analysis **CO.2**. Operate equipment used in electro chemical analysis **CO.3**. Carryout various volumetric titrations **CO.4**. Carryout various electrochemical titrations **CO.5**. Develop analytical skills						

CO Map	Question No.	Question	Marks
CO1,2,4	Q.1a	Synopsis- Define Assay.	2
CO1,2,4	Q.1b	Synopsis- Define Standard Solution and Molarity.	2
CO1,2,4	Q.1c	Synopsis- Illustrate the formula for Assay of NH4Cl.	2
CO1,2,4	Q.1d	Synopsis- List the any three methods of Volumetric Analysis.	2
CO1,2,4	Q.1e	Synopsis- What are Primary and Secondary standard?	2
CO1,2, 4,5	Q.2	Experiment To prepare 0.1 N H2So4 Solution and standardize it using 0.1 N Sodium Carbonate as standard.	25
CO1,2,3,4,5	Q.3	Viva	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

100 % Percentage of students secured more than 60% marks, so this course Pharmaceutical Analysis I - Practical (BP108P) attained Level -3.

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AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)
Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

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AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICS

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I SEM	BP109P	3	1	2	1	1	2		2		3	2				

Dr. Mohanty

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DEPARTMENT OF PHARMACEUTICS
Course Handout
Course : PHARMACEUTICS – I PRACTICAL
Course Code : BP109P, Crédits : 02, Session :2021-22 (Odd Sem.), Class : B.Pharm. 1st Year
Faculty Name: Dr. M. Prathap

A. Introduction: The course is designed to impart skill development in the arts and science of preparing the different conventional dosage forms.

B. Course Outcomes: At the end of the course, students will be able to:

BP109P.1. To recall the principles used in the preparation of solid, liquid, and semi-solid dosage forms.

BP109P.2. Operate equipment used in the manufacturing of different dosage forms

BP109P.3. Formulate various conventional dosage forms such as solid dosage forms.

BP109P.4. Design various liquid dosage forms and semi-solid dosage forms.

BP109P.5. Estimate the ingredients calculation for preparation of dosage form

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal	Mid Term 1	CT	10%
	Mid Term 2		

Evaluation	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

E. Syllabus

1 . Syrups a) Syrup IP'66**,** b) Compound syrup of Ferrous Phosphate BPC'68
2. Elixirs a) Piperazine citrate elixir, b) Paracetamol pediatric elixir
3.Linctus a) Terpin Hydrate Linctus IP'66
4. Solutions a) Iodine Throat Paint (Mandles Paint)**,** b) Strong solution of ammonium acetate**,**
c) Cresol with soap solution**,** d) Lugol's solution
5. Suspensions a) Calamine lotion**,** b) Magnesium Hydroxide mixture**,** c) Aluminimum Hydroxide gel
6. Emulsions a) Turpentine Liniment, b) Liquid paraffin emulsion
7. Powders and Granules a) ORS powder (WHO)**,** b) Effervescent granules**,** c)Dusting powder**,** d)Divded powders
8. Suppositories a) Glycero gelatin suppository**,** b) Coca butter suppository**,** c) Zinc Oxide suppository
8. Semisolids a) Sulphur ointment**,** b) Non staining-iodine ointment with methyl salicylate**,** c) Carbopal gel
9. Gargles and Mouthwashes a) Iodine gargle**,** b) Chlorhexidine mouthwash

F. Examination Scheme:

Components	**A**	**CT**	**LR**	**V**	**EE**
Weightage (%)	2	10	1	2	35

CT: Class Test, LR: Lab Record, V: Viva, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

- H.C. Ansel et al., Pharmaceutical Dosage Form and Drug Delivery System, Lippincott Williams and Walkins, New Delhi.
- Carter S.J., Cooper and Gunn's-Dispensing for Pharmaceutical Students, CBS publishers, New Delhi.
- M.E. Aulton, Pharmaceutics, The Science& Dosage Form Design, Churchill Livingstone, Edinburgh.

- Indian pharmacopoeia.
- British pharmacopoeia.

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	To prepare and submit simple syrup IP.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
2	To prepare and submit simple syrup BP.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
3	To prepare and submit Paracetamol pediatric elixir	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
4	To prepare and submit Iodine Throat Paint.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
5	To prepare and submit Lugol's solution.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
6	To prepare and submit Calamine lotion	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
7	To prepare and submit turpentine liniment	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
8	To prepare and submit liquid paraffin emulsion	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
9	To prepare and submit zinc oxide dusting powder	Practical	CO1, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
10	To prepare and submit ORS powder	Practical	CO1, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
11	To prepare and submit effervescent powder	Practical	CO1, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
12	To prepare and submit Glycero gelatin suppository.	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
13	To prepare and submit Non staining-iodine ointment with methyl salicylate,	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
14	To prepare and submit Carbopol gel	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
15	To prepare and submit iodine gargle	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	
BP109P.1	To recall the principles used in the preparation of solid, liquid, and semi-solid dosage forms.	3		2	1	2	1	-	2	1	2	1	
BP109P.2.	Operate equipment used in the manufacturing of different dosage forms	2	-	-	1	-	1	-	-	-	-	3	
BP109P.3.	Formulate various conventional dosage forms such as solid dosage forms.	3	2	2	1	-	2	-	2	-	-	3	
BP109P.4.	Design various liquid dosage forms and semi-solid dosage forms.	2	2	2	1	-	2	-	2	-	-	3	
BP109P.5.	Estimate the ingredients calculation for preparation of dosage form.	1	2	3	-	-	2	-	2	-	-	3	

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutics I MID-SEMESTER (SEM –Ist) 2021-22
Class: B.Pharm, I Semester

Dr. Mohanty

Subject Name: BP109P Pharmaceutics-I Practical		Time: 4 Hrs			Max. Marks: 40	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,4	Q.2,3	Q.4	Q.2,5,6		

Student will be able to

CO.1. To recall the principles used in the preparation of solid, liquid, and semi-solid dosage forms.

CO.2. Operate equipment used in the manufacturing of different dosage forms

CO.3. Formulate various conventional dosage forms such as solid dosage forms.

CO.4. Design various liquid dosage forms and semi-solid dosage forms.

CO.5. Estimate the ingredients calculation for preparation of dosage form

CO Map	Question No.	Question	Marks
CO1,2,4	Q.1a	Synopsis- Compare lotion and liniments.	2
CO1,2,4	Q.1b	Synopsis- Define suspension.	2
CO1,2,4	Q.1c	Synopsis- Illustrate the formula for liquid paraffin emulsion.	2
CO1,2,4	Q.1d	Synopsis- List the ingredients required for the preparation of gargles.	2
CO1,2,4	Q.1e	Synopsis- What is the concentration of sugar in simple syrup IP?	2
CO1,2, 4,5	Q.2	Experiment To formulate and submit dusting powder.	25
CO1,2,3,4,5	Q.3	Viva	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

97.8 % Percentage of students secured more than 60% marks, so this course Pharmaceutics I - Practical (BP109P) attained Level -3.

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Bachelor of Pharmacy (B. Pharm.)

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PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

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PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

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AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-2022

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2].Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMMEARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
ISEM	BP110P	3	2	3	1	1	2		3		1	2				
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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DEPARTMENT OF PHARMACEUTICAL CHEMISTRY
Course Handout
Course : PHARMACEUTICAL INORGANIC CHEMISTRY (Practical)
Course Code : BP110P, Crédits : 02, Session : 2021-22 (Odd Sem.), Class : B.Pharm. 1st Year
Faculty Name: Dr. Srabanti Jana

A. Introduction: This subject deals with the monographs of inorganic drugs and pharmaceuticals.

B. Course Outcomes: At the end of the course, students will be able to:

BP110P.1. To recognize various sources of impurities and carry out limit test of ions in inorganic compounds.

BP110P.2. Describe the effects of impurities in pharmacopoeial substances.

BP110P.3. Perform the identification test of various inorganic compounds as per Indian pharmacopeia.

BP110P.4. Carry out the test for purity of inorganic compounds.

BP110P.5. Prepare various inorganic pharmaceuticals preparation.

C. Programme Outcomes:

[PO.1].Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2].Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

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D. Assessment Plan:

Component of Evaluation	Description	Code	Weightage %
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance isrequiredtobemaintainedbyastudentto be qualified for taking up the EndSemester examination. The allowanceof 20%includesalltypesofleaves includingmedicalleaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

E. Syllabus;

I **Limit tests for following ions:** Limit test for Chlorides and Sulphates; Modified limit test for Chlorides and Sulphates; Limit test for Iron ;Limit test for Heavy metals; Limit test for Lead ;Limit test for Arsenic.

IIIdentification test: Magnesium hydroxide; ferrous sulphate; Sodium bicarbonate; Calcium gluconate; Copper sulphate.

III Test for purity: Swelling power of Bentonite; Neutralizing capacity of aluminum hydroxide gel; Determination of potassium iodate and iodine in potassium Iodide.

IV Preparation of inorganic pharmaceuticals: Boric acid Potash alum ferrous sulphate

F. Examination Scheme:

Components	A	CT	LR	V	EE
Weightage (%)	2	10	1	2	35

CT: Class Test, LR: Lab Record, V: Viva,EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, Stahlone Press of University of London, 4 th edition.
2. A.I. Vogel, Text Book of Quantitative Inorganic analysis
3. P. Gundu Rao, Inorganic Pharmaceutical Chemistry, 3 rd Edition
4. M.L Schroff, Inorganic Pharmaceutical Chemistry

5. Bentley and Driver's Textbook of Pharmaceutical Chemistry
6. Anand & Chatwal, Inorganic Pharmaceutical Chemistry
7. Indian Pharmacopoeia

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	To perform limit test for chloride in given sample.	Practical	CO1, 2, 4	Mid Term-1, Quiz & End Sem Exam
2	To perform limit test for sulphate in given sample.	Practical	CO1, 2, 4	Mid Term-1, Quiz & End Sem Exam
3	To perform limit test for iron in given sample.	Practical	CO1, 2, 4	Mid Term-1, Quiz & End Sem Exam
4	To perform identification test for boric acid.	Practical	CO1,3, 4,	Mid Term-1, Quiz & End Sem Exam
5	To perform the identification test of ammonium chloride.	Practical	CO1, 3, 4,	Mid Term-1, Quiz & End Sem Exam
6	To identify cation & anion in given pharmaceutical compounds.	Practical	CO1,3, 4,	Mid Term-1, Quiz & End Sem Exam
7	To prepare and submit aluminum hydroxide.	Practical	CO1, 4,5,	Mid Term-2, Quiz & End Sem Exam
8	To prepare and submit Boric acid (H3BO3)	Practical	CO1, 4,5,	Mid Term-2, Quiz & End Sem Exam
9	To prepare and submit Potash alum (K2SO4. Al2(SO4)3 .24 H2O)	Practical	CO1, 4,5,	Mid Term-2, Quiz & End Sem Exam
10	To prepare and submit Zinc sulphate (ZnSO4).	Practical	CO1, 4,5,	Mid Term-2, Quiz & End Sem Exam
11	To prepare and submit magnesium carbonate (MgCO3)	Practical	CO1,4,5,	Mid Term-2, Quiz & End Sem Exam
12	To prepare and submit calcium carbonate (CaCO3).	Practical	CO1, 4,5,	Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1	PO1	

											0	1	
BP110P.1	To recognize various sources of impurities and carry out limit test of ions in inorganic compounds.	3	-	2	1	2	1	-	2	1	2	1	
BP110P.2.	Describe the effects of impurities in pharmacopoeial substances.	2	-	-	1	-	1	-	-	-	-	3	
BP110P.3.	Perform the identification test of various inorganic compounds as per Indian pharmacopeia.	3	2	2	1	-	2	-	2	-	-	3	
BP110P.4.	Carry out the test for purity of inorganic compounds.	2	2	2	1	-	2	-	2	-	-	3	
BP110P.5.	Prepare various inorganic pharmaceutic als preparation.	1	2	3	-	-	2	-	2	-	-	3	

SampleQuestionPaper

Amity Institute of Pharmacy
Department of pharmaceutical chemistry
I MID-SEMESTER(SEM–I st) 2021-22

Class: B.Pharm, I Semester

Subject Name: BP110P-Pharmaceutical inorganic chemistry -I Practical	Time: 4Hrs	Max.Marks: 40

Levels of thequestions as perBloomsTaxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
QuestionMapping	Q.1,4,5	Q.4	Q.2,3,5	Q.2,3,5		

Student willbeableto

CO.1. To recall different chemical methods to prepare inorganic pharmaceuticals.
CO.2. To Perform identification tests as per Indian Pharmacopoeia.
CO.3. Determine the impurities qualitatively be performing tests for purity
CO.4. Understand the medicinal and pharmaceutical importance of inorganic compounds
CO.5. Adjudge the level of specific impurities in the given inorganic compounds by performing different limit tests.

COMap	QuestionNo.	Question	Marks
CO1,2,4	Q.1a	Synopsis-define impurities	2
CO1,2,4	Q.1b	Synopsis- Define limit test and uses	2
CO1,2,4	Q.1c	Synopsis- writes the principle of the limit test of iron.	2
CO 3, 5	Q.1d	Synopsis- writes the uses and molecular formula of and prepn of potash alum.	2
CO 3, 5	Q.1e	Synopsis- write the molecular formula and uses of boric acid	2
CO1,2, 4,5	Q.2	Experiment To perform the limit test of chloride for given sample.	25
CO1,2,3,4,5	Q.3	Viva	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

96.6 % Percentage of students secured more than 60% marks, so this course Pharmaceutical Inorganic Chemistry - Practical (BP110P) attained Level -3.

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AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)
Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

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AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICS

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

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Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I SEM																
	BP111P	1	1	3	1	1	3	1	1	2	3	3				

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACOLOGY
Course Handout
Course : Communication Skills- Practicals
Course Code : BP111P, Crédits : 01, Session :2021-22 (Odd Sem.), Class : B.Pharm. 1st Year
Faculty Name: Dr. Bishakha Mandal

A. Introduction: The course is designed to import knowledge about basic communication.

B. Course Outcomes: At the end of the course, students will be able to:

BP111P: 1. Practice different types of skills such as presentation skills, communications skills, and listening skills.

BP111P: 2. Practice of basic communication.

BP111P: 3. Interview handling skills.

BP111P: 4. Practice of **pronunciations**.

BP111P: 5. Communicate effectively (Verbal and Non Verbal)

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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D. Assessment Plan:

Component of Evaluation	Description	Code	Weightage %
Continuous Internal Evaluation	Mid Term 1	CT	5%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	15%
Total			**25%**

E. Syllabus

Basic communication covering the following topics

Meeting People

Asking Questions

Making Friends

What did you do?

Do's and Dont's

Pronunciations covering the following topics

Pronunciation (Consonant Sounds)

Pronunciation and Nouns

Pronunciation (Vowel Sounds)

Advanced Learning

Listening Comprehension / Direct and Indirect Speech

Figures of Speech

Effective Communication

Writing Skills

Effective Writing

Interview Handling Skills

E-Mail etiquette

Presentation Skills

F. Examination Scheme:

Components	A	CT	LR	V	EE

Weightage (%)	2	5	1	2	15

CT: Class Test, LR: Lab Record, V: Viva, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. Basic communication skills for Technology, Andreja. J. Ruther Ford, 2nd Edition, Pearson Education, 2011
2. Communication skills, Sanjay Kumar, Pushpalata, 1stEdition, Oxford Press, 2011
3. Organizational Behaviour, Stephen .P. Robbins, 1stEdition, Pearson, 2013
4. Brilliant- Communication skills, Gill Hasson, 1stEdition, Pearson Life, 2011
5. The Ace of Soft Skills: Attitude, Communication and Etiquette for success, Gopala Swamy Ramesh, 5thEdition, Pearson, 2013
6. Developing your influencing skills, Deborah Dalley, Lois Burton, Margaret, Green hall, 1st Edition Universe of Learning LTD, 2010
7. Communication skills for professionals, Konar nira, 2ndEdition, New arrivals – PHI, 2011
8. Personality development and soft skills, Barun K Mitra, 1stEdition, Oxford Press, 2011
9. Soft skill for everyone, Butter Field, 1st Edition, Cengage Learning india pvt.ltd,

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Meeting People, Asking Questions, Making Friends What did you do?	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
2	Pronunciation (Consonant Sounds) Pronunciation and Nouns Pronunciation (Vowel Sounds)	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
3	Pronunciation (Consonant Sounds) Pronunciation and Nouns Pronunciation (Vowel Sounds)	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
4	Listening Comprehension / Direct and Indirect Speech	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
5	Figures of Speech	Practical	CO2	Mid Term-1, Quiz & End Sem Exam
6	Effective Communication	Practical	CO3	Mid Term-1, Quiz & End Sem Exam
7	Writing Skills Effective Writing	Practical	CO4	Mid Term-2, Quiz & End Sem Exam
8	Interview Handling Skills	Practical	CO3,5	Mid Term-2, Quiz & End Sem Exam
9	Interview Handling Skills	Practical	CO6	Mid Term-2, Quiz

				& End Sem Exam
10	Interview Handling Skills	Practical	CO4	Mid Term-2, Quiz & End Sem Exam
11	E-Mail etiquette	Practical	CO3	Mid Term-2, Quiz & End Sem Exam
12	Presentation Skills	Practical	CO1	Mid Term-2, Quiz & End Sem Exam

A. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	
BP111P: 1.	**BP111P: 1.** Practice different types of skills such as presentation skills, communications skills, and listening skills.	2	2	2	3	2	1	1	3	1	2	3	
BP111P: 2.	**BP111P: 2.** Practice of basic communication	2	1	3	2	1	1	1	3	1	3	2	
BP111P: 3.	**BP111P: 3.** Interview handling skills.	2	2	2	2	1	2	-	3	-	3	2	
BP111P: 4.	**BP111P: 4.** Practice of **pronunciations**.	2	2	2	3	1	2	1	3	1	2	2	
BP111P: 5.	**BP111P: 5.** Communicate effectively (Verbal and Non Verbal)	2	2	2	3	1	2	-	3	-	3	3	

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutics I MID-SEMESTER (SEM –Ist) 2021-22
Class: B.Pharm, I Semester

Subject Name: Communication Skills-Practical (BP111P)		Time: 2 Hrs			Max. Marks: 40	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1a,b,c,d,e	Q.3	Q.3	Q.2,5,6	Q.3	Q.2

Student will be able to

BP111P: 1. Practice different types of skills such as presentation skills, communications skills, and listening skills.

BP111P: 2. Practice of basic communication.

BP111P: 3. Interview handling skills.

BP111P: 4. Practice of **pronunciations**.

CO Map	Question No.	Question	Marks
CO1	Q.1a	Synopsis- verbal communication	2
CO1	Q.1b	Synopsis- What are the types of communication?	2
CO2	Q.1c	Synopsis- What are Do's of interview.	2
CO3	Q.1d	Synopsis- Discuss group discussion	2
CO3	Q.1e	Synopsis- What is listening skills	2
CO4	Q.2	Experiment Participate in Mock Interview.	25
CO1,2,3,4	Q.3	Viva	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

96.6 % Percentage of students secured more than 60% marks, so this course Communication Skills – Practical (BP111P) attained Level -3.

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PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

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AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOLOGY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

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Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I SEM																
	BP112RBP	1	1	3	1	1	3	1	1	2	3	3				

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACOLOGY
Course Handout
Course : Remedial Biology- PRACTICAL
Course Code : BP112RBP, Crédits : 01, Session :2021-22 (OddSem.), Class : B.Pharm. 1st Year
Faculty Name: Mrs. Monika Kaushik

A. Introduction: The course is designed to import knowledge about physiology of animals and plants.

B. Course Outcomes: At the end of the course, students will be able to:

BP112RBP: 1. Know about several type of microscopes, staining techniques.

BP112RBP: 2. Study of types and components of cell.

BP112RBP: 3. Study about the modifications of Stem, Root, Leaf, seed, fruit etc.

BP112RBP: 4. Give detailed study of frog by using computer models.

BP112RBP: 5. Microscopic study and identification of tissues pertinent to Stem, Root, Leaf, seed, fruit and flower

BP112RBP: 6. Identify types of bones

BP112RBP: 7. Determination of blood group and blood pressure of human.

C. Programme Outcomes:

[PO.1]. Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills.

Develop and implement plans and organize work to meet deadlines.

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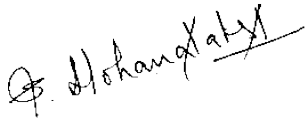

D. Assessment Plan:

Component of Evaluation	Description	Code	Weightage %
Continuous Internal Evaluation	Mid Term 1	CT	5%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	15%
Total			**25%**

E. Syllabus

1. Introduction to experiments in biology

a) Study of Microscope

b) Section cutting techniques

c) Mounting and staining

d) Permanent slide preparation

2. Study of cell and its inclusions

3. Study of Stem, Root, Leaf, seed, fruit, flower and their modifications

4. Detailed study of frog by using computer models

5. Microscopic study and identification of tissues pertinent to Stem, Root, Leaf, seed, fruit and flower

6. Identification of bones

7. Determination of blood group

8. Determination of blood pressure

9. Determination of tidal volume

F. Examination Scheme:

Components	A	CT	LR	V	EE

Weightage (%)	2	5	1	2	15

CT: Class Test, LR: Lab Record, V: Viva, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. Practical human anatomy and physiology. by S.R.Kale and R.R.Kale.

2. A Manual of pharmaceutical biology practical by S.B.Gokhale, C.K.Kokate and S.P.Shriwastava.

3. Biology practical manual according to National core curriculum .Biology forum of Karnataka. Prof. M.J.H.Shafi

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	1. Introduction to experiments in biology a) Study of Microscope	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
2	1. Introduction to experiments in biology b) Section cutting techniques	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
3	1. Introduction to experiments in biology c) Mounting and staining	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
4	1. Introduction to experiments in biology d) Permanent slide preparation	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
5	Study of cell and its inclusions	Practical	CO2	Mid Term-1, Quiz & End Sem Exam
6	Study of Stem, Root, Leaf, seed, fruit, flower and their modifications	Practical	CO3	Mid Term-1, Quiz & End Sem Exam
7	Detailed study of frog by using computer models	Practical	CO4	Mid Term-2, Quiz & End Sem Exam
8	Microscopic study and identification of tissues pertinent to Stem, Root Leaf, seed, fruit and flower	Practical	CO3,5	Mid Term-2, Quiz & End Sem Exam
9	Identification of bones	Practical	CO6	Mid Term-2, Quiz & End Sem Exam
10	Determination of blood group	Practical	CO7	Mid Term-2, Quiz & End Sem Exam
11	Determination of blood pressure	Practical	CO7	Mid Term-2, Quiz & End Sem Exam

12	Determination of tidal volume	Practical	CO7	Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	
BP112RBP: 1.	Know about several type of microscopes, staining techniques.	2	2	2	3	2	1	1	1	1	2	3	
BP112RBP: 2.	Study of types and components of cell.	2	1	3	2	1	1	1	1	1	3	2	
BP112RBP: 3.	Study about the modifications of Stem, Root, Leaf, seed, fruit etc.	2	2	2	2	1	2	-	2	-	3	2	
BP112RBP: 4.	Give detailed study of frog by using computer models.	2	2	2	3	1	2	1	2	1	2	2	
BP112RBP: 5.	Microscopic study and identification of tissues pertinent to Stem, Root, Leaf, seed, fruit and flower	2	2	2	3	1	2	-	2	-	3	3	

BP112RBP: 6.	Identify types of bones	3	1	2	2	2	1	2	1	1	2	3	
BP112RBP: 7.	Determination of blood group and blood pressure of human.	3	1	2	2	1	1	2	2	1	1	3	

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutics I MID-SEMESTER (SEM –Ist) 2021-22						
Class: B.Pharm, I Semester						
Subject Name: BP112RBP-Practical		Time: 2 Hrs			Max. Marks: 40	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1a,b,c,d,e	Q.3	Q.3	Q.2,5,6	Q.3	Q.2

Student will be able to

CO: 1. Know about several type of microscopes, staining techniques.

CO: 2. Study of types and components of cell.

CO: 3. Study about the modifications of Stem, Root, Leaf, seed, fruit etc.

CO: 4. Give detailed study of frog by using computer models.

CO Map	Question No.	Question	Marks
CO1	Q.1a	Synopsis- Define sterilization.	2
CO1	Q.1b	Synopsis- Discuss the types of microscopes?	2
CO2	Q.1c	Synopsis- Differentiate human and animal cell.	2
CO3	Q.1d	Synopsis- Discuss the modifications of root.	2
CO3	Q.1e	Synopsis- Write about modifications of leaf.	2

CO4	Q.2	Experiment Give detailed study of frog by using computer models.	25
CO1,2,3,4	Q.3	Viva	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

100 % Percentage of students secured more than 60% marks, so this course Remedial Biology Practical (BP112RBP) attained Level -3.

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AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)
Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

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AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOLOGY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
II SEM	BP201T	3	2	2	1	1	3	2	1	1	1	3				

Dr. Mohanty

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DEPARTMENT OF PHARMACOLOGY
Course Handout
Course : HUMAN ANATOMY AND PHYSIOLOGY – II THEORY
Course Code : BP201T, Crédits : 04, Session :2021-22 (Even Sem.), Class : B.Pharm. Ist Year
Faculty Name: Dr. Naveen Sharma

A. Introduction: This subject is designed to impart fundamental knowledge on the structure and functions of the various systems of the human body. It also helps in understanding both homeostatic mechanisms.

B. Course Outcomes: At the end of the course, students will be able to:

BP201T.1. Explain the gross morphology, structure and functions of various organs of the human body.

BP201T.2. Describe the various homeostatic mechanisms and their imbalances.

BP201T.3. Identify the various tissues and organs of different systems of human body.

BP201T.4. Perform the hematological tests like blood cell counts, haemoglobin estimation, bleeding/clotting time etc and also record blood pressure, heart rate, pulse and respiratory volume.

BP201T.5. Appreciate coordinated working pattern of different organs of each system

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

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[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

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[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	Description	Code	Weightage %
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

Unit I

Nervous system

Organization of nervous system, neuron, neuroglia, classification and properties of nerve fibre, electrophysiology, action potential, nerve impulse, receptors, synapse, neurotransmitters.

Central nervous system: Meninges, ventricles of brain and cerebrospinal fluid. structure and functions of brain (cerebrum, brain stem, cerebellum), spinal cord (gross structure, functions of afferent and efferent nerve tracts, reflex activity)

Unit II

Digestive system

Anatomy of GI Tract with special reference to anatomy and functions of stomach, Acid production in the stomach, regulation of acid production through parasympathetic nervous system, pepsin role in protein digestion) small intestine and large intestine, anatomy and functions of salivary glands, pancreas and liver, movements of GIT, digestion and absorption of nutrients and disorders of GIT.

Energetics

Formation and role of ATP, Creatinine Phosphate and BMR.

Unit III

Respiratory system

Anatomy of respiratory system with special reference to anatomy of lungs, mechanism of respiration, regulation of respiration Lung Volumes and capacities transport of respiratory gases, artificial respiration, and resuscitation methods.

Urinary system

Anatomy of urinary tract with special reference to anatomy of kidney and nephrons, functions of kidney and urinary tract, physiology of urine formation, micturition reflex and role of kidneys in acid base balance, role of RAS in kidney and disorders of kidney.

Unit IV

Endocrine system

Classification of hormones, mechanism of hormone action, structure and functions of pituitary gland, thyroid gland, parathyroid gland, adrenal gland, pancreas, pineal gland, thymus and their disorders.

Unit V

Reproductive system

Anatomy of male and female reproductive system, Functions of male and female reproductive system, sex hormones, physiology of menstruation, fertilization, spermatogenesis, oogenesis, pregnancy and parturition

Introduction to genetics

Chromosomes, genes and DNA, protein synthesis, genetic pattern of inheritance

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypee brothers medical publishers, New Delhi.

2. Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York

3. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co,Riverview,MI USA

4. Text book of Medical Physiology- Arthur C,Guyton andJohn.E. Hall. Miamisburg, OH, U.S.A.

5. Principles of Anatomy and Physiology by Tortora Grabowski. Palmetto, GA, U.S.A.

6. Textbook of Human Histology by Inderbir Singh, Jaypee brothers medical publishers, New Delhi.

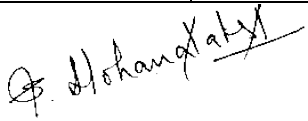
7. Textbook of Practical Physiology by C.L. Ghai, Jaypee brothers medical publishers, New Delhi.

8. Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee brother's medical publishers, New Delhi.

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Organization of nervous system	Lecture	1	Mid Term-1, Quiz & End Sem Exam
2	neuron, neuroglia, classification and properties of nerve fibre,	Lecture	1	Mid Term-1, Quiz & End Sem Exam
3	electrophysiology, action potential,	Lecture	1	Mid Term-1, Quiz & End Sem Exam
4	nerve impulse, receptors, synapse, neurotransmitters.	Tutorial	1	Mid Term-1, Quiz & End Sem Exam
5	Central nervous system: Meninges, ventricles of brain	Lecture	1	Mid Term-1, Quiz & End Sem Exam
6	cerebrospinal fluid. structure and functions of brain	Lecture	1,4	Mid Term-1, Quiz & End Sem Exam
7	structure and functions of cerebrum,	Lecture	1	Mid Term-1, Quiz & End Sem Exam
8	structure and functions of brain stem, cerebellum	Lecture	1	Mid Term-1, Quiz & End Sem Exam
9	spinal cord: gross structure,	Lecture	4	Mid Term-1, Quiz & End Sem Exam
10	functions of afferent and efferent nerve tracts, reflex activity	Lecture	4	Mid Term-1, Quiz & End Sem Exam
11	Unit-1	Tutorial		Mid Term-1, Quiz

				& End Sem Exam
12	Anatomy of GI Tract with special reference to anatomy and functions of stomach	Lecture	1	Mid Term-1, Quiz & End Sem Exam
13	Acid production in the stomach, regulation of acid production through parasympathetic nervous system,	Lecture	5	Mid Term-1, Quiz & End Sem Exam
14	pepsin role in protein digestion small intestine and large intestine,	Lecture	5	Mid Term-1, Quiz & End Sem Exam
15	anatomy and functions of salivary glands, pancreas and liver,	Lecture	5	Mid Term-1, Quiz & End Sem Exam
16	movements of GIT, digestion and absorption of nutrients and disorders of GIT.	Lecture	2,3	Mid Term-1, Quiz & End Sem Exam
17	Formation and role of ATP, Creatinine Phosphate and BMR.	Lecture	1	Mid Term-1, Quiz & End Sem Exam
18	Unit-2	Tutorial		Mid Term-1, Quiz & End Sem Exam
19	Anatomy of respiratory system with special reference to anatomy of lungs	Lecture	2,3	Mid Term-1, Quiz & End Sem Exam
20	mechanism of respiration,	Lecture		Mid Term-1, Quiz & End Sem Exam
21	regulation of respiration Lung Volumes and capacities	Lecture	1	Mid Term-1, Quiz & End Sem Exam
22	transport of respiratory gases,	Lecture	4	Mid Term-1, Quiz & End Sem Exam
23	artificial respiration, and resuscitation methods.	Lecture	4	Mid Term-1, Quiz & End Sem Exam
24	Anatomy of urinary tract with special reference to anatomy of kidney and nephrons	Lecture	1	Mid Term-1, Quiz & End Sem Exam
25	functions of kidney and urinary tract,	Lecture	4	Mid Term-1, Quiz & End Sem Exam
26	physiology of urine formation,	Lecture	1	Mid Term-1, Quiz & End Sem Exam
27	micturition reflex and role	Lecture	1	Mid Term-1, Quiz



	of kidneys in acid base balance,			& End Sem Exam
28	role of RAS in kidney and disorders of kidney.	Lecture	4	Mid Term-1, Quiz & End Sem Exam
29	Unit 3	Tutorial		Mid Term-1, Quiz & End Sem Exam
30	Classification of hormones,	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
31	mechanism of hormone action,	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
32	structure and functions of pituitary gland,	Lecture	1	Mid Term-2, Quiz & End Sem Exam
33	structure and functions of thyroid gland,	Lecture	1,4	Mid Term-2, Quiz & End Sem Exam
34	structure and functions of parathyroid gland,	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
35	Structure and functions of Adrenal gland,	Lecture	4	Mid Term-2, Quiz & End Sem Exam
36	Structure and functions of pancreas, pineal gland,	Lecture	1	Mid Term-2, Quiz & End Sem Exam
37	Structure and functions of thymus and their disorders.	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
38	Anatomy of male and female reproductive system	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
39	Functions of male and female reproductive system,	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
40	sex hormones	Lecture	1	Mid Term-2, Quiz & End Sem Exam
41	physiology of menstruation, fertilization,	Lecture	4	Mid Term-2, Quiz & End Sem Exam
42	spermatogenesis, oogenesis,	Lecture	5,45	Mid Term-2, Quiz & End Sem Exam
43	pregnancy and parturition,	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
44	Chromosomes, genes and DNA,	Lecture	4	Mid Term-2, Quiz & End Sem Exam
45	protein synthesis, genetic pattern of inheritance	Lecture	1,4	Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP201T.1	**BP201T.1**. Explain the gross morphology, structure and functions of various organs of the human body.	3	1	1	1	2	3	1	1	1	1	3				
BP201T.2	**BP201T.2**. Describe the various homeostatic mechanisms and their imbalances.	2	1	2	1	2	2	1	1	1	1	3				
BP201T.3	**BP201T.3**. Identify the various tissues and organs of different systems of human body.	2	1	1	1	2	3	1	1	1	1	3				

BP201T.4	**BP201T.4**. Perform the hematological tests like blood cell counts, haemoglobin estimation, bleeding/clotting time etc and also record blood pressure, heart rate, pulse and respiratory volume.	2	1	1	1	2	3	1	1	1	1	3				
BP201T.5	**BP201T.5**. Appreciate coordinated working pattern of different organs of each system	3	1	2	1	2	3	1	1	1	1	3				

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacology I MID-SEMESTER (SEM –IInd) 2021-22						
Class: B.Pharm, II Semester						
Subject Name: BP201T Human Anatomy and Physiology-II Theory		Time: 1 Hrs			Max. Marks: 30	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3,4,5,7	Q.6,8,9	Q.2			Q2
The student will be able to **CO.1**. Explain the gross morphology, structure and functions of various organs of the human body. **CO.2**. Describe the various homeostatic mechanisms and their imbalances. **CO.3**. Identify the various tissues and organs of different systems of human body.						

Dr. Mohanty

CO Map	Question No.	Question	Marks
CO1	Q.1	Write about the Organization of nervous system.	2
CO1	Q.2	Draw a well levelled diagram of nerve cell	2
CO1	Q.3	What do you mean by neurotransmitters?	2
CO2	Q.4	Write the functions of salivary glands	2
CO2	Q.5	What is the role of pepsin in protein digestion?	2
CO3	Q.6	Write the Anatomy of GI Tract with special reference to anatomy and functions of stomach	10
CO2	Q.7	Explain the process of Acid production in the stomach and regulation of acid production through parasympathetic nervous system	10
CO1	Q.8	Write the classification and properties of nerve fibre	5
CO2	Q.9	Discuss the Formation and role of ATP.	5
CO2	Q.10	Write the Anatomy of respiratory system with special reference to anatomy of lungs	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 2 :

71.0 % Percentage of students secured more than 60% marks, so this course Human Anatomy And Physiology Ii – Theory (BP201T) attained Level -2.

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Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

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[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Programme Specific Outcomes:

PSO 1: Will be able to design, develop and implement efficient software for a given real life problem.

PSO 2: Will be able to apply knowledge of AI, Machine Learning and Data Mining in analyzing big data forextracting useful information from it and for performing predictive analysis.

PSO 3: Will be able to design, manage and secure wired/ wireless computer networks for transfer and sharing ofinformation.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
II SEM																
	BP202T	2	-	2	-	1	2	2	1	1	-					

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Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICAL CHEMISTRY
Course Handout
Course : PHARMACEUTICAL ORGANIC CHEMISTRY – I THEORY
Course Code : BP 202T, Crédits : 04, Session : 2021-22 (Even Sem.), Class : B.Pharm. I st Year
Faculty Name: Dr. Pawan Kumar Gupta

A. **Introduction:** The course is designed to impart fundamental knowledge on the preparatory Pharmacy with arts and science of preparing the different conventional dosage forms.

B. **Course Outcomes:** At the end of the course, students will be able to:

BP202 T.1. Relate pharmacy education with pharmacy career options.

BP202 T.2. Classify the different types of *organic compounds* based on medicinal use.

BP*202* T.3. Experiment in the preparation of various types organic compounds and their derivatives.

BP202 T.4. Able to analyse and also to *write the structure, name and the type of isomerism of the organic compound*.

BP202 T.5. Able to Solve and write *the reaction, name the reaction and also orientation of reactions* in different types of *organic compounds*

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well-being.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

C. Programme Specific Outcomes:

PSO 1: Will be able to design, develop and implement efficient software for a given real life problem.

PSO 2: Will be able to apply knowledge of AI, Machine Learning and Data Mining in analyzing big data forextracting useful information from it and for performing

predictive analysis.

PSO 3: Will be able to design, manage and secure wired/ wireless computer networks for transfer and sharing ofinformation.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

Classification, nomenclature and isomerism

Classification of Organic Compounds

Common and IUPAC systems of nomenclature of organic compounds

(up to 10 Carbons open chain and carbocyclic compounds)

Structural isomerisms in organic compounds

Alkanes*, Alkenes* and Conjugated dienes*

SP^3 hybridization in alkanes, Halogenation of alkanes, uses of paraffins.

Stabilities of alkenes, SP^2 hybridization in alkenes

E_1 and E_2 reactions – kinetics, order of reactivity of alkyl halides, rearrangement of carbocations, Saytzeffs orientation and evidences. E_1 verses E_2 reactions, Factors affecting E_1 and E_2 reactions. Ozonolysis, electrophilic addition reactions of alkenes, Markownikoff's orientation, free radical addition reactions of alkenes, Anti Markownikoff's orientation.

Stability of conjugated dienes, Diel-Alder, electrophilic addition, free radical addition reactions of conjugated dienes, allylic rearrangement

Alkyl halides*

SN_1 and SN_2 reactions - kinetics, order of reactivity of alkyl halides, stereochemistry andrearrangement of carbocations.

SN_1 versus SN_2 reactions, Factors affecting SN_1 and SN_2 reactions

Structure and uses of ethylchloride, Chloroform, trichloroethylene, tetrachloroethylene,dichloromethane, tetrachloromethane and iodoform.

Alcohols*- Qualitative tests, Structure and uses of Ethyl alcohol, Methyl alcohol, chlorobutanol, Cetosteryl alcohol, Benzyl alcohol, Glycerol, Propylene glycol

Carbonyl compounds* (Aldehydes and ketones)

Nucleophilic addition, Electromeric effect, aldol condensation, Crossed Aldol condensation, Cannizzaro reaction, Crossed Cannizzaro reaction, Benzoin condensation, Perkin condensation, qualitative tests, Structure and uses of Formaldehyde, Paraldehyde, Acetone, Chloral hydrate, Hexamine, Benzaldehyde, Vanilin, Cinnamaldehyde.

Carboxylic acids*

Acidity of carboxylic acids, effect of substituents on acidity, inductive effect and qualitative tests for carboxylic acids ,amide and ester

Structure and Uses of Acetic acid, Lactic acid, Tartaric acid, Citric acid, Succinic acid. Oxalic acid, Salicylic acid, Benzoic acid, Benzyl benzoate, Dimethyl phthalate, Methyl salicylate and Acetyl salicylic acid

Aliphatic amines* -

Basicity, effect of substituent on Basicity. Qualitative test, Structure and uses of Ethanolamine, Ethylenediamine, Amphetamine

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

Organic Chemistry by Morrison and Boyd

Organic Chemistry by I.L. Finar, Volume-I

Textbook of Organic Chemistry by B.S. Bahl & Arun Bahl.

Organic Chemistry by P.L.Soni

Practical Organic Chemistry by Mann and Saunders.

Vogel's text book of Practical Organic Chemistry

Advanced Practical organic chemistry by N.K.Vishnoi.

Introduction to Organic Laboratory techniques by Pavia, Lampman and Kriz.

Reaction and reaction mechanism by Ahluwaliah/Chatwal.

Lecture Plan

Lecture	**Topics**	**Mode of Delivery**	**Corresponding CO**	**Mode of Assessing CO**
1	Classification of Organic Compounds on the basis of structure.	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
2	Classification of Organic Compounds on the basis of functional group.	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
3	IUPAC systems of nomenclature of Alkanes, Alkenes and Conjugated dienes.	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
4	IUPAC systems of nomenclature of Alkyl halides and alcohol.	Tutorial	CO1,4	Mid Term-1, Quiz & End Sem Exam
5	IUPAC systems of nomenclature of Carbonyl compound (Aldehydes and ketones).	Lecture	CO1,2	Mid Term-1, Quiz & End Sem Exam
6	IUPAC systems of nomenclature of Carboxylic acids.	Lecture	CO1,2	Mid Term-1, Quiz & End Sem Exam
7	IUPAC systems of nomenclature of aliphatic	Lecture	CO1,2	Mid Term-1,

	amines.			Quiz & End Sem Exam
8	Structural isomerism in organic compounds.	Tutorial	CO1,3	Mid Term-1, Quiz & End Sem Exam
9	Structural isomerism in organic compounds.	Lecture	CO1,2	Mid Term-1, Quiz & End Sem Exam
10	Alkanes- method of Prepration, reaction	Lecture	CO1,3	Mid Term-1, Quiz & End Sem Exam
11	Quiz	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
12	SP^3 hybridization in alkanes.	Tutorial	CO1,4	Mid Term-1, Quiz & End Sem Exam
13	Halogenation of alkanes, uses of paraffin.	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
14	Stabilities of alkenes, SP^2 hybridization in alkenes.	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
15	Alkyl halide- method of Prepration, reaction	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
16	Unit test	Tutorial		Mid Term-1, Quiz &

				End Sem Exam
17	Rearrangement of carbocations.	Lecture	CO1,5	Mid Term-1, Quiz & End Sem Exam
18	Saytzeffs orientation and evidences.	Lecture	CO1,3	Mid Term-1, Quiz & End Sem Exam
19	E_1 verses E_2 reactions, Factors affecting E_1 and E_2 reactions.	Lecture	CO1,3	Mid Term-1, Quiz & End Sem Exam
20	Ozonolysis, electrophilic addition reactions of alkenes.	Tutorial	CO1,4	Mid Term-1, Quiz & End Sem Exam
21	Markownikoff's orientation, Anti Markownikoff's orientation.	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
22	Free radical addition reactions of alkenes,	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
23	Conjugated dienes* method of Prepration and reaction.	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
24	Quiz	Tutorial		Mid Term-1, Quiz & End Sem Exam
25	Stability of conjugated dienes, Diel-Alder.	Lecture	CO1,5	Mid Term-1, Quiz & End Sem

				Exam
26	Electrophilic addition reaction of dienes.	Lecture	CO1,3	Mid Term-1, Quiz & End Sem Exam
27	Free radical addition reactions of conjugated dienes, allylic rearrangement.	Lecture	CO1,5	Mid Term-1, Quiz & End Sem Exam
28	Method of Prepration and reaction of Alkyl halides. reaction Reaction of aromatic acid	Tutoria l	CO1,5	Mid Term-1, Quiz & End Sem Exam
29	SN_1 and SN_2 reactions - kinetics, order of reactivity of alkyl halides.	Lecture	CO1,3	Mid Term-1, Quiz & End Sem Exam
30	SN_1 versus SN_2 reactions, Factors affecting SN_1 and SN_2 reactions.	Lecture	CO1,5	Mid Term-1, Quiz & End Sem Exam
31	Structure and uses of ethylchloride, Chloroform.	Lecture	CO1,2	Mid Term-2, Quiz & End Sem Exam
32	Structure and uses of trichloroethylene, tetrachloroethylene.	Tutoria l	CO1,2	Mid Term-2, Quiz & End Sem Exam
33	Structure and uses of dichloromethane, tetrachlorometha ne and iodoform.	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
34	Alcohols- method of	Lecture	CO1,5	Mid Term-2,

	Prepration, reaction.			Quiz & End Sem Exam
35	Qualitative tests of Alcohols.	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
36	Seminar	Tutorial	CO1,5	Mid Term-2, Quiz & End Sem Exam
37	Structure and uses of Ethyl alcohol, Methyl alcohol.	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
38	Carbonyl compounds (Aldehydes and ketones) method of Prepration, reaction.	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
39	Acidity of carboxylic acids, effect of substituent on acidity.	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
40	Unit test	Tutorial	CO1,5	Mid Term-2, Quiz & End Sem Exam
41	Inductive effect and qualitative tests for carboxylic acids.	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
42	Structure and Uses of Acetic acid, Lactic acid, Tartaric acid.	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
43	Qualitative tests for amide and ester	Lecture	CO1,3	Mid Term-2, Quiz &

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	.			End Sem Exam
44	Seminar	Tutorial	CO1,3	Mid Term-2, Quiz & End Sem Exam
45	Structure and uses of chlorobutanol, Cetosteryl alcohol, Benzyl alcohol.	Lecture	CO1,4	Mid Term-2, Quiz & End Sem Exam
46	Structure and uses of Glycerol, Propylene glycol. .	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
47	Structure and Uses of Acetic acid, Lactic acid, Tartaric acid. .	Lecture	CO1,5	Quiz & End Sem Exam
48	Quiz	Tutorial		Quiz & End Sem Exam
49	Structure and Uses of Citric acid, Succinic acid. Oxalic acid, Salicylic acid	Lecture	CO1,5	Quiz & End Sem Exam
50	Structure and Uses of Benzoic acid, Benzyl benzoate, Dimethyl phthalate.	Lecture	CO1,4	Quiz & End Sem Exam
51	Structure and Uses of Methyl salicylate and Acetyl salicylic acid. .	Lecture	CO1,4	Quiz & End Sem Exam
52	Aliphatic amines method of Prepration and reaction.	Tutorial	CO1,4	Quiz & End Sem Exam
53	Aliphatic amines	Lecture	CO1,4	Quiz &

	method of Prepration and reaction.			End Sem Exam
54	Basicity, effect of substituent on Basicity.	Lecture	CO1,2	Quiz & End Sem Exam
55	Basicity, effect of substituent on Basicity.	Lecture	CO1,3	Quiz & End Sem Exam
56	Unit test	Tutorial		Quiz & End Sem Exam
57	Aliphatic amines. Qualitative test of amine.	Lecture	CO1,2	Quiz & End Sem Exam
58	Aliphatic amines. Qualitative test of amine.	Lecture	CO1,2	Quiz & End Sem Exam
59	Structure and uses of Ethanolamine, Ethylenediamine, Amphetamine.	Lecture	CO1,2	Quiz & End Sem Exam
60	Structure and uses of Ethanolamine, Ethylenediamine, Amphetamine.	Tutorial	CO1,2	Quiz & End Sem Exam

H. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP202T.1	Relate pharmacy education with pharmacy career options.	2	-	-	-	2	2	1	-	1	-	-				
BP202T.2.	Classify the different types of *organic compounds* based on medicinal use.	3	-	-	1	-	2	-	-	-	-	3				
BP202T.3.	Experiment in the preparation of various types organic compounds and their derivatives.	3	2	-	3	-	2	-	-	-	-	3				
BP202T.4.	Able to analyse and also to *write the structure, name and the type of isomerism of the organic compound*.	2	2	3	3	-	1	-	-	-	-	3				
BP202T.5.	Able to Solve and write *the reaction, name the reaction and also orientation of reactions* in different types of *organic compounds* .	1	-	3	-	-	-	-	-	-	-	3				

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutical Chemistry I MID-SEMESTER (SEM –II nd) 2021-22						
Class: B.Pharm, IInd Semester						
Subject Name: BP202T Pharmaceutical Organic Chemistry-I Theory		Time: 1 Hrs		Max. Marks: 30		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,4,5	Q.2,3,6,8,9	Q.4,7	Q.2,5,		

Student will be able to
CO1: List the broad perceptive of cloud architecture and model.
CO2: Apply different cloud programming models as per need.

CO Map	Question No.	Question	Marks
CO1	Q.1	Define organic compounds.	2
CO1	Q.2	Explain significance of ethyl Alcohol	2
CO2	Q.3	Classify structural Isomerism	2
CO2	Q.4	By showing structure of chloroform. And summarize any three medicinal uses of chloroform	2
CO2	Q.5	What do you understand by Substitution reaction give example?	2
	Q.6	Explain IUPAn Nomenclature in carbonyl compounds.	10
CO1	Q.7	What relationship between Structural and Geometric Isomerism Give their Classification.	10
CO1	Q.8	Outline Markownikoff's rule with suitable example.	5
CO2	Q.9	Explain sp3 Hybridization.	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment below Level 1 :

59% Percentage of students secured more than 60% marks, so this course Pharmaceutical Organic Chemistry I – Theory (BP202T) attainment below Level -1.

AMITY UNIVERSITY
MADHYA PRADESH
Established vide Government of Madhya Pradesh Act No. 27 of 2010

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)
Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-2022

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

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[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

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[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

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Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMMEARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
IIS EM																
	BP-203 T	3	-	1	-	1	2	2	1	1	-	2				

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AMITY UNIVERSITY

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Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICAL CHEMISTRY
Course Handout
Course : BIOCHEMISTRY (Theory)
Course Code : BP203T, Crédits : 04, Session :2021-22 (Even Sem.), Class : B.Pharm. 1st Year
FacultyName: Dr. S Vijayaraj

A. Introduction: Biochemistry deals with complete understanding of the molecular levels of the chemical process associated with living cells. The scope of the subject is providing biochemical facts and the principles to understand metabolism of nutrient molecules in physiological and pathological conditions. It is also emphasizing on genetic organization of mammalian genome and hetero & autocatalytic functions of DNA

B. Course Outcomes: At the end of the course, students will be able to:

BP203T.1. Describe the concept of biomolecules and bioenergetics.

BP203T.2. Explain the metabolic pathways of biomolecules in both physiological and pathological conditions.

BP203T.3. Understand the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes.

BP203T.4.Understand the genetic organization of mammalian genome and functions of

DNA in the synthesis of RNAs and proteins.

BP203T.5. Describe the clinical pathology of blood and urine.

C. Programme Outcomes:

[PO.1].Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2].Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

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identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance isrequiredtobemaintainedbyastudentto be qualified for taking up the EndSemester examination. The allowanceof 20%includesalltypesofleaves includingmedicalleaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

UNIT – I

Biomolecules Introduction, classification, chemical nature and biological role of carbohydrate, lipids, nucleic acids, amino acids and proteins.

Bioenergetics Concept of free energy, endergonic and exergonic reaction, Relationship between free energy, enthalpy and entropy; Redox potential. Energy rich compounds; classification; biological significances of ATPand cyclic AMP

UNIT – II

Carbohydrate metabolism: Glycolysis – Pathway, energetics and significance Citric acid cycle- Pathway, energetics and significance HMP shunt and its significance; Glucose-6-Phosphate dehydrogenase (G6PD) deficiency Glycogen metabolism Pathways and glycogen storage diseases (GSD) Gluconeogenesis- Pathway and its significance Hormonal regulation of blood glucose level and Diabetes mellitus.

Biological oxidation:

Electron transport chain (ETC) and its mechanism.Oxidative phosphorylation & its mechanism and substrate

Phosphorylation Inhibitors ETC and oxidative phosphorylation/Uncouplers level.

UNIT – III

Lipid metabolism:

B-Oxidation of saturated fatty acid (Palmitic acid). Formation and utilization of ketone bodies; ketoacidosis, De novo synthesis of fatty acids (Palmitic acid),Biological significance of cholesterol and conversion of cholesterol into bile acids, steroid hormone and vitamin D, Disorders of lipid metabolism: Hypercholesterolemia, atherosclerosis, fatty liver and obesity.

Amino acid metabolism

General reactions of amino acid metabolism: Transamination, deamination & decarboxylation, urea cycle and its disorders Catabolism of phenylalanine and tyrosine and their metabolic disorders (Phenyketonuria, Albinism, alkeptonuria, tyrosinemia) Synthesis and significance of biological substances; 5-HT, melatonin, dopamine, noradrenaline, adrenaline Catabolism of heme; hyperbilirubinemia and jaundice.

UNIT – IV

Nucleic acid metabolism and genetic information transfer

Biosynthesis of purine and pyrimidine nucleotides Catabolism of purine nucleotides and Hyperuricemia and Gout disease Organization of mammalian genome Structure of DNA and RNA and their functions DNA replication (semi conservative model) Transcription or RNA synthesis Genetic code, Translation or Protein synthesis and inhibitors

UNIV – V

Enzymes:

Introduction, properties, nomenclature and IUB classification of enzymes Enzyme kinetics (Michaelis plot, Line Weaver Burke plot) Enzyme inhibitors with examples Regulation of enzymes: enzyme induction and repression, allosteric enzymes regulation Therapeutic and diagnostic applications of enzymes and isoenzymes Coenzymes – Structure and biochemical functions

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	75

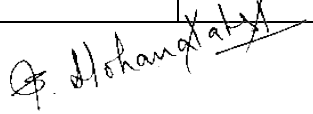
CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

- Principles of Biochemistry by Lehninger.
- Harper's Biochemistry by Robert K. Murry, Daryl K. Granner and Victor W. Rodwell.
- Biochemistry by Stryer.
- Biochemistry by D. Satyanarayan and U.Chakrapani
- Textbook of Biochemistry by Rama Rao.
- Textbook of Biochemistry by Deb.
- Outlines of Biochemistry by Conn and Stump

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Introduction, classification, chemical nature of biomolecules	Lecture	1	Mid Term-1, Quiz & End Sem Exam
2	biological role of carbohydrate and lipids	Lecture	1	Mid Term-1, Quiz & End Sem Exam
3	Biological role of nucleic acids, amino acids and proteins.	Lecture		Mid Term-1, Quiz & End Sem Exam
4	Revision of biomolecules	Tutorial	1	Mid Term-1, Quiz & End Sem Exam
5	Concept of free energy, endergonic and exergonic reaction,	Lecture	1	Mid Term-1, Quiz & End Sem Exam
6	Relationship between free energy, enthalpy and entropy; Redox potential.	Lecture	1	Mid Term-1, Quiz & End Sem Exam
7	Classification and biological significances of ATP and cyclic AMP	Lecture	1	Mid Term-1, Quiz & End Sem Exam
8	Quiz	Tutorial		Mid Term-1, Quiz & End Sem Exam
9	Introduction of carbohydrate metabolism, Glycolysis – Pathway, energetics and significance	Lecture	1,2	Mid Term-1, Quiz & End Sem Exam
10	Pathway, energetics and significance ofCitric acid cycle	Lecture	2	Mid Term-1, Quiz & End Sem Exam
11	HMP shunt and its significance; Glucose-6-Phosphate dehydrogenase (G6PD) deficiency	Lecture	2	Mid Term-1, Quiz & End Sem Exam
12	Revision of carbohydrate metabolic pathways.	Tutorial		Mid Term-1, Quiz & End Sem Exam
13	Glycogen metabolism Pathways and glycogen storage diseases (GSD)	Lecture	2	Mid Term-1, Quiz & End Sem Exam
14	Gluconeogenesis- Pathway and its significance	Lecture	2	Mid Term-1, Quiz & End Sem Exam
15	Hormonal regulation of blood glucose level and Diabetes mellitus	Lecture	2	Mid Term-1, Quiz & End Sem Exam



16	Complete discussion of carbohydrate metabolism.	Tutorial		Mid Term-1, Quiz & End Sem Exam
17	Electron transport chain (ETC) and its mechanism	Lecture	1	Mid Term-1, Quiz & End Sem Exam
18	Oxidative phosphorylation & its mechanism and substrate Phosphorylation.	Lecture	1	Mid Term-1, Quiz & End Sem Exam
19	Inhibitors ETC and oxidative phosphorylation/Uncouplers	Lecture	1	Mid Term-1, Quiz & End Sem Exam
20	Group discussion on biological oxidation.	Tutorial		Mid Term-1, Quiz & End Sem Exam
21	β-Oxidation of saturated fatty acid (Palmitic acid)	Lecture	2	Mid Term-1, Quiz & End Sem Exam
22	ketoacidosis : Formation and utilization of ketone bodies;	Lecture	2	Mid Term-1, Quiz & End Sem Exam
23	De novo synthesis of fatty acids (Palmitic acid	Lecture	2	Mid Term-1, Quiz & End Sem Exam
24	Revision of lipid metabolism	Tutorial		Mid Term-1, Quiz & End Sem Exam
25	conversion of cholesterol into bile acids, steroid hormone and vitamin D	Lecture	2	Mid Term-1, Quiz & End Sem Exam
26	Metabolic disorder of lipids.	Lecture	2,5	Mid Term-1, Quiz & End Sem Exam
27	Hypercholesterolemia, atherosclerosis, fatty liver and obesity	Lecture	2,5	Mid Term-1, Quiz & End Sem Exam
28	Quiz	Tutorial		Mid Term-1, Quiz & End Sem Exam
29	General reactions of amino acid metabolism: Transamination, deamination & decarboxylation	Lecture	2	Mid Term-1, Quiz & End Sem Exam
30	urea cycle and its disorders	Lecture	2,5	Mid Term-1, Quiz & End Sem Exam
31	Catabolism of phenylalanine and tyrosine and their metabolic disorders (Phenyketonuria, Albinism, alkeptonuria, tyrosinemia)	Lecture	2,5	Mid Term-2, Quiz & End Sem Exam
32	Group discussion on amino acid metabolism	Tutorial		Mid Term-2, Quiz & End Sem Exam
33	Synthesis and significance of biological substances; 5-	Lecture	2	Mid Term-2, Quiz & End Sem Exam

	HT, melatonin,			
34	dopamine, noradrenaline, adrenaline	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
35	Catabolism of heme; hyperbilirubinemia and jaundice methods to overcome	Lecture	4	Mid Term-2, Quiz & End Sem Exam
36	Seminar	Tutorial		Mid Term-2, Quiz & End Sem Exam
37	Introduction of Nucleic acid metabolism and genetic information transfer	Lecture	4	Mid Term-2, Quiz & End Sem Exam
38	Biosynthesis of purine nucleotides	Lecture	4	Mid Term-2, Quiz & End Sem Exam
39	Biosynthesis of pyrimidine nucleotides	Lecture	4	Mid Term-2, Quiz & End Sem Exam
40	Catabolism of purine nucleotides and Hyperuricemia and Gout disease	Lecture	4	Mid Term-2, Quiz & End Sem Exam
41	Unit test	Tutorial		Mid Term-2, Quiz & End Sem Exam
42	Organization of mammalian genome Structure of DNA and RNA and their functions.	Lecture	4	Mid Term-2, Quiz & End Sem Exam
43	DNA replication (semi conservative model)	Lecture	4	Mid Term-2, Quiz & End Sem Exam
44	Transcription or RNA synthesis	Lecture	4	Mid Term-2, Quiz & End Sem Exam
45	Seminar	Tutorial		Mid Term-2, Quiz & End Sem Exam
46	Genetic code	Lecture	4	Mid Term-2, Quiz & End Sem Exam
47	Translation or Protein synthesis and inhibitors	Lecture	4	Mid Term-2, Quiz & End Sem Exam
48	Introduction and properties of enzymes	Lecture	3	Mid Term-2, Quiz & End Sem Exam
49	nomenclature and IUB classification of enzymes	Lecture	3	Mid Term-2, Quiz & End Sem Exam
50	Enzyme kinetics (Michaelis plot, Line Weaver Burke plot	Lecture	3	Quiz & End Sem Exam
51	Revision of enzyme kinetics	Tutorial		Quiz & End Sem Exam
52	Enzyme inhibitors with	Lecture	3	Quiz & End Sem

	examples			Exam
53	Enzyme induction and repression	Lecture	3	Quiz & End Sem Exam
54	Regulation of enzymes	Lecture	3	Quiz & End Sem Exam
55	Group discussion on enzyme inhibitors	Tutorial		Quiz & End Sem Exam
56	Therapeutic applications of enzyme	Lecture	3	Quiz & End Sem Exam
57	Diagnostic applications of enzyme	Lecture	3	Quiz & End Sem Exam
58	isoenzymes	Lecture	3	Quiz & End Sem Exam
59	Structure and biochemical functions of coenzymes	Lecture	3	Quiz & End Sem Exam
60	Unit test	Tutorial		Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP203T.1	**BP203T.1**. Describe the concept of biomolecules and bioenergetics.	3	-	-	-	2	2	1	-	1	-	3				
BP203T.2.	**BP203T.2**. Explain the metabolic pathways of biomolecules in both physiological and pathological conditions.	3	-	-	1	-	2	-	-	-	-	3				
BP203T.3.	**BP203T.3**. . Understand the catalytic role of enzymes,	3	2	-	3	-	2	-	-	-	-	3				

	importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes.															
BP203T.4.	**BP203T.4**. Understand the genetic organization of mammalian genome and functions of DNA in the synthesis of RNAs and proteins.	2	2	3	3	-	1	-	-	-	-	3				
BP203T.5.	**BP203T.5**. Describe the clinical pathology of blood and urine.	1	-	3	-	-	-	-	-	-	-	3				

SampleQuestionPaper

Amity Institute of Pharmacy DepartmentofPharmaceutics IMID-SEMESTER(SEM–IInd)2021-22						
Class:B.Pharm, IInd Semester						
SubjectName: BP203T BIOCHEMISTRY (Theory)-I		Time:1Hrs			Max.Marks:30	
Levels of thequestions as perBloomsTaxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
QuestionMapping	Q.1,4,5	Q.2,3	Q.7,9,10	Q.6, 8		

The student willbeableto

CO1. Describe the concept of biomolecules and bioenergetics.

CO2. Explain the metabolic pathways of biomolecules in both physiological and pathological conditions.

CO3. Understand the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes.

CO4. Understand the genetic organization of mammalian genome and functions ofDNA in the synthesis of RNAs and proteins.

CO5. Describe the clinical pathology of blood and urine.

COMap	QuestionNo.	Question	Marks
CO1	Q.1	Write a note on inhibitors and uncouplers of oxidative phosphorylation.	2
CO2	Q.2	Define glycogenesis and glycogenolysis.	2
CO2	Q.3	Write a short note on urea cycle.	2
CO2	Q.4	Write about atherosclerosis.	2
CO2	Q.5	Write in short about glycolysis pathway.	2
CO2	Q.6	Write in detail about the beta oxidation of fatty acid.	10
CO4	Q.7	Describe the factors in details which affect the functions of enzymes.	10
CO3	Q.8	Give the structure and functions of DNA and RNA.	5
CO3	Q.9	What are enzymes? How they classified on the basis of type of reaction catalysed.	5
CO4	Q.10	Write a detail note on components of nucleosides and nucleotides.	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment below Level 1 :

53% Percentage of students secured more than 60% marks, so this course Biochemistry – Theory (BP203T) attainment below Level -1.

AMITY UNIVERSITY
MADHYA PRADESH
Established vide Government of Madhya Pradesh Act No. 27 of 2010

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)
Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOLOGY

PROGRAMME OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge asscoited with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions

[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "-"

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
II SEM	BP 204T	3	3	3	3	2	2	3	1	1	3	1	-	-	-

AMITY UNIVERSITY

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DEPARTMENT OF PHARMACOLOGY
Course Handout
Course : PATHOPHYSIOLOGY (THEORY)
Course Code : BP 204T, Credits : 04, Session : 2021-22 (Even Sem.), Class : B. Pharm.1st Year
Faculty Name : Mrs. Monika Kaushik

Introduction: This subject is intended to impart the fundamental knowledge on various aspects (the study of causes of diseases and reactions of the body to such disease producing causes), emphasis the basic concepts of bioassay.:

1. The relevant aspects of pathology of various conditions with reference to its pharmacological applications.
2. Understanding of basic pathophysiological mechanisms.
3. Help to study the syllabus of pathology.
4. Give baseline knowledge required to practice medicine safely, confidently, rationally, and effectively.
5.

Course Outcomes: At the end of the course, students will be able to:

BP204T.1. Describe the etiology and pathogenesis of the selected disease states.Discuss the

BP204T.2. Name the signs and symptoms of the diseases

BP204T.3. Mention the complications of the diseases.

BP204T.4. Distinguish environmental factors, physical, psychosocial, and cognitive characteristics of various diseases and conditions.

BP204T.5 Identify implications of therapeutic interventions for diseases and conditions.

A. Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

B. Assessment Plan:

Component of Evaluation	Description	Code	Weightage %
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	A minimum of 80% attendance is required to be maintained by a student to be qualified for taking up the Odd Semester examination	A	4 %
	Quiz/ Assignment/Open book test/ Field work/Group discussion/ Seminar	Q/A/OBT/FW/GD/S	3%
	Student – Teacher interaction	STA	3%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

Q: Quiz, A: Assignment, OBT: Open book test, FW: Field work, GD: Group discussion, S: Seminar

C. Syllabus

Unit I. 10Hours

Basic principles of Cell injury and Adaptation: Introduction, definitions, Homeostasis, Components and Types of Feedback systems, Causes of cellular injury,Pathogenesis (Cell membrane damage, Mitochondrial damage, Ribosome damage, Nuclear damage),Morphology of cell injury – Adaptive changes (Atrophy, Hypertrophy, hyperplasia, Metaplasia, Dysplasia),Cell swelling, Intra cellular accumulation, Calcification, Enzyme leakage and Cell Death Acidosis &Alkalosis,Electrolyte imbalance.

Basic mechanism involved in the process of inflammation and repair: Introduction, Clinical signs of inflammation, Different types of Inflammation,Mechanism of Inflammation – Alteration in vascular permeability and blood flow, migration of WBC's,Mediators of

inflammation,Basic principles of wound healing in the skin,Pathophysiology of Atherosclerosis

Unit II. 10Hours

Cardiovascular System: Hypertension, congestive heart failure, ischemic heart disease (angina,myocardial infarction, atherosclerosis and arteriosclerosis)

Respiratory system:Asthma, Chronic obstructive airways diseases. Renal system:Acute and chronic renal failure .

Unit III. 10Hours

Haematological Diseases:

Iron deficiency, megaloblastic anemia (Vit B12 and folic acid), sickle cell anemia, thalasemia, hereditary acquired anemia, hemophilia

Endocrine system: Diabetes, thyroid diseases, disorders of sex hormones

Nervous system: Epilepsy, Parkinson's disease, stroke, psychiatric disorders: depression, schizophrenia and Alzheimer's disease.

Gastrointestinal system: Peptic Ulcer

Unit IV. 8 Hours

Inflammatory bowel diseases, jaundice, hepatitis (A,B,C,D,E,F) alcoholic liver disease.

Disease of bones and joints: Rheumatoid arthritis, osteoporosis and gout

Principles of cancer: classification, etiology and pathogenesis of cancer

Diseases of bones and joints:Rheumatoid Arthritis, Osteoporosis,Gout

Principles of Cancer: Classification, etiology and pathogenesis of Cancer

Unit V. 7 Hours

Infectious diseases:Meningitis,Typhoid, Leprosy, Tuberculosis

Urinary tract infections

Sexually transmitted diseases:AIDS, Syphilis, Gonorrhea

Examination Scheme:

Components	CT	A	Q/A/OBT/FW/GD/S	STI	EE
Weightage (%)	15	4	3	3	75

Q: Quiz, A: Assignment, OBT: Open book test, FW: Field work, GD: Group discussion, S: Seminar, STI: Student – Teacher interaction

D. Suggested Text/Reference Books:

A. 1. Vinay Kumar, Abul K. Abas, Jon C. Aster; Robbins &Cotran Pathologic Basis of Disease; South Asia edition; India; Elsevier; 2014.

B. 2. Harsh Mohan; Text book of Pathology; 6th edition; India; Jaypee Publications; 2010.

C. 3. Laurence B, Bruce C, Bjorn K. ; Goodman Gilman's The Pharmacological Basis of Therapeutics; 12th edition; New York; McGraw-Hill; 2011. 4. Best, Charles Herbert 1899-1978; Taylor, Norman Burke 1885-1972; West, John B (John Burnard); Best and

Taylor's Physiological basis of medical practice; 12th ed; united states; 5. William and Wilkins, Baltimore;1991 [1990 printing]. 6. Nicki R. Colledge, Brian R. Walker, Stuart H. Ralston;Davidson's Principles and Practice of Medicine; 21st edition; London; ELBS/Churchill Livingstone; 2010.
7. Guyton A, John .E Hall; Textbook of Medical Physiology; 12th edition; WB Saunders Company; 2010. 8. Joseph DiPiro, Robert L. Talbert, Gary Yee, Barbara Wells, L. Michael Posey; Pharmacotherapy: A Pathophysiological Approach; 9th edition; London; McGraw-Hill Medical; 2014. 9. V. Kumar, R. S. Cotran and S. L. Robbins; Basic Pathology; 6th edition; Philadelphia; WB Saunders Company; 1997. 10. Roger Walker, Clive Edwards; Clinical Pharmacy and Therapeutics; 3rd edition; London; Churchill Livingstone publication; 2003.

E. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1.	Introduction of cellular injury	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
2.	Definitions of cellular injury,	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
3.	Homeostasis,	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
4.	Tutorial 1	Tutorial 1		
5.	Components and Types of Feedback systems,	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
6.	Causes of cellular injury	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
7.	Pathogenesis (Cell membrane damage, Mitochondrial damage)	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
8.	Tutorial 2	Tutorial 2		
9.	Pathogenesis (Ribosome damage, Nuclear damage)	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam

10	Morphology of cell injury – Adaptive changes	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
11	(Atrophy, Hypertrophy, hyperplasia, Metaplasia, Dysplasia)	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
12	Tutorial 3	Tutorial 3		
13	Cell swelling, Intra cellular accumulation,	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
14	Acidosis & Alkalosis, Electrolyte imbalance	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
15	Introduction, Clinical signs of inflammation,	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
16	Tutorial 4	Tutorial 4		
17	Different types of Inflammation, Mechanism of Inflammation – Alteration in vascular permeability and blood flow	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
18	migration of WBC's, Mediators of inflammation,Basic principles of wound healing in the skin,	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
19	Pathophysiology of Atherosclerosis	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
20	Hypertension, congestive heart failure,	Lecture	BP 204T.1	Mid Term-1, Quiz & End Sem Exam
21	Tutorial 5	Tutorial 5		
22	ischemic heart disease (angina, myocardial infarction)	Lecture	BP204T.2	Mid Term-1, Quiz & End Sem Exam

23	atherosclerosis and arteriosclerosis	Lecture	BP204T.2	Mid Term-1, Quiz & End Sem Exam
24	Tutorial 6	Tutorial 6		
25	Asthma	Lecture	BP204T.2	Mid Term-1, Quiz & End Sem Exam
26	Chronic obstructive airways diseases.	Lecture	BP204T.2	Mid Term-1, Quiz & End Sem Exam
27	Acute and chronic renal failure	Tutorial	BP204T.2	Mid Term-1, Quiz & End Sem Exam
28	Tutorial 7	Tutorial 7		
29	Iron deficiency, megaloblastic anemia (Vit B12 and folic acid),	Lecture	BP204T.3	Mid Term-2, Quiz & End Sem Exam
30	sickle cell anemia, thalasemia	Lecture	BP204T.3	Mid Term-2, Quiz & End Sem Exam
31	hereditary acquired anemia, hemophilia	Lecture	BP204T.3	Mid Term-2, Quiz & End Sem Exam
32	Tutorial 8	Tutorial 8		
33	Diabetes, thyroid diseases	Tutorial	BP204T.3	Mid Term-2, Quiz & End Sem Exam
34	disorders of sex hormones	Lecture	BP204T.3	Mid Term-2, Quiz & End Sem Exam
35	Epilepsy	Lecture	BP204T.3	Mid Term-2, Quiz & End Sem Exam
36	Tutorial 9	Tutorial 9		
37	stroke	Lecture	BP204T.3	Mid Term-2, Quiz & End Sem

				Exam
38	Schizophrenia	Tutorial	BP204T.3	Mid Term-2, Quiz & End Sem Exam
39	Alzheimer‘s disease	Lecture	BP204T.3	Mid Term-2, Quiz & End Sem Exam
40	Tutorial 10	Tutorial 10		
41	Peptic Ulcer	Lecture	BP204T.3	Mid Term-2, Quiz & End Sem Exam
42	Inflammatory bowel diseases.	Lecture	BP204T.4	Mid Term-2, Quiz & End Sem Exam
43	jaundice	Tutorial	BP204T.4	Mid Term-2, Quiz & End Sem Exam
44	Tutorial 11	Tutorial 11		
45	hepatitis (A,B,C,D,E,F)	Lecture	BP204T.4	Mid Term-2, Quiz & End Sem Exam
46	alcoholic liver disease	Lecture	BP204T.4	Mid Term-2, Quiz & End Sem Exam
47	Rheumatoid arthritis,	Lecture	BP204T.4	Mid Term-2, Quiz & End Sem Exam
48	Tutorial 12	Tutorial 12		
49	osteoporosis	Tutorial	BP204T.4	Mid Term-2, Quiz & End Sem Exam
50	gout	Lecture	BP204T.4	Quiz & End Sem Exam
51	psychiatric disorders: depression	Lecture	BP204T.4	Quiz & End Sem Exam
52	Tutorial 13	Tutorial 13		
53	Classification, etiology and	Lecture	BP204T.5	Quiz & End Sem Exam

	pathogenesis of cancer			
54	Parkinson's disease	Tutorial	BP204T.5	Quiz & End Sem Exam
55	Meningitis	Lecture	BP204T.5	Quiz & End Sem Exam
56	Tutorial 14	Tutorial 14		
57	Typhoid,	Lecture	BP204T.5	Quiz & End Sem Exam
58	Leprosy,	Lecture	BP602T.5	Mid Term-2, Quiz & End Sem Exam
59	Tuberculosis	Lecture	BP204T.5	Quiz & End Sem Exam
60	Tutorial 15	Tutorial 15		
61	Urinary tract infections	Lecture	BP204T.5	Quiz & End Sem Exam
62	AIDS, Syphilis, Gonorrhea	Lecture	BP204T.5	Quiz & End Sem Exam

F. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP204T.1	Discuss the diffrenet type of components and feedback systems present in the body.	2	2	3	2	-	1	2	1	-	-	1
BP204T.2	What are the adaptaive changes ocuurs in morphology during cell injury.	2	2	2	3	-	1	1	1	-	-	1
BP204T.3	Write a descriptive note on disease know as porous bone or silent disease.	2	1	1	-	-	1	3	2	-	-	-
BP204T.4	What are the causes, symptoms and treatment of epilepsy.	2	2	2	1	-	1	-	-	-	-	-
BP204T.5	*Write a descriptive note on Tuberculosis.*	2	1	-	-	-	2	1	1	-	-	1

Sample Question Paper

Amity School of Pharmacy Department of Pharmacology I MID-SEMESTER(SEM–II)2021-22						
Class: B.Pharm. II Semester						
Subject Name: BP204T Pathophysiology		Time:1 Hrs		Max.Marks:30		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,4	Q.2,3	Q.4	Q.2,5,6		

CO Map	Question No.	Question	Marks
CO1	Q.1	Write about the disease caused by deficiency of Vit B12.	2
CO1	Q.2	Discuss the symptoms of Alzheimer's disease.	2
	Q.3	Write a note on Stroke.	2
	Q.4	Write a note on Rheumatoid Arthritis.	2
	Q.5	What is cancer?	2
CO1	Q.6	Write a about etiology, clinical presentation, diagnosis, and treatment of Peptic Ulcer.	10
CO2	Q.7	Discuss the symptoms and management of Schizophrenia.	10
CO2	Q.8	Write the descriptive note on CHF.	5
	Q.9	Write an explanatory note on hepatitis A, B and C?	5
CO2	Q.10	Explain the pathophysiology and treatment strategy for alcoholic liver disease.	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

80.0 % Percentage of students secured more than 60% marks, so this course Pathophysiology – Theory (BP204T) attained Level -3.

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Established vide Government of Madhya Pradesh Act No. 27 of 2010

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)
Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

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MADHYA PRADESH
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AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICS

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I SEM																
	BP205T	3	-	2	3	1	3	2	1	1	2	2				

M. Mohanty

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Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
Course Handout
Course : COMPUTER APPLICATION IN PHARMACY THEORY
Course Code: BP205T, Credits: 03, Session:2021-22 (Even Sem.), Class: B.Pharm - 1st Year
Faculty Name: Dr. Jovita Kanoujia and Dr. Samta Goyal Jain

A. Introduction: This subject deals with the introduction database, database management system,
computer application in clinical studies and use of databases.

B. Course Outcomes: At the end of the course, students will be able to:

BP205T.1. Apply one's complement, and two's complement methods to solve various problems based on the binary system.

BP205T.2. Illustrate data flow diagrams, product cycle and discover web technologies application in pharmacy.

BP205T.3. Define the role of computer in various fields of pharmacy

BP205T.4. Explain the application of bioinformatics in various disciplines.

BP205T.5. Outline the use of LIMS, TIMS and CDS in pre-clinical development.

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

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[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	Description	Code	Weightage %
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	50%
Total			**75%**

E. Syllabus

UNIT – I

Number system: Binary number system, Decimal number system, Octal number system, Hexadecimal number systems, conversion decimal to binary, binary to decimal, octal to binary etc, binary addition, binary subtraction – One's complement, Two's complement method, binary multiplication, binary division**.**

Concept of Information Systems and Software : Information gathering, requirement and feasibility analysis, data flow diagrams, process specifications, input/output design, process life cycle, planning and managing the project

UNIT –II

Web technologies:Introduction to HTML, XML,CSS and Programming languages, introduction to web servers and Server Products**,** Introduction to databases, MYSQL, MS ACCESS, Pharmacy Drug database

UNIT – III

Application of computers in Pharmacy – Drug information storage and retrieval, Pharmacokinetics, Mathematical model in Drug design, Hospital and Clinical Pharmacy,

Electronic Prescribing and discharge (EP) systems, barcode medicine identification and automated dispensing of drugs, mobile technology and adherence monitoring Diagnostic System, Lab-diagnostic System, Patient Monitoring System, Pharma Information System.

UNIT – IV

Bioinformatics: Introduction, Objective of Bioinformatics, Bioinformatics Databases, Concept of Bioinformatics, Impact of Bioinformatics in Vaccine Discovery

UNIT-V

Computers as data analysis in Preclinical development: Chromatographic dada analysis(CDS), Laboratory Information management System (LIMS) and Text Information Management System(TIMS).

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

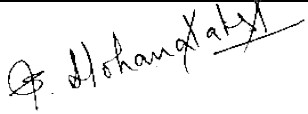
G. Suggested Text/Reference Books:

- Computer Application in Pharmacy – William E.Fassett –Lea and Febiger, 600 South Washington Square, USA, (215) 922-1330.
- Computer Application in Pharmaceutical Research and Development –Sean Ekins –Wiley-Interscience, A John Willey and Sons, INC., Publication, USA.
- Bioinformatics (Concept, Skills and Applications) – S.C.Rastogi-CBS Publishers and Distributors, 4596/1- A, 11 Darya Gani, New Delhi – 110 002(INDIA)
- Microsoft office Access - 2003, Application Development Using VBA, SQL Server, DAP and Infopath – Cary N.Prague – Wiley Dreamtech India (P) Ltd., 4435/7, Ansari Road, Daryagani, New Delhi – 110002.

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Binary number system, Decimal number system, Octal number system, Hexadecimal number systems,	Lecture	1	Mid Term-1, Quiz & End Sem Exam
2	Conversion decimal to binary, binary to decimal, octal to binary etc,	Lecture	1	Mid Term-1, Quiz & End Sem Exam

3	Conversion decimal to binary, binary to decimal, octal to binary etc,	Lecture	1	Mid Term-1, Quiz & End Sem Exam
4	Binary addition, binary subtraction – One's complement, binary	Lecture	1	Mid Term-1, Quiz & End Sem Exam
5	Two's complement method, Binary multiplication, binary division	Lecture	1	Mid Term-1, Quiz & End Sem Exam
6	Two's complement method, Binary multiplication, binary division	Lecture	1	Mid Term-1, Quiz & End Sem Exam
7	**Concept of I**nformation **Systems and Software : I**nformation gathering, requirement and feasibility analysis,	Lecture	2	Mid Term-1, Quiz & End Sem Exam
8	Data flow diagrams, process Specifications	Lecture	2	Mid Term-1, Quiz & End Sem Exam
9	Input/output design, process life cycle,	Lecture	2	Mid Term-1, Quiz & End Sem Exam
10	Planning and managing the project	Lecture	2	Mid Term-1, Quiz & End Sem Exam
11	**Web technologies**:Introduction to HTML,	Lecture	2	Mid Term-1, Quiz & End Sem Exam
12	XML, CSS	Lecture	2	Mid Term-1, Quiz & End Sem Exam
13	Programming languages,	Lecture	2	Mid Term-1, Quiz & End Sem Exam
14	Introduction to web servers and Server Products	Lecture	2	Mid Term-1, Quiz & End Sem Exam
15	Introduction to databases, MYSQL, MS ACCESS,	Lecture	2	Mid Term-1, Quiz & End Sem Exam
16	Pharmacy Drug database	Lecture	3	Mid Term-1, Quiz & End Sem Exam
17	**Application of computers in Pharmacy** – Drug information storage and retrieval,	Lecture	3	Mid Term-1, Quiz & End Sem Exam
18	Pharmacokinetics, Mathematical model in Drug design,	Lecture	3	Mid Term-1, Quiz & End Sem Exam
19	Hospital and Clinical Pharmacy,	Lecture	3	Mid Term-1, Quiz & End Sem Exam
20	Electronic Prescribing and discharge (EP) systems,	Lecture	3	Mid Term-1, Quiz & End Sem Exam



21	Barcode medicine identification	Lecture	3	Mid Term-1, Quiz & End Sem Exam
22	Automated dispensing of drugs,	Lecture	3	Mid Term-1, Quiz & End Sem Exam
23	Mobile technology and adherence monitoring	Lecture	3	Mid Term-2, Quiz & End Sem Exam
24	Diagnostic System, Lab-diagnostic System,	Lecture	3	Mid Term-2, Quiz & End Sem Exam
25	Patient Monitoring System,	Lecture	3	Mid Term-2, Quiz & End Sem Exam
26	Pharma Information System	Lecture	3	Mid Term-2, Quiz & End Sem Exam
27	**Bioinformatics:** Introduction,	Lecture	4	Mid Term-2, Quiz & End Sem Exam
28	Objective of Bioinformatics,	Lecture	4	Mid Term-2, Quiz & End Sem Exam
29	Bioinformatics Databases,	Lecture	4	Mid Term-2, Quiz & End Sem Exam
30	Bioinformatics Databases,	Lecture	4	Mid Term-2, Quiz & End Sem Exam
31	Concept of Bioinformatics,	Lecture	4	Mid Term-2, Quiz & End Sem Exam
32	Concept of Bioinformatics,	Lecture	4	Mid Term-2, Quiz & End Sem Exam
33	Impact of Bioinformatics in Vaccine Discovery	Lecture	4	Mid Term-2, Quiz & End Sem Exam
34	Impact of Bioinformatics in Vaccine Discovery	Lecture	4	Mid Term-2, Quiz & End Sem Exam
35	Impact of Bioinformatics in Vaccine Discovery	Lecture	4	Mid Term-2, Quiz & End Sem Exam
36	Chromatographic dada analysis(CDS),	Lecture	5	Mid Term-2, Quiz & End Sem Exam
37	Features of CDS	Lecture	5	Mid Term-2, Quiz & End Sem Exam
38	HPLC, GC	Lecture	5	Mid Term-2, Quiz & End Sem Exam
39	Laboratory Information management System (LIMS)	Lecture	5	Mid Term-2, Quiz & End Sem Exam
40	Laboratory Information management System (LIMS)	Lecture	5	Mid Term-2, Quiz & End Sem Exam
41	Laboratory Information management System (LIMS)	Lecture	5	Mid Term-2, Quiz & End Sem Exam
42	Text Information	Lecture	5	Mid Term-2, Quiz

	Management System(TIMS)			& End Sem Exam
43	Steps in TIMS	Lecture	5	Mid Term-2, Quiz & End Sem Exam
44	Features of TIMS	Lecture	5	Mid Term-2, Quiz & End Sem Exam
45	Uses in Pharmacy	Lecture	5	Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP205T.1	**BP205T.1**. Apply one's complement, and two's complement methods to solve various problems based on the binary system.	3	-	3	3	1	2	1	-	1	-	-				
BP205T.2.	**BP205T.2**. Illustrate data flow diagrams, product cycle and discover web technologies application in pharmacy.	2	1	3	3	-	2	1	-	-	-	3				
BP205T.3.	**BP205T.3**. Define the role of computer in various fields of pharmacy	3	2	2	3	2	2	3	3	2	1	2				
BP205T.4.	**BP205T.4**. Explain the application of bioinformatics in various disciplines.	2	1	3	3	-	2	-	2	1	1	3				
BP205T.5.	**BP205T.5**. Outline the use of LIMS, TIMS and CDS in pre-clinical development.	2	3	3	3	2	2	-	3	1	-	3				

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutics I MID-SEMESTER (SEM –IInd) 2021-22						
Class: B.Pharm, II Semester						
Subject Name: BP205T Computer Application in Pharmacy-Theory		Time: 1 Hrs		Max. Marks: 30		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q1,3,4,9,10	Q2,5,6	Q7	Q8		

The student will be able to

CO.3. Define the role of computer in various fields of pharmacy

CO.4. Explain the application of bioinformatics in various disciplines.

CO Map	Question No.	Question	Marks
CO5	Q.1	What is the two examples of LIMS?	2
CO3	Q.2	What is full form of a medication adherence monitoring system (MAMS)?	2
CO3	Q.3	What are the two parameters monitored by the patient monitoring system (PMS) in ICU?	2
CO4	Q.4	Define bioinformatics.	2
CO4	Q.5	Classify taxonomy database used in pharmacy.	2
CO3	Q.6	Explain the role of computers in clinical pharmacy.	10
CO3	Q.7	Make use of a sensor-based medication adherence monitoring system (MAMS) in patient care?	10
CO3	Q.8	Compare computer-based e-prescription over handwritten prescription.	5
CO3	Q.9	How medical adherence technology are useful in pharmacy?	5
CO4	Q.10	Write about nucleic acid databases.	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 2 :

75.0 % Percentage of students secured more than 60% marks, so this course Computer Applications In Pharmacy - Theory (BP205T) attained Level -2.

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PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

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AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOLOGY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

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Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3: Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
II SEM																
	BP206T	2	1	2	3	1	3	2	1	2	3	3				

Dr. Mohanty

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Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACOLOGY
Course Handout
Course : ENVIRONMENTAL SCIENCES-THEORY
Course Code: BP206T, Credits: 03, Session:2021-22 (Even Sem.), Class: B.Pharm - 1st Year
Faculty Name: Dr. Rwitabrata Mallick, Abhishek Kumar Bhardwaj

A. **Introduction:** This subject deals with the scientific study of the environmental system and the status of its inherent or induced changes on organisms. It includes not only the study of physical and biological characters of the environment but also the social and cultural factors and the impact of man on environment.

B. **Course Outcomes:** At the end of the course, students will be able to:

BP206T: 1. Create the awareness about environmental problems among learners.

BP206T: 2. Impart basic knowledge about the environment and its allied problems.

BP206T: 3. Develop an attitude of concern for the environment.

BP206T: 4. Motivate learner to participate in environment protection and environment improvement.

BP206T: 5. Acquire skills to help the concerned individuals in identifying and solving environmental problems.

C. **Programme Outcomes:**

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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D. Assessment Plan:

Component of Evaluation	Description	Code	Weightage %
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	50%
Total			**75%**

E. Syllabus

Unit-I

The Multidisciplinary nature of environmental studies

Natural Resources

Renewable and non-renewable resources:

Natural resources and associated problems

a) Forest resources; b) Water resources; c) Mineral resources; d) Food resources; e) Energy resources; f) Land resources: Role of an individual in conservation of natural resources.

Unit-II

Ecosystems

 Concept of an ecosystem.

 Structure and function of an ecosystem.

 Introduction, types, characteristic features, structure and function of the ecosystems: Forest ecosystem; Grassland ecosystem; Desert ecosystem; Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Unit- III

Environmental Pollution: Air pollution; Water pollution; Soil pollution

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. Y.K. Sing, Environmental Science, New Age International Pvt, Publishers, Bangalore
2. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
3. Bharucha Erach, The Biodiversity of India, Mapin Pu blishing Pvt. Ltd., Ahmedabad – 380 013, India,
4. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
5. Clark R.S., Marine Pollution, Clanderson Press Oxford
6. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumbai, 1196p
7. De A.K., Environmental Chemistry, Wiley Eastern Ltd.

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	The Multidisciplinary nature of environmental studies	Lecture	3,4	Mid Term-1, Quiz & End Sem Exam
2	Natural Resources Renewable and non-renewable resources.	Lecture	3,4	Mid Term-1, Quiz & End Sem Exam

3	Natural resources and associated problems	Lecture	3,4	Mid Term-1, Quiz & End Sem Exam
4	a) Forest resources;	Lecture	3,4	Mid Term-1, Quiz & End Sem Exam
5	b) Water resources;	Lecture	3,4	Mid Term-1, Quiz & End Sem Exam
6	c) Mineral resources;	Lecture	3,4	Mid Term-1, Quiz & End Sem Exam
7	d) Food resources;	Lecture	3,4	Mid Term-1, Quiz & End Sem Exam
8	e) Energy resources;	Lecture	3,4	Mid Term-1, Quiz & End Sem Exam
9	f) Land resources:	Lecture	3,4	Mid Term-1, Quiz & End Sem Exam
10	Role of an individual in conservation of natural resources	Lecture	2	Mid Term-1, Quiz & End Sem Exam
11	Ecosystems	Lecture	2	Mid Term-2, Quiz & End Sem Exam
12	? Concept of an ecosystem.	Lecture	2	Mid Term-2, Quiz & End Sem Exam
13	? Structure and function of an ecosystem.	Lecture	2	Mid Term-2, Quiz & End Sem Exam
14	? Introduction, types of ecosystems.	Lecture	3	Mid Term-2, Quiz & End Sem Exam
15	characteristic features of the ecosystems	Lecture	3	Mid Term-2, Quiz & End Sem Exam
16	structure and function of the ecosystems	Lecture	3	Mid Term-2, Quiz & End Sem Exam
17	Forest ecosystem;	Lecture	3	Mid Term-2, Quiz & End Sem Exam
18	Grassland ecosystem;	Lecture	3	Mid Term-2, Quiz & End Sem Exam
19	Desert ecosystem;	Lecture	3	Mid Term-2, Quiz & End Sem Exam
20	Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)	Lecture	3	Mid Term-2, Quiz & End Sem Exam

Dr. Dhananjaya

21	Environmental Pollution	Lecture	1,2	Mid Term-2, Quiz & End Sem Exam
22	Air pollution;	Lecture	1,2	Mid Term-2, Quiz & End Sem Exam
23	Air pollution;	Lecture	1,2	Mid Term-2, Quiz & End Sem Exam
24	Quiz	Lecture	1,2	Mid Term-2, Quiz & End Sem Exam
25	Water pollution;	Lecture	1,2	Mid Term-2, Quiz & End Sem Exam
26	Water pollution;	Lecture	1,2	Mid Term-2, Quiz & End Sem Exam
27	Quiz	Lecture	1,2	Mid Term-2, Quiz & End Sem Exam
28	Soil pollution	Lecture	1,2	Mid Term-2, Quiz & End Sem Exam
29	Soil pollution	Lecture	1,2	Mid Term-2, Quiz & End Sem Exam
30	Quiz	Lecture	1,2	Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP206T: 1	**BP206T: 1**. Create the awareness about environmental problems among learners.	3	1	1	1	1	2	1	-	1	3	2				
BP206T: 2	**BP206T: 2**. Impart basic knowledge about the environment and its allied problems.	2	1	2	1	-	2	1	-	1	3	3				

BP206T: 3	**BP206T: 3.** Develop an attitude of concern for the environment.	2	1	2	2	2	2	2	1	2	3	2				
BP206T: 4	**BP206T: 4**. Motivate learner to participate in environment protection and environment improvement.	2	1	1	1	-	2	1	1	1	3	3				
BP206T: 5	**BP206T: 5**. Acquire skills to help the concerned individuals in identifying and solving environmental problems	2	1	1	1	2	2	1	1	1	3	3				

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacology I MID-SEMESTER (SEM –IInd) 2021-22						
Class: B. Pharm, II Semester						
Subject Name: Environmental Sciences BP206T-Theory		Time: 1 Hrs			Max. Marks: 30	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q1,Q2,Q5	Q3,Q4				
The student will be able to **CO: 3.** Develop an attitude of concern for the environment.						

CO: 4. Motivate learner to participate in environment protection and environment improvement.			
CO Map	Question No.	Question	Marks
CO3,4	Q.1	Explain the Multidisciplinary nature of environmental studies.	5
CO3,4	Q.2	Write about Natural resources and associated problems With the Forest resources.	5
CO3,4	Q.3	Discuss the role of an individual in conservation of natural resources.	5
CO3,4	Q.4	Discuss the water and resources.	5
CO3,4	Q.5	Gives a detailed note on Renewable and non-renewable resources.	10

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 2 :

76.0 % Percentage of students secured more than 60% marks, so this course Environmental Sciences - Theory (BP206T) attained Level -2.

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Programme Educational Objectives (PEOs)
Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

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AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOLOGY

PROGRAMME OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions

[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3: Substantial (High)

If there is no correlation, put "-"

PROGRAMME ARTICULATION MATRIX												
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
II SEM	BP 207P	3	2	2	3	1	2	2	1	3	2	3

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DEPARTMENT OF PHARMACOLOGY
Course Handout
Course : Human Anatomy and Physiology (Practical)
Course Code : BP207P, Credits : 02, Session : 2021-22 (Even Sem.), Class : B. Pharm. First Year
Faculty Name : Dr. Naveen Sharma, Dr. K. Anitha

Introduction: This subject is designed to impart fundamental and practical knowledge of pharmaceutical *microbiology* and various categories of microorganisms especially for the production of alcohol, antibiotics, vaccines, vitamins enzymes etc.

A. **Course Outcomes:** At the end of the course, students will be able to:

BP207P: 1. To study the human body systems using specimen, models, etc.,

BP207P: 2. Recording of body temperature.

BP207P: 3. To demonstrate positive and negative feedback mechanism.

BP207P: 4. Determination of tidal volume and vital capacity.

BP207P: 5. Study of family planning devices and pregnancy diagnosis test.

BP207P: 6. Demonstration of total blood count by cell analyser.

B. **Programme Outcomes:**

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

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employers, employees).

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[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

C. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance isrequiredtobemaintainedbyastudentto be qualified for taking up the EndSemester examination. The allowanceof 20%includesalltypesofleaves includingmedicalleaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

PR: Practical Records, RV: Regular viva, As: Assignment

D. Syllabus

1. To study the integumentary and special senses using specimen, models, etc.,
2. To study the nervous system using specimen, models, etc.,
3. To study the endocrine system using specimen, models, etc
4. To demonstrate the general neurological examination
5. To demonstrate the function of olfactory nerve
6. To examine the different types of taste.
7. To demonstrate the visual acuity
8. To demonstrate the reflex activity
9. Recording of body temperature
10. To demonstrate positive and negative feedback mechanism.
11. Determination of tidal volume and vital capacity.
12. Study of digestive, respiratory, cardiovascular systems, urinary and reproductive systems with the help of models, charts and specimens.
13. Recording of basal mass index.
14. Study of family planning devices and pregnancy diagnosis test.
15. Demonstration of total blood count by cell analyser
16. Permanent slides of vital organs and gonads.

E. Examination Scheme:

Components	A	CT	LR	V	EE
Weightage (%)	2	10	1	2	35

PR: Practical Records, RV: Regular viva, As: Assignment

F. Suggested Text/Reference Books:

1. Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypee brothers medical publishers, New Delhi.
2. Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York
3. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co,Riverview,MI USA
4. Text book of Medical Physiology- Arthur C,Guyton andJohn.E. Hall. Miamisburg, OH, U.S.A.
5. Principles of Anatomy and Physiology by Tortora Grabowski. Palmetto, GA, U.S.A.
6. Textbook of Human Histology by Inderbir Singh, Jaypee brothers medical publishers, New Delhi.
7. Textbook of Practical Physiology by C.L. Ghai, Jaypee brothers medical publishers, New

Delhi.
8. Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee brother's medical publishers, New Delhi.

G. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1.	1. To study the integumentary and special senses using specimen, models, etc.,	Practical	CO1	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
2.	2. To study the nervous system using specimen, models, etc.,	Practical	CO1	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
3.	3. To study the endocrine system using specimen, models, etc	Practical	CO1	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
4.	4. To demonstrate the general neurological examination	Practical	CO, 9	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
5.	*5.* To demonstrate the function of olfactory nerve	Practical	CO1, 11	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
6.	6. To examine the different types of taste.	Practical	CO1, 9	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
7.	7. To demonstrate the visual activity	Practical	CO1, 9, 10, 11	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
8.	8. To demonstrate the reflex activity	Practical	CO1, 10, 11	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
9.	9. Recording of body temperature	Practical	CO1, 9	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
10.	10. To demonstrate positive and negative feedback mechanism.	Practical	CO1	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
11.	11. Determination of tidal volume and vital capacity.	Practical	CO1, 11	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
12.	12. Study of digestive,	Practical	CO1,11	Mid Term-2 & End Sem

	respiratory, cardiovascular systems, urinary and reproductive systems with the help of models, charts and specimens.			Exam as Synopsis/ Experiments/ Viva voce for both
13.	13. Recording of basal mass index.	Practical	CO1, 11	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
14.	14. Study of family planning devices and pregnancy diagnosis test.	Practical	CO1, 11	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
15.	15. Demonstration of total blood count by cell Analyzer	Practical	CO1, 11	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
16.	16. Permanent slides of vital organs and gonads.	Practical	CO1, 11	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both

H. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP207P: 1.	**BP207P: 1**. To study the human body systems using specimen, models, etc.,	1	1	1	3	1	-	-	1	2	2	3
BP207P: 2	**BP207P: 2**. Recording of body temperature.	2	1	1	3	1	-	1	1	2	2	2
BP207P: 3	**BP207P: 3**. To demonstrate positive and negative feedback mechanism.	1	1	1	2	1	-	-	1	1	2	2
BP207P: 4	**BP207P: 4**. Determination of tidal volume and vital capacity.	2	1	1	3	1	-	1	1	2	3	2

BP207P: 5	**BP207P: 5**. Study of family planning devices and pregnancy diagnosis test.	2	1	1	3	1	-	1	1	2	2	2
BP207P: 6	**BP207P: 6**. Demonstration of total blood count by cell analyser.	3	1	1	2	1	-	1	1	2	2	2

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacy I MID-SEMESTER (SEM–II) 2021-22						
Class: B. Pharm II Semester						
Subject Name: Human Anatomy and Physiology-II BP 207P (Practical)		Time: 4 Hrs			Max. Marks: 40	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3	Q.2		Q.2	Q.2	

Student will be able to
CO1: To study the human body systems using specimen, models, etc.,
CO2: To demonstrate positive and negative feedback mechanism.

CO Map	Question No.	Question	Marks
CO1 and CO3	Q.1	Synopsis	10
CO3	Q.2	To demonstrate the reflex action.	25
CO1 and CO3	Q.3	Viva voce	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

99.0 % Percentage of students secured more than 60% marks, so this course Human Anatomy And Physiology Ii –Practical (BP207P) attained Level -3.

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PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

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AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1]. Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

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Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
II SEM	BP208P	3	1	2	1	1	2		2							

Dr. Mohanty

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DEPARTMENT OF PHARMACEUTICAL CHEMISTRY
Course Handout
Course : PHARMACEUTICAL ORGANIC CHEMISTRY – I PRACTICAL
Course Code : BP208P, Crédits : 02, Session :2021-22 (Even Sem.), Class : B.Pharm. 1st Year
Faculty Name: Dr. Pawan Kumar Gupta and Dr Parmeshwar Raula

A. Introduction: The course is designed to impart skill development in the arts and science of preparing the different conventional dosage forms.

B. Course Outcomes: At the end of the course, students will be able to:

BP208P.1. Understand the principles of analysis

BP208P.2. Operate equipment used in chemical analysis

BP208P.3. Carryout various qualitative test for determination of unknown compound.

BP208P.4. Carryout various functional group test.

BP208P.5. Develop analytical skills

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

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C. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance	A	2%

	is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.		
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

D. Syllabus

Systematic qualitative analysis of unknown organic compounds like

a. Preliminary test: Color, odour, aliphatic/aromatic compounds, saturationand unsaturation, etc.

b. Detection of elements like Nitrogen, Sulphur and Halogenby Lassaigne's test

c. Solubility test

d. Functional group test like Phenols, Amides/ Urea, Carbohydrates, Amines, Carboxylic acids, Aldehydes and Ketones, Alcohols, Esters, Aromatic and Halogenated Hydrocarbons, Nitro compounds and Anilide.

e. Melting point/Boiling point of organic compounds

f. Identification of the unknown compound from the literature usingmelting point/ boiling point.

g. Preparation of the derivatives and confirmation of the unknown compound by melting point/ boiling point.

h. Minimum 5 unknown organic compounds to be analysed systematically.

Preparation of suitable solid derivatives from organic compounds
Construction of molecular models

E. Examination Scheme:

Components	A	CT	LR	V	EE
Weightage (%)	2	10	1	2	35

CT: Class Test, LR: Lab Record, V: Viva, EE: End Semester Examination; A: Attendance

F. Suggested Text/Reference Books:

A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, StahlonePress of University of London

A.I. Vogel, Text Book of Quantitative Inorganic analysis

P. Gundu Rao, Inorganic Pharmaceutical Chemistry

Bentley and Driver's Textbook of Pharmaceutical Chemistry

John H. Kennedy, Analytical chemistry principles

Indian Pharmacopoeia.

G. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	To determine melting point of the given sample.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
2	To determine boiling point of the given sample.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
3	To perform solubility test of given sample.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
4	To perform preliminary investigation of following organic compound.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
5	To perform elemental analysis of the given sample.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
6	To perform identification of functional group in the given sample (Carbohydrate).	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
7	To perform identification of functional group in	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz &

	the given sample (Urea and Thiourea)).			End Sem Exam
8	To perform identification of functional group in the given sample (Carboxylic Acid).	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
9	To perform identification of functional group in the given sample (Phenol).	Practical	CO1, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
10	To perform identification of functional group in the given sample (Aldehyde)	Practical	CO1, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
11	To perform identification of functional group in the given sample (Ketone)	Practical	CO1, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
12	To perform identification of functional group in the given sample (Amine) .	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
13	To determine Iodine value of the given sample of castor oil.	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
14	To Synthesize Benzanilide (Benzylaniline) by Bezoylation	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem

	process.			Exam
15	To prepare and submit Phenyl Benzoate from Phenol.	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam

H. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	
BP208P.1	Understand the principles of analysis	3		2	1	2	1	-	2	1	2	1	
BP208P.2.	Operate equipment used in chemical analysis	2	-	-	1	-	1	-	-	-	-	3	
BP208P.3.	Carryout various qualitative test for determination of unknown compound	3	2	2	1	-	2	-	2	-	-	3	
BP208P 4.	Carryout various functional group test.	2	2	2	1	-	2	-	2	-	-	3	
BP208P.5.	Develop analytical skills	1	2	3	-	-	2	-	2	-	-	3	

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutical Chemistry I MID-SEMESTER (SEM –IInd) 2022-23						
Class: B.Pharm, IInd Semester						
Subject Name: BP108P Pharmaceutical Organic Chemistry-I Practical		Time: 4 Hrs		Max. Marks: 40		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,4	Q.2,3	Q.4	Q.2,5,6		

Student will be able to

CO.1. Understand the principles of analysis

CO.2. Operate equipment used in chemical analysis

CO.3. Carryout various qualitative test for determination of unknown compound

CO.4. Carryout various functional group test.

CO.5. Develop analytical skills

CO Map	Question No.	Question	Marks
CO1,2,4	Q.1a	Synopsis- Define Qualitative Analysis.	2
CO1,2,4	Q.1b	Synopsis- Define Solubility.	2
CO1,2,4	Q.1c	Synopsis- Illustrate the formula of Salicylic Acid.	2
CO1,2,4	Q.1d	Synopsis- List the any three methods of qualitative Analysis.	2
CO1,2,4	Q.1e	Synopsis- What are various functional groups?	2
CO1,2, 4,5	Q.2	Experiment To perform Solubility analysis of the given sample.	25
CO1,2,3,4,5	Q.3	Viva	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

98.0% Percentage of students secured more than 60% marks, so this course Pharmaceutical Organic Chemistry I– Practical (BP208P) attained Level -3.

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Programme Educational Objectives (PEOs)
Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

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AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
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DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES
Bachelor of Pharmacy (B. Pharm.), Academic Year – 2022-23

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2].Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMMEARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
IISEM																
	BP209P	3	2	3	1	1	2		3		1	2				

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DEPARTMENT OF PHARMACEUTICAL CHEMISTRY
Course Handout
Course : BIOCHEMISTRY (Practical)
Course Code : BP209P, Crédits : 02, Session :2021-22 (Even Sem.), Class : B.Pharm. 1st Year
Faculty Name: Dr. S Vijayaraj

A. Introduction: Biochemistry deals with complete understanding of the molecular levels of the chemical process associated with living cells. The scope of the subject is providing biochemical facts and the principles to understand metabolism of nutrient molecules in physiological and pathological conditions. It is also emphasizing on genetic organization of mammalian genome and hetero & autocatalytic functions of DNA.

B. Course Outcomes: At the end of the course, students will be able to:

BP209P.1. Perform various Qualitative analysis of biomolecules i.e. carbohydrates (Glucose, Fructose, Lactose, Maltose,Sucrose and starch), proteins (albumin and Casein).

BP209P.2. Learn about the normal constituents of urine, blood and their significance in maintaining good health.

BP209P.3. Learn qualitative and quantitative analysis of constituents of biological fluids such as urine, blood and their estimation using standard methods.

BP209P.4. Prepare various buffer solution with specific pH Value

BP209P.5. Perform various enzymatic activities.

C. Programme Outcomes:

[PO.1].Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2].Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

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[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of

technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance isrequiredtobemaintainedbyastudentto be qualified for taking up the EndSemester examination. The allowanceof 20%includesalltypesofleaves includingmedicalleaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

E. Syllabus;

1. Qualitative analysis of carbohydrates (Glucose, Fructose, Lactose, Maltose, Sucrose and starch) 2. Identification tests for Proteins (albumin and Casein)
3. Quantitative analysis of reducing sugars (DNSA method) and Proteins (Biuret method)
4. Qualitative analysis of urine for abnormal constituents
5. Determination of blood creatinine
6. Determination of blood sugar
7. Determination of serum total cholesterol
8. Preparation of buffer solution and measurement of pH
9. Study of enzymatic hydrolysis of starch
10. Determination of Salivary amylase activity
11. Study the effect of Temperature on Salivary amylase activity.
12. Study the effect of substrate concentration on salivary amylase activity.

Examination Scheme:

Components	**A**	**CT**	**LR**	**V**	**EE**
Weightage (%)	2	10	1	2	35

CT: Class Test, LR: Lab Record, V: Viva,EE: End Semester Examination; A: Attendance

F. Suggested Text/Reference Books:

1. Practical Biochemistry by R.C. Gupta and S. Bhargavan.

2. Introduction of Practical Biochemistry by David T. Plummer. (3rd Edition)

3. Practical Biochemistry for Medical students by Rajagopal and Ramakrishna.

4. Practical Biochemistry by Harold Varley

5. Indian Pharmacopoeia

G. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	To perform the qualitative analysis of different unknown sample of carbohydrates.	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
2	To perform the qualitative analysis of different unknown sample of carbohydrates.	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
3	To perform the qualitative analysis of different unknown sample of carbohydrates.	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
4	To estimate creatinine in given blood sample.	Practical	CO2,3	Mid Term-1, Quiz & End Sem Exam
5	To perform the identification Test For albumin in given sample.	Practical	CO2,3	Mid Term-1, Quiz & End Sem Exam
6	To prepare carbonate – bicarbonate buffer of pH 10.2	Practical	CO 4	Mid Term-1, Quiz & End Sem Exam
7	To perform qualitative analysis of abnormal constituent of urine Sample.	Practical	CO 2,3	Mid Term-2, Quiz & End Sem Exam
8	To perform qualitative analysis of normal constituent of urine Sample.	Practical	CO2,3	Mid Term-2, Quiz & End Sem Exam
9	To analyze the effect of pH on activity of salivary amylase	Practical	CO 4,5	Mid Term-2, Quiz & End Sem Exam
10	To determine the time needed for hydrolysis of starch in presence of	Practical	CO4,5,	Mid Term-2, Quiz & End Sem Exam

	amylase.			
11	To determine the protein content of the serum sample	Practical	CO 2,3	Mid Term-2, Quiz & End Sem Exam
12	To determine serum total cholestrol.	Practical	CO 2,3	Mid Term-2, Quiz & End Sem Exam

H. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	
BP209P.1	Perform various Qualitative analysis of biomolecules i.e. carbohydrates (Glucose, Fructose, Lactose, Maltose, Sucrose and starch), proteins (albumin and Casein).	3	-	2	1	2	1	-	2	1	2	1	
BP209P.2.	Learn about the normal constituents of urine, blood and their significance in maintaining good health.	2	-	-	1	-	1	-	-	-	-	3	
BP209P.3.	Learn qualitative and quantitative analysis of constituents of biological fluids such as urine, blood and their estimation using standard methods	3	2	2	1	-	2	-	2	-	-	3	
BP209P.4.	Prepare various buffer solution with specific pH Value	2	2	2	1	-	2	-	2	-	-	3	

BP209P.5.	Perform various enzymatic activities.	1	2	3	-	-	2	-	2	-	-	3	

SampleQuestionPaper

Amity Institute of Pharmacy DepartmentofPharmaceuticalchemistry IMID-SEMESTER(SEM–II)2022-23						
Class: B.Pharm, IISemester						
SubjectName: BP209PBiochemistry Practical		Time:4 Hrs			Max.Marks:40	
Levels of thequestions as perBloomsTaxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
QuestionMapping	Q.1,2,5	Q.4,5	Q.3	Q.3, 4		

Student willbeableto

CO.1. Recall different qualitative testfor identification of carbohydrates.
CO.2.perform identification tests of protein in given sample.
CO.3. Determine the normal and abnormal constituents of urine sample.
CO.4.analyze the effect of time for the hydrolysis of starch in presence of amylase.
CO.5. Prepare various buffer solution of given pH

COMap	QuestionNo.	Question	Marks
CO2	Q.1a	Synopsis-Define polypeptide with examples	2
CO4	Q.1b	Synopsis- Define coenzymes.	2
CO 2,3	Q.1c	Synopsis- enlist the various normal and abnormal constituents of urine	2
CO1	Q.1d	Synopsis- What is molisch test?	2
CO1	Q.1e	Synopsis- what is Biuret test?	2
CO 2,3,4	Q.2	Experiment To perform qualitative analysis of abnormal constituent of urine Sample.	25
CO1,2,3,4,5	Q.3	Viva voce	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

96.0 % Percentage of students secured more than 60% marks, so this course Biochemistry – Practical (BP209P) attained Level -3.

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PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

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AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICS

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

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Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
II SEM	BP210P	3	1	2	1	1	2		2		3	2				

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DEPARTMENT OF PHARMACEUTICS
Course Handout
Course : COMPUTER APPLICATIONS IN PHARMACY- PRACTICAL
Course Code : BP210P, Crédits : 01, Session :2021-22 (Even Sem.), Class : B.Pharm. 1st Year
Faculty Name: Dr. Samta Goyal Jain, Dr. Jovita Kanoujia

A. Introduction: The course is designed to impart skill development in database management.

B. Course Outcomes: At the end of the course, students will be able to:

BP210P.1. Create and manage databases on the given information

BP210P.2. Design a questionnaire using various processing packages to gather information about a particular disease.

BP210P.3. Generate, edit and print reports and webpage and XML pages based on patient information.

BP210P.4. Explain drug information storage and retrieval system.

BP210P.5. Utilize Ms-office, Ms-Access for data management

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily

practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

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[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

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D. Assessment Plan:

Component of Evaluation	Description	Code	Weightage %

Continuous Internal Evaluation	Mid Term 1	CT	5%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	15%
Total			**25%**

E. Syllabus

1. Design a questionnaire using a word processing package to gather information
2. about a particular disease.
3. Create a HTML web page to show personal information.
4. Retrieve the information of a drug and its adverse effects using online tools
5. Creating mailing labels Using Label Wizard, generating label in MS WORD
6. Create a database in MS Access to store the patient information with the required
7. fields Using access
8. Design a form in MS Access to view, add, delete and modify the patient record in
9. the database
10. Generating report and printing the report from patient database
11. Creating invoice table using – MS Access
12. Drug information storage and retrieval using MS Access
13. Creating and working with queries in MS Access
14. Exporting Tables, Queries, Forms and Reports to web pages
15. Exporting Tables, Queries, Forms and Reports to XML pages

F. Examination Scheme:

Components	**A**	**CT**	**LR**	**V**	**EE**
Weightage (%)	2	5	1	2	15

CT: Class Test, LR: Lab Record, V: Viva, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. Computer Application in Pharmacy – William E.Fassett –Lea and Febiger, 600 South Washington Square, USA, (215) 922-1330.
2. Computer Application in Pharmaceutical Research and Development –Sean Ekins – Wiley-Interscience, A John Willey and Sons, INC., Publication, USA

3. Bioinformatics (Concept, Skills and Applications) – S.C.Rastogi-CBS Publishers and Distributors, 4596/1- A, 11 Darya Gani, New Delhi – 110 002(INDIA)
4. Microsoft office Access - 2003, Application Development Using VBA, SQL Server, DAP and Infopath – Cary N.Prague – Wiley Dreamtech India (P) Ltd., 4435/7,Ansari Road, Daryagani, New Delhi – 110002

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Design a questionnaire using a word processing package to gather information about a particular disease.	Practical	CO1, 2	Mid Term-1, Quiz & End Sem Exam
2	Design a questionnaire using a word processing package to gather information about a particular disease.	Practical	CO1, 2	Mid Term-1, Quiz & End Sem Exam
3	Create a HTML web page to show personal information.	Practical	CO3	Mid Term-1, Quiz & End Sem Exam
4	Retrieve the information of a drug using online tools	Practical	CO4	Mid Term-1, Quiz & End Sem Exam
5	Retrieve the information of drug adverse effects using online tools	Practical	CO4	Mid Term-1, Quiz & End Sem Exam
6	Creating mailing labels Using Label Wizard, generating label in MS WORD	Practical	CO5	Mid Term-1, Quiz & End Sem Exam
7	Create a database in MS Access to store the patient information with the required fields using access	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
8	Design a form in MS Access to view, add, delete and modify the patient record in the database	Practical	CO1,5	Mid Term-2, Quiz & End Sem Exam
9	Design a form in MS Access to view, add, delete and modify the patient record in the database	Practical	CO1, 5	Mid Term-2, Quiz & End Sem Exam
10	Generating report and printing the report from patient database	Practical	CO1, 3	Mid Term-2, Quiz & End Sem Exam
11	Creating invoice table using – MS Access	Practical	CO5	Mid Term-2, Quiz & End Sem Exam

12	Drug information storage and retrieval using MS Access	Practical	CO5	Mid Term-2, Quiz & End Sem Exam
13	Creating and working with queries in MS Access	Practical	CO5	Mid Term-2, Quiz & End Sem Exam
14	Exporting Tables, Queries, Forms and Reports to web pages	Practical	CO3	Mid Term-2, Quiz & End Sem Exam
15	Exporting Tables, Queries, Forms and Reports to XML pages	Practical	CO3	Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	
BP210P.1	Create and manage databases on the given information	2	2	3	3	2	1	-	1	1	1	1	
BP210P.2.	Design a questionnaire using various processing packages to gather information about a particular disease	2	1	3	3	1	1	-	1	1	1	1	
BP210P.3.	Generate, edit and print reports and webpage and XML pages based on patient information.	2	2	3	3	1	2	-	2	-	-	2	
BP210P.4.	Explain drug information storage and retrieval system.	2	2	3	3	1	2	-	2	-	-	2	

BP210P.5.	Utilize Ms-office, Ms-Access for data management	2	2	3	3	1	2	-	2	-	1	3	

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutics I MID-SEMESTER (SEM –IInd) 2021-22						
Class: B.Pharm, II Semester						
Subject Name: BP210P Computer Application in Pharmacy-Practical		Time: 2 Hrs			Max. Marks: 40	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1a,b,c,d,e	Q.3	Q.3	Q.2,5,6	Q.3	Q.2

Student will be able to

CO.1. Create and manage databases on the given information

CO.2. Design a questionnaire using various processing packages to gather information about a particular disease.

CO.3. Generate, edit and print reports and webpage and XML pages based on patient information.

CO.4. Explain drug information storage and retrieval system.

CO.5. Utilize Ms-office, Ms-Access for data management

CO Map	Question No.	Question	Marks
CO5	Q.1a	Synopsis- What is the database?	2
CO5	Q.1b	Synopsis- What is the use of MS Access?	2
CO1,3	Q.1c	Synopsis- What is the use of HTML?	2
CO5	Q.1d	Synopsis- Which field type will you select if you need to enter long name in MS Access?	2
CO5	Q.1e	Synopsis- What is the Microsoft word shortcut key to Copy and save a file?	2
CO3	Q.2	Experiment To Create a HTML web page to show personal information.	25

CO1,2,3,4,5	Q.3	Viva	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

100.0 % Percentage of students secured more than 60% marks, so this course Computer Applications In Pharmacy - Practical (BP210P) attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)
Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Programme Specific Outcomes:

PSO 1: Will be able to design, develop and implement efficient software for a given real life problem.

PSO 2: Will be able to apply knowledge of AI, Machine Learning and Data Mining in analyzing big data forextracting useful information from it and for performing predictive analysis.

PSO 3: Will be able to design, manage and secure wired/ wireless computer networks for transfer and sharing ofinformation.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
III SEM																
	BP301T	2	-	2	-	1	2	2	1	1	-	2				

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICAL CHEMISTRY
Course Handout
Course : PHARMACEUTICAL ORGANIC CHEMISTRY – II THEORY
Course Code : BP 301T, Crédits : 04, Session : 2021`-22 (Odd Sem.), Class : B.Pharm. II nd Year
Faculty Name: Dr. Pawan Kumar Gupta

A. Introduction: The course is designed to impart fundamental knowledge on the preparatory pharmacy with arts and science of preparing the different conventional dosage forms.

B. Course Outcomes: At the end of the course, students will be able to:

BP301T.1. Relate pharmacy education with pharmacy career options.

BP301T.2. Classify the different types of *organic compounds* based on medicinal use.

BP301T.3. Experiment in the preparation of various types organic compounds and their derivatives.

BP301T.4. Able to analyse and also to *write the structure, name and the type of isomerism of the organic compound*.

BP301T.5. Able to Solve and write *the reaction, name the reaction and also orientation of reactions* in different types of *organic compounds*

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

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[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

C. Programme Specific Outcomes:

PSO 1: Will be able to design, develop and implement efficient software for a given real life problem.

PSO 2: Will be able to apply knowledge of AI, Machine Learning and Data Mining in analyzing big data forextracting useful information from it and for performing predictive analysis.

PSO 3: Will be able to design, manage and secure wired/ wireless computer networks for transfer and sharing ofinformation.

D. Assessment Plan:

Component of Evaluation	Description	Code	Weightage %
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

UNIT – I Benzene and its derivatives

Analytical, synthetic and other evidences in the derivation of structure of benzene, Orbital picture, resonance in benzene, aromatic characters, Huckel's rule Reactions of benzene - nitration, sulphonation, halogenation- reactivity, Friedelcrafts alkylation- reactivity, limitations, Friedelcrafts acylation. Substituents, effect of substituents on reactivity and orientation of mono substituted benzene compounds towards electrophilic substitution reaction Structure and uses of DDT, Saccharin, BHC and Chloramine

UNIT – II

Phenols* - Acidity of phenols, effect of substituents on acidity, qualitativetests, Structure and uses of phenol, cresols, resorcinol, naphthols **Aromatic Amines* -** Basicity of amines, effect of substituents on basicity,and synthetic uses of aryl diazonium salts **Aromatic Acids*** Acidity, effect of substituents on acidity andimportant reactions of benzoic acid

UNIT – III Fats and Oil

Fatty acids reaction Hydrolysis, Hydrogenation, Saponification and Rancidity of oils, Drying oils. Analytical constants – Acid value, Saponification value, Ester value, Iodine value, Acetyl value, Reichert Meissl (RM) value- significance and principle involved in their determination.

UNIT – IV Polynuclear hydrocarbons:

Synthesis, reactions Structure and medicinal uses of Naphthalene, Phenanthrene, Anthracene,Diphenylmethane, Triphenylmethane and their derivatives.

UNIT – V Cyclo alkanes*

Stabilities – Baeyer's strain theory, limitation of Baeyer's strain theory,Coulson and Moffitt's modification, Sachse Mohr's theory (Theory of strainless rings), reactions of cyclopropane and cyclobutane only

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

Organic Chemistry by Morrison and Boyd.

Organic Chemistry by I.L. Finar, Volume-I
Textbook of Organic Chemistry by B.S. Bahl & Arun Bahl.
Organic Chemistry by P.L.Soni.
Practical Organic Chemistry by Mann and Saunders.
Vogel's text book of Practical Organic Chemistry.
Advanced Practical organic chemistry by N.K.Vishnoi.

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Analytical, evidences in the derivation of structure of benzene.	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
2	Synthetic and other evidences in the derivation of structure of benzene.	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
3	Orbital picture, resonance in benzene.	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
4	Aromatic characters, Hückel's rule of benzene.	Tutorial	CO1,4	Mid Term-1, Quiz & End Sem Exam
5	Nitration Reactions of benzene	Lecture	CO1,2	Mid Term-1, Quiz & End Sem Exam
6	Sulfonation Reactions of benzene	Lecture	CO1,2	Mid Term-1, Quiz & End Sem Exam
7	Halogenation Reactions of benzene	Lecture	CO1,2	Mid Term-1, Quiz & End Sem Exam
8	Friedel Craft Alkylation Reactions of benzene	Tutorial	CO1,3	Mid Term-1, Quiz & End Sem Exam
9	Friedel Craft Acylation Reactions of benzene	Lecture	CO1,2	Mid Term-1, Quiz & End Sem Exam
10	Substituents effect on	Lecture	CO1,3	Mid Term-1, Quiz

	Reactivity and orientation of benzene.			& End Sem Exam
11	Quiz	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
12	Structure and uses of D.D.T.	Tutorial	CO1,4	Mid Term-1, Quiz & End Sem Exam
13	Structure and uses of Saccharin.	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
14	Structure and uses of BHC.	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
15	Structure and uses of Chloramine.	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
16	Unit test	Tutorial		Mid Term-1, Quiz & End Sem Exam
17	Method of prepration and reaction Reaction of Phenol	Lecture	CO1,5	Mid Term-1, Quiz & End Sem Exam
18	Acidity of phenols. Effect of substituents on acidity	Lecture	CO1,3	Mid Term-1, Quiz & End Sem Exam
19	Qualitative tests of Phenol	Lecture	CO1,3	Mid Term-1, Quiz & End Sem Exam
20	Structure and uses of phenol	Tutorial	CO1,4	Mid Term-1, Quiz & End Sem Exam
21	Structure and uses of cresol	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
22	Structure and uses of resorcinol	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
23	Structure and uses of naphthol	Lecture	CO1,4	Mid Term-1, Quiz & End Sem Exam
24	Quiz	Tutorial		Mid Term-1, Quiz & End Sem Exam
25	Method of prepration and reaction Reaction of amine	Lecture	CO1,5	Mid Term-1, Quiz & End Sem Exam
26	Basicity of amine. Effect of substituents on Basicity	Lecture	CO1,3	Mid Term-1, Quiz & End Sem Exam
27	synthetic uses of aryl diazonium salt	Lecture	CO1,5	Mid Term-1, Quiz & End Sem Exam
28	Method of prepration and reaction Reaction of aromatic acid	Tutorial	CO1,5	Mid Term-1, Quiz & End Sem Exam
29	Acidity of aromatic acid Effect of substituents on acidity	Lecture	CO1,3	Mid Term-1, Quiz & End Sem Exam
30	Important reaction of Benzoic acid	Lecture	CO1,5	Mid Term-1, Quiz & End Sem Exam

Dr. Mohanty

31	Fats and Oils Definition, Properties and Classification	Lecture	CO1,2	Mid Term-2, Quiz & End Sem Exam
32	Fats and Oils Nomenclature	Tutorial	CO1,2	Mid Term-2, Quiz & End Sem Exam
33	Fatty acids – reactions. Hydrolysis	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
34	Fatty acids – reactions, Hydrogenation	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
35	Saponification and Rancidity of oils	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
36	Seminar	Tutorial	CO1,5	Mid Term-2, Quiz & End Sem Exam
37	Drying of oil Analytical constants: Acetyl value	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
38	Analytical constants: Acid value	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
39	Analytical constants: Saponification value	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
40	Unit test	Tutorial	CO1,5	Mid Term-2, Quiz & End Sem Exam
41	Analytical constants: Iodine value	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
42	Analytical constants: Ester value , Reichert Meissl (RM) value	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam
43	Polycyclic Aromatic Hydrocarbons, Classification.	Lecture	CO1,3	Mid Term-2, Quiz & End Sem Exam
44	Seminar	Tutorial	CO1,3	Mid Term-2, Quiz & End Sem Exam
45	Preparation, Reactions *and derivative of* biphenyl.	Lecture	CO1,4	Mid Term-2, Quiz & End Sem Exam
46	Synthesis and reactions of Naphthalene.	Lecture	CO1,5	Mid Term-2, Quiz & End Sem Exam

47	Synthesis and reactions of anthracene.	Lecture	CO1,5	Quiz & End Sem Exam
48	Quiz	Tutorial		Quiz & End Sem Exam
49	*Synthesis and reactions of Phenanthrene*	Lecture	CO1,5	Quiz & End Sem Exam
50	Structure and medicinal uses of Naphthalene.	Lecture	CO1,4	Quiz & End Sem Exam
51	Structure and medicinal uses of Phenanthrene .	Lecture	CO1,4	Quiz & End Sem Exam
52	*Structure and medicinal uses of Diphenylmethane and Triphenylmethane*	Tutorial	CO1,4	Quiz & End Sem Exam
53	*Prepration, Reaction **of** Cyclo alkanes.*	Lecture	CO1,4	Quiz & End Sem Exam
54	Baeyer's strain theory.	Lecture	CO1,2	Quiz & End Sem Exam
55	Limitation of Baeyer's strain theory.	Lecture	CO1,3	Quiz & End Sem Exam
56	Unit test	Tutorial		Quiz & End Sem Exam
57	Coulson and Moffitt's modification.	Lecture	CO1,2	Quiz & End Sem Exam
58	Sachse Mohr's theory.	Lecture	CO1,2	Quiz & End Sem Exam
59	Reactions of cyclopropane.	Lecture	CO1,2	Quiz & End Sem Exam
60	*Reactions of cyclobutane*	Tutorial	CO1,2	Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP301T.1	Relate pharmacy education with pharmacy career options.	2	-	-	-	2	2	1	-	1	-	-				
BP103T.2.	Classify the different types of *organic compounds* based on medicinal use.	3	-	-	1	-	2	-	-	-	-	3				
BP103T.3.	Experiment in the preparation of various types organic compounds and their derivatives.	3	2	-	3	-	2	-	-	-	-	3				
BP103T.4.	Able to analyse and also to *write the structure, name and the type of isomerism of the organic compound*.	2	2	3	3	-	1	-	-	-	-	3				
BP103T.5.	Able to Solve and write *the reaction, name the reaction and also orientation of reactions* in different types of *organic compounds* .	1	-	3	-	-	-	-	-	-	-	3				

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacutical Chemistry I MID-SEMESTER (SEM –Ist) 2022-23						
Class: B.Pharm, III Semester						
Subject Name: BP301T Pharmaceutical Organic Chemistry-II Theory		Time: 1 Hrs		Max. Marks: 30		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,4,5	Q.2,3,6,8,9	Q.4,7	Q.2,5,		

Student will be able to
CO1: List the broad perceptive of cloud architecture and model.
CO2: Apply different cloud programming models as per need.

CO Map	Question No.	Question	Marks
CO1	Q.1	Define Fat and Oil.	2
CO1	Q.2	Explain significance of Analytical Constant .	2
CO2	Q.3	Classify Polynuclear hydrocarbons.	2
CO2	Q.4	By showing structure of Anthracene. And summarize any three medicinal uses of Anthracene.	2
CO2	Q.5	What do you understand by Cyclo alkanes give example?	2
	Q.6	Explain Nitration reaction in benzene.	10
CO1	Q.7	What relationship between Fat and Oil Give their Classification and Nomenclature.	10
CO1	Q.8	Outline Huckel's rule for determination of aromaticity with suitable example.	5
CO2	Q.9	Explain Acidity of Carboxylic Acid.	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

100 % Percentage of students secured more than 60% marks, so this course Pharmaceutical Organic Chemistry II– Theory (BP301T) attained Level 3.

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AMITY UNIVERSITY MADHYA PRADESH, GWALIOR

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PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

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AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICS

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

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Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
III SEM																
	B302T	3	-	2	-	1	3	2	1	1	-	2				
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICS
Course Handout
Course : PHYSICAL PHARMACEUTICS I
Course Code : BP302T, Programme : B. Pharmacy III-Semester **Crédits : 04, Session :2021-22 (Odd Sem.)**
Faculty Name: Dr. Ankit Yadav, Ms. Ankita Kishore

A. Scope: The course deals with the various physical and physicochemical properties, and principle involved in dosage forms/formulations. Theory and practical components of the subject help the student to get a better insight into various areas of formulation research and development, and stability studies of pharmaceutical dosage forms.

B. Course Outcome: ***At the end of each course, the student will be able to:***

CO302.1	Write the importance of solubility in designing of dosage forms and principles of diffusion in biological systems.
CO302.2	Classify the states of matter and understand the applications of various physiochemical properties to design dosage forms
CO302.3	Explain the principles of interfacial tension and the applications of surface active agents in drug solubilization
CO302.4	Make use of concepts of complexation and protein binding in pharmacy
CO302.5	Function of pH, buffers and their use in the stabilization of pharmaceutical formulations.

C. 1.Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices**.**

2. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

3. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice.

Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

4. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

5. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well-being.

6. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

7. Pharmaceutical Ethics: Honor personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

8. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

9. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional Pharmacy Practice

10. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

11. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively

D.Programme specific outcomes:

1. Scientific Thinking: Enable student's knowledge in scientific perception to understand the concepts and to solve the problems positively while making pharmaceutical formulations.
2. Analytical Skills: Assimilate and develop analytical skills using advanced equipment to design and evaluate pharmaceutical products, also to assess their quality.
3. Resource Management: Utilize and manage resources from natural, semi synthetic and synthetic origin to develop real time products with utmost benefit and safety.
4.Public Health Care: Promote and empower the healthy living in the community by various means of awareness and health strategies.
5. Entrepreneurship: Acquire and develop entrepreneurship and administration skills to establish community pharmacy, learning and training centers for the long term wellbeing of society.

E. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2 quiz, assignment, open book test, field work, group discussion and seminar)		
	Seminar/ Assignment/Quiz/ Open book test	S/As/Q/OBT	3%
Interaction	Student-Teacher interaction	ST	3%

Attendance	A minimum of 80% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

F. Syllabus

UNIT-I

Solubility of drugs: Solubility expressions, mechanisms of solute solvent interactions, ideal solubility parameters, solvation & association, quantitative approach to the factors influencing solubility of drugs, diffusion principles in biological systems. Solubility of gas in liquids, solubility of liquids in liquids, (Binary solutions, ideal solutions) Raoult's law, real solutions. Partially miscible liquids, Critical solution temperature and applications. Distribution law, its limitations and applications

UNIT-II

States of Matter and properties of matter: State of matter, changes in the state of matter, latent heats, vapor pressure, sublimation critical point, eutectic mixtures, gases, aerosols– inhalers, relative humidity, liquid complexes, liquid crystals, glassy states, solid crystalline, amorphous & polymorphism.

Physicochemical properties of drug molecules: Refractive index, optical rotation, dielectric constant, dipole moment, dissociation constant, determinations and applications

UNIT-III

Surface and interfacial phenomenon: Liquid interface, surface & interfacial tensions, surface free energy, measurement of surface & interfacial tensions, spreading coefficient, adsorption at liquid interfaces, surface active agents, HLB Scale, solubilization, detergency, adsorption at solid interface.

UNIT-IV

Complexation and protein binding: Introduction, Classification of Complexation, Applications, methods of analysis, protein binding, Complexation and drug action, crystalline structures of complexes and thermodynamic treatment of stability constants.

UNIT-V 07 Hours

pH, buffers and Isotonic solutions: Sorensen's pH scale, pH determination (electrometric and calorimetric), applications of buffers, buffer equation, buffer capacity, buffers in pharmaceutical and biological systems, buffered isotonic solutions.

G. Examination Scheme:

Components	**A**	**ST**	**CT**	**S/As/Q/OBT**	**EE**
Weightage (%)	4	3	15	3	75

CT: Class Test, As: Assignment, ST: Student teacher interaction,

S/A/Q/OBT: Seminar/ Assignment/Quiz/ Open book test, EE: End Semester Examination; A: Attendance

H. Suggested Text/Reference Books:

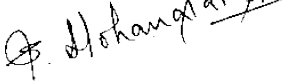
1. Physical Pharmacy by Alfred Martin
2. Experimental Pharmaceutics by Eugene, Parott.

3. Tutorial Pharmacy by Cooper and Gunn.
4. Stocklosam J. Pharmaceutical Calculations, Lea &Febiger, Philadelphia.
5. Liberman H.A, Lachman C., Pharmaceutical Dosage forms, Tablets, Volume-1 to 3, MarcelDekkar Inc.
6. Liberman H.A, Lachman C, Pharmaceutical Dosage forms. Disperse systems, volume 1, 2, 3. Marcel Dekkar Inc.
7. Physical Pharmaceutics by Ramasamy C and ManavalanR.
8. Laboratory Manual of Physical Pharmaceutics, C.V.S. Subramanian, J. Thimma settee
9. Physical Pharmaceutics by C.V.S. Subramanyam

I. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Introduction, Solvent-solute interactions	Lecture	BP302T.1	Mid Term-1, Quiz & End Sem Exam
2	Solubility of gas in liquids	Lecture	BP302T.1	Mid Term-1, Quiz & End Sem Exam
3	Solubility of liquids in liquids and solids in liquids	Lecture	BP302T.1	Mid Term-1, Quiz & End Sem Exam
4	Distribution of solutes in solvents	Tutorial	BP302T.1	Mid Term-1, Quiz & End Sem Exam
5	Fick's first law and second law	Lecture	BP302T.1	Mid Term-1, Quiz & End Sem Exam
6	Raoult's law, real solutions	Lecture	BP302T.1	Mid Term-1, Quiz & End Sem Exam
7	Partially miscible liquids	Lecture	BP302T.1	Mid Term-1, Quiz & End Sem Exam
8	Critical solution temperature and applications	Tutorial	BP302T.1	Mid Term-1, Quiz & End Sem Exam
9	Solubility of liquids in liquids and solids in liquids	Lecture	BP302T.1	Mid Term-1, Quiz & End Sem Exam
10	Fick's first law and second law	Lecture	BP302T.1	Mid Term-1, Quiz & End Sem Exam
11	mechanisms of solute solvent interactions,	Lecture	BP302T.1	Mid Term-1, Quiz & End Sem Exam
12	mechanisms of solute solvent interactions,	Tutorial	BP302T.1	Mid Term-1, Quiz & End Sem Exam
13	States of Matter and properties of matter: State of matter	Lecture	BP302T.2	Mid Term-1, Quiz & End Sem Exam
14	changes in the state of matter	Lecture	BP302T.2	Mid Term-1, Quiz & End Sem Exam
15	changes in the state of matter	Lecture	BP302T.2	Mid Term-1, Quiz &

				End Sem Exam
16	latent heats, vapor pressure	Tutorial	BP302T.2	Mid Term-1, Quiz & End Sem Exam
17	sublimation critical point, eutectic mixtures	Lecture	BP302T.2	Mid Term-1, Quiz & End Sem Exam
18	sublimation critical point, eutectic mixtures	Lecture	BP302T.2	Mid Term-1, Quiz & End Sem Exam
19	Refractive index, optical rotation,	Lecture	BP302T.2	Mid Term-1, Quiz & End Sem Exam
20	optical rotation, dielectric constant	Tutorial	BP302T.2	Mid Term-1, Quiz & End Sem Exam
21	dielectric constant, optical rotatory dispersion	Lecture	BP302T.2	Mid Term-1, Quiz & End Sem Exam
22	optical rotatory dispersion	Lecture	BP302T.2	Mid Term-1, Quiz & End Sem Exam
23	Liquid interface, surface & interfacial tensions	Lecture	BP302T.3	Mid Term-1, Quiz & End Sem Exam
24	Liquid interface, surface & interfacial tensions	Tutorial	BP302T.3	Mid Term-1, Quiz & End Sem Exam
25	surface free energy	Lecture	BP302T.3	Mid Term-1, Quiz & End Sem Exam
26	measurement of surface & interfacial tensions	Lecture	BP302T.3	Mid Term-1, Quiz & End Sem Exam
27	measurement of surface & interfacial tensions	Lecture	BP302T.3	Mid Term-1, Quiz & End Sem Exam
28	measurement of surface & interfacial tensions	Tutorial	BP302T.3	Mid Term-2, Quiz & End Sem Exam
29	spreading coefficient	Lecture	BP302T.3	Mid Term-2, Quiz & End Sem Exam
30	spreading coefficient	Lecture	BP302T.3	Mid Term-2, Quiz & End Sem Exam
31	adsorption at liquid interfaces,	Lecture	BP302T.3	Mid Term-2, Quiz & End Sem Exam
32	adsorption at liquid interfaces,	Tutorial	BP302T.3	Mid Term-2, Quiz & End Sem Exam
33	adsorption at liquid interfaces,	Lecture	BP302T.3	Mid Term-2, Quiz & End Sem Exam
34	surface active agents	Lecture	BP302T.3	Mid Term-2, Quiz & End Sem Exam
35	HLB Scale, solubilization, detergency,	Lecture	BP302T.3	Mid Term-2, Quiz & End Sem Exam
36	adsorption at solid interface	Tutorial	BP302T.3	Mid Term-2, Quiz & End Sem Exam



37	adsorption at solid interface	Lecture	BP302T.3	Mid Term-2, Quiz & End Sem Exam
38	Complexation and protein binding: Introduction,	Lecture	BP302T.4	Mid Term-2, Quiz & End Sem Exam
39	Classification of Complexation	Lecture	BP302T.4	Mid Term-2, Quiz & End Sem Exam
40	Classification of Complexation	Tutorial	BP302T.4	Mid Term-2, Quiz & End Sem Exam
41	Classification of Complexation	Lecture	BP302T.4	Mid Term-2, Quiz & End Sem Exam
42	methods of analysis,	Lecture	BP302T.4	Mid Term-2, Quiz & End Sem Exam
43	methods of analysis	Lecture	BP302T.4	Mid Term-2, Quiz & End Sem Exam
44	methods of analysis	Tutorial	BP302T.4	Mid Term-2, Quiz & End Sem Exam
45	protein binding	Lecture	BP302T.4	Mid Term-2, Quiz & End Sem Exam
46	protein binding	Lecture	BP302T.4	Mid Term-2, Quiz & End Sem Exam
47	Complexation and drug action	Lecture	BP302T.4	Mid Term-2, Quiz & End Sem Exam
48	Complexation and drug action	Tutorial	BP302T.4	Mid Term-2, Quiz & End Sem Exam
49	crystalline structures of complexes	Lecture	BP302T.4	Mid Term-2, Quiz & End Sem Exam
50	Sorensen's pH scale	Lecture	BP302T.5	Mid Term-2, Quiz & End Sem Exam
51	pH determination (electrometric and calorimetric)	Lecture	BP302T.5	Mid Term-2, Quiz & End Sem Exam
52	pH determination (electrometric and calorimetric)	Tutorial	BP302T.5	Mid Term-2, Quiz & End Sem Exam
53	applications of buffers	Lecture	BP302T.5	Mid Term-2, Quiz & End Sem Exam
54	buffer equation	Lecture	BP302T.5	Mid Term-2, Quiz & End Sem Exam
55	buffer equation, buffer capacity,	Lecture	BP302T.5	Mid Term-2, Quiz & End Sem Exam
56	buffer capacity, buffers in pharmaceutical and biological systems	Tutorial	BP302T.5	Mid Term-2, Quiz & End Sem Exam
57	buffered isotonic solutions	Lecture	BP302T.5	Mid Term-2, Quiz & End Sem Exam

P. Mohanaty

58	buffered isotonic solutions	Lecture	BP302T.5	Mid Term-2, Quiz & End Sem Exam
59	buffered isotonic solutions	Lecture	BP302T.5	Mid Term-2, Quiz & End Sem Exam
60	buffered isotonic solutions	Tutorial	BP302T.5	Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

Code	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
C302.1	Write the importance of solubility in designing of dosage forms and principles of diffusion in biological systems.	3	3	-	-	3	2	-	-	-	1	-
C302.2	Classify the states of matter and understand the applications of various physiochemical properties to design dosage forms	1	-	3	2	-	-	-	-	-	1	1
C302.3	Explain the principles of interfacial tension and the applications of surface active agents in drug solubilization	3	2	1	-	-	-	-	1	-	-	1
C302.4	Make use of concepts of	1	2	1	1	0	1	-	-	1	-	2

	complexation and protein binding in pharmacy											
C302.5	Function of pH, buffers and their use in the stabilization of pharmaceutical formulations.	1	2	2	-	2	-	-	-	1	2	3
Average		1.8	1.8	1.66	1.4	1	0.6	1	0.2	0.4	0.8	1.4

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutics I MID-SEMESTER (SEM –IIIrd) 2021-22						
Class: B.Pharm, III Semester						
Subject Name: BP 302T Physical Pharmaceutics-I Theory		Time: 1 Hrs		Max. Marks: 30		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,4,5	Q.6,8, 10	Q.2,3	Q.7,9,		

The student will be able to

C302.1 Write the importance of solubility in designing of dosage forms and principles of diffusion in biological systems.

C302.2 Classify the states of matter and understand the applications of various physiochemical properties to design dosage forms

C302.3 Explain the principles of interfacial tension and the applications of surface active agents in drug solubilization

C302.4 Make use of concepts of complexation and protein binding in pharmacy

C302.5 Function of pH, buffers and their use in the stabilization of pharmaceutical formulations.

CO Map	Question No.	Question	Marks
CO3	Q.1	Define spreading co-efficient	2
CO1	Q.2	Fick's law of diffusion	2
CO3	Q.3	Mechanism action of wetting agent	2
CO5	Q.4	Define buffer and buffer capacity	2
CO2	Q.5	Define optical rotation	2
CO4	Q.6	Enumerate the methods for analysis of complexes and explain in detail about solubility method and pH titration method	10
CO1	Q.7	Explain the term solubility, brief out the factors influencing solubility of solid in liquids and gas in liquids	10
CO2	Q.8	Write the methods to achieve liquefaction of gases with neat labeled diagram	5
CO4	Q.9	Enumerate the methods for analysis of complexes and explain in detail about solubility method and pH titration method	5

CO1	Q.10	Explain steady state diffusion and derive fick's first law	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

89.5 % Percentage of students secured more than 60% marks, so this course Physical Pharmaceutics I – Theory (BP302T) attained Level 3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)
Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOLOGY

PROGRAMME OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge asscoited with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions

[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "-"

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
III SEM	BP 303T	3	3	3	3	2	2	3	1	1	3	1	-	-	-

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACOLOGY
Course Handout
Course : PHARMACEUTICAL MICROBIOLOGY (Theory)
Course Code : BP303T, Credits : 04, Session : 2021-22 (Odd Sem.), Class : B. Pharm. 2nd Year
Faculty Name : Mrs Monika Kaushik/ Dr. M. Sathish Kumar

A. Introduction: This subject is intended to impart the fundamental knowledge on various aspects (study of all organisms that are invisible to the naked eye- that is the study of microorganisms. Microbiology has an impact on medicine and in addition, emphasis on to;

1. Microorganisms are necessary for the production of bread, cheese, beer, antibiotics, vaccines, vitamins, enzymes etc.
2. Microbiology has an impact on agriculture, food science, ecology, genetics, biochemistry, immunology etc.

B. Course Outcomes: At the end of the course, students will be able to:

BP303T.1. Understand methods of identification, cultivation and preservation of various microorganisms

BP303T.2. Importance of sterilization in microbiology. and pharmaceutical industry

BP303T.3. Learn sterility testing of pharmaceutical products.

BP303T.4. Microbiological standardization of Pharmaceuticals.

BP303T.5. Understand the cell culture technology and its applications in pharmaceutical industries.

C. Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions

during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**

Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	A minimum of 80% attendance is required to be maintained by a student to be qualified for taking up the Odd Semester examination	A	4 %
	Quiz/ Assignment/Open book test/ Field work/Group discussion/ Seminar	Q/A/OBT/FW/GD/S	3%
	Student – Teacher interaction	STA	3%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

Q: Quiz, A: Assignment, OBT: Open book test, FW: Field work, GD: Group discussion, S: Seminar

E. Syllabus

Unit I. 10 Hours

Introduction, history of microbiology, its branches, scope and its importance. a) Introduction to Prokaryotes and Eukaryotes. b) Study of ultra-structure and morphological classification of bacteria, nutritional requirements, raw materials used for culture media and physical parameters for growth, growth curve, isolation and preservation methods for pure cultures, cultivation of anaerobes, quantitative measurement of bacterial growth (total & viable count). c) Study of different types of phase constrast microscopy, dark field microscopy and electron microscopy.

Unit II. 10 Hours

a) Identification of bacteria using staining techniques (simple, Gram's &Acid fast staining) and biochemical tests (IMViC). b) Study of principle, procedure, merits, demerits and applications of Physical, chemical and mechanical method of sterilization. c) Evaluation of the efficiency of sterilization methods. d) Equipments employed in large scale sterilization. Sterility indicators.

Unit III. 10 Hours

a) Study of morphology, classification, reproduction/replication and cultivation of Fungi and Virus. b) Classification and mode of action of disinfectants. c) Factors influencing disinfection, antiseptics and their evaluation. For bacteriostatic and bactericidal actions. d) Evaluation of bactericidal & Bacteriostatic. e) Sterility testing of products (solids, liquids, ophthalmic and other sterile products) according to IP, BP and USP.

Unit IV. 08 Hours

Designing of aseptic area, laminar flow equipments; study of different sources of contamination in an aseptic area and methods of prevention, clean area classification. a) Principles and methods of different microbiological assay. Methods for standardization of antibiotics, vitamins and amino acids. b) Assessment of a new antibiotic and testing of antimicrobial activity of a new substance. c) General aspects-environmental cleanliness.
Unit V. 07Hours
a). Types of spoilage, factors affecting the microbial spoilage of pharmaceutical products, sources and types of microbial contaminants, assessment of microbial contamination and spoilage. b) Preservation of pharmaceutical products using antimicrobial agents, evaluation of microbial stability of formulations. c) Growth of animal cells in culture, general procedure for cell culture, Primary, established and transformed cell cultures. d) Application of cell cultures in pharmaceutical industry and research.

Examination Scheme:

Components	CT	A	Q/A/OBT/FW/GD/S	STI	EE
Weightage (%)	15	4	3	3	75

Q: Quiz, A: Assignment, OBT: Open book test, FW: Field work, GD: Group discussion, S: Seminar, STI: Student – Teacher interaction

F. Suggested Text/Reference Books:

1. W.B. Hugo and A.D. Russel: Pharmaceutical Microbiology, Blackwell Scientific publications, Oxford London.
2. Prescott and Dunn., Industrial Microbiology, 4th edition, CBS Publishers & Distributors, Delhi.
3. Pelczar, Chan Kreig, Microbiology, Tata McGraw Hill edn.
4. Malcolm Harris, Balliere Tindall and Cox: Pharmaceutical Microbiology.
5. Rose: Industrial Microbiology.
6. Probisher, Hinsdill et al: Fundamentals of Microbiology, 9th ed. Japan
7. Cooper and Gunn's: Tutorial Pharmacy, CBS Publisher and Distribution.
8. Peppler: Microbial Technology.
9. I.P., B.P., U.S.P.- latest editions.
10. Ananthnarayan : Text Book of Microbiology, Orient-Longman, Chennai
11. Edward: Fundamentals of Microbiology.
12. N.K.Jain: Pharmaceutical Microbiology, Vallabh Prakashan, Delhi
13. Bergeys manual of systematic bacteriology, Williams and Wilkins- A Waverly company

G. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1.	Introduction, history of microbiology, its branches, scope and its importance.	Lecture	BP303T.1	Mid Term-1, Quiz & End Sem Exam

2.	Branches of microbiology, scope and its importance.	Lecture	BP303T.1	Mid Term-1, Quiz & End Sem Exam
3.	Introduction to Prokaryotes Eukaryotes	Lecture	BP303T.1	Mid Term-1, Quiz & End Sem Exam
4.	Tutorial 1	Tutorial1		
5.	*Study of ultra-structure of bacteria*	Lecture	BP303T.1	Mid Term-1, Quiz & End Sem Exam
6.	Study of morphological classification of bacteria	Lecture	BP303T.1	Mid Term-1, Quiz & End Sem Exam
7.	Study of nutritional requirements of bacteria, raw materials used for culture media	Lecture	BP303T.1	Mid Term-1, Quiz & End Sem Exam
8.	Tutorial 2	Tutorial 2		
9.	Study of physical parameters for of bacterial growth	Lecture	BP303T.1	Mid Term-1, Quiz & End Sem Exam
10.	Study of growth curve	Lecture	BP303T.1	Mid Term-1, Quiz & End Sem Exam
11.	Study of isolation and preservation methods for pure culture	Lecture	BP303T.1	Mid Term-1, Quiz & End Sem Exam
12.	Tutorial 3	Tutorial 3		
13.	Study of quantitative measurement of bacterial growth (total & viable count).	Lecture	BP303T.1	Mid Term-1, Quiz & End Sem Exam
14.	Study of different types of phase constrast microscopy	Lecture	BP303T.1	Mid Term-1, Quiz & End Sem Exam
15.	Study of dark field microscopy and electron microscopy.	Lecture	BP303T.1	Mid Term-1, Quiz & End Sem Exam
16.	Tutorial 4	Tutorial4		
17.	Identification of bacteria using staining techniques (simple staining, Gram's staining, Acid fast staining)	Lecture	BP303T.2	Mid Term-1, Quiz & End Sem Exam
18.	Identification of bacteria using biochemical tests (IMViC).	Lecture	BP303T.2	Mid Term-1, Quiz & End Sem Exam
19.	Study of principle, procedure, merits, demerits and applications of Physical, chemical and mechanical method of sterilization.	Lecture	BP701T.2	Mid Term-1, Quiz & End Sem Exam
20.	Tutorial 5	Tutorial 5		

21.	Evaluation of the efficiency of sterilization methods.	Lecture	BP303T.2	Mid Term-1, Quiz & End Sem Exam
22.	Equipments employed in large scale sterilization.	Lecture	BP303T.2	Mid Term-1, Quiz & End Sem Exam
23.	Sterility indicators	Lecture	BP303T.2	Mid Term-1, Quiz & End Sem Exam
24.	Tutorial 6	Tutorial 6		
25.	Study of morphology and classification of Fungi.	Lecture	BP303T.3	Mid Term-2, Quiz & End Sem Exam
26.	Study of reproduction/replication of Fungi	Lecture	BP303T.3	Mid Term-2, Quiz & End Sem Exam
27.	Study of cultivation of Fungi	Lecture	BP303T.3	Mid Term-2, Quiz & End Sem Exam
28.	Tutorial 7	Tutorial 7		
29.	Study of morphology of Virus.	Lecture	BP303T.3	Mid Term-2, Quiz & End Sem Exam
30.	Study of classification and cultivation of Virus.	Lecture	BP303T.3	Mid Term-2, Quiz & End Sem Exam
31.	Study of reproduction/replication of Virus.	Lecture	BP303T.3	Mid Term-2, Quiz & End Sem Exam
32.	Classification of action of disinfectants method of sterilization.	Lecture	BP303T.3	Mid Term-2, Quiz & End Sem Exam
33.	Classification and mode of action of disinfectants method of sterilization.	Lecture	BP303T.3	Mid Term-1, Quiz & End Sem Exam
34.	Tutorial 08	Tutorial 08		
35.	Factors influencing disinfection, antiseptics and their evaluation.	Lecture	BP303T.3	Mid Term-1, Quiz & End Sem Exam
36.	applications of Physical, chemical and mechanical method of sterilization	Lecture	BP303T.3	Mid Term-2, Quiz & End Sem Exam
37.	Evaluation of bactericidal & Bacteriostatic.	Lecture	BP303T.3	Mid Term-2, Quiz & End Sem Exam
38.	Tutorial 09	Tutorial 09		
39.	Sterility testing of products (solids, liquids, ophthalmic and other sterile products)	Lecture	BP303T.3	Mid Term-2, Quiz & End Sem Exam

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	according to IP, BP and USP.			
40.	Designing of aseptic area, laminar flow.	Lecture	BP303T.4	Mid Term-2, Quiz & End Sem Exam
41.	Designing of study of different sources of contamination.	Lecture	BP303T.4	Mid Term-2, Quiz & End Sem Exam
42.	Tutorial 10	Tutorial 10		
43.	methods of prevention, clean area classification.	Lecture	BP303T.4	Mid Term-2, Quiz & End Sem Exam
44.	Principles and methods of different microbiological assay.	Lecture	BP303T.4	Mid Term-2, Quiz & End Sem Exam
45.	Tutorial 11	Tutorial 11		
46.	Methods for standardization of antibiotics, vitamins and amino acids.	Lecture	BP303T.4	Quiz & End Sem Exam
47.	Assessment of a new antibiotic.	Lecture	BP303T.4	Quiz & End Sem Exam
48.	testing of antimicrobial activity of a new substance.	Lecture	BP303T.4	Quiz & End Sem Exam
49.	Tutorial 12	Tutorial 12		
50.	General aspects- environmental cleanliness. Types of spoilage	Lecture	BP303T.5	Quiz & End Sem Exam
51.	factors affecting the microbial spoilage of pharmaceutical products, sources and types of microbial contaminants, assessment of microbial contamination and spoilage.	Lecture	BP303T.5	Quiz & End Sem Exam
52.	sources of microbial contaminants	Lecture	BP303T.5	Quiz & End Sem Exam
53.	Tutorial 13	Tutorial 13		
54.	types of microbial contaminants,	Lecture	BP303T.5	Quiz & End Sem Exam
55.	assessment of microbial contamination and spoilage.	Lecture	BP303T.5	Quiz & End Sem Exam
56.	Preservation of pharmaceutical products using antimicrobial agents, evaluation of microbial stability of formulations.	Lecture	BP303T.5	Quiz & End Sem Exam
57.	Tutorial 13	Tutorial 13		
58.	Growth of animal cells in	Lecture	BP303T.5	Mid Term-2,

	culture			Quiz & End Sem Exam
59.	Tutorial 14	Tutorial 14		
60.	general procedure for cell culture, Primary, established and transformed cell cultures	Lecture	BP303T.5	Mid Term-2, Quiz & End Sem Exam
61.	Application of cell cultures in pharmaceutical industry and research.	Lecture	BP303T.5	Mid Term-2, Quiz & End Sem Exam
62.	Tutorial 15	Tutorial 15		

H. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP303T.1	Discuss various methods used for evaluation of disinfectants.	2	2	3	2	-	1	2	1	-	-	1
BP303T.2	*Discuss phenol coefficient test.*	2	2	2	3	-	1	1	1	-	-	1
BP303T.3	*What is sterilization? Explain in detail the various physical methods of sterilization.*	2	1	1	-	-	1	3	2	-	-	-
BP303T.4	*Discuss the various applications of cell cultures in pharmaceutical industries*	2	2	2	1	-	1	-	-	-	-	-
BP303T.5	*Write a note on chemical indicators of sterilization.*	2	1	-	-	-	2	1	1	-	-	1

Sample Question Paper

Amity School of Pharmacy Department of Pharmacology I MID-SEMESTER(SEM–III)2021-22						
Class: B.Pharm.- III Semester						
Subject Name: BP303T PHARMACEUTICAL MICROBIOLOGY (Theory)		Time:1 Hrs			Max.Marks:30	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,4	Q.2,3	Q.4	Q.2,5,6		

CO Map	Question No.	Question	Marks
CO1	Q.1	Write down the principle of pour plate.	2
CO1	Q.2	Define IMViC test.	2
	Q.3	Write down the microbiological assay of antibiotics.	2
	Q.4	Define Hanging drop method.	2
	Q.5	Differentiate among Gram +ve and Gram -ve bacteria.	2
CO1	Q.6	a) Give description of most common biochemical test used for identification of bacteria. b) Explain the principle of acid-fast staining of bacteria.	10
CO2	Q.7	a) Discuss the various applications of cell cultures in pharmaceutical industries. b) Write a note on Pour Plate method.	10
CO2	Q.8	Explain the growth curve of bacteria in detail.	5
	Q.9	Explain the various substances required for the growth of microorganisms.	5

CO2	Q.10	Explain the principle of moist heat and radiation sterilization method.	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

100% Percentage of students secured more than 60% marks, so this course Pharmaceutical Microbiology – Theory (BP303T) attained Level 3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)
Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICS

PROGRAMME OUTCOMES AND PROGRAMME-SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Program Outcomes:

[PO.1]. Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills, and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific inquiry, thinking analytically, clearly, and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership, and team-building when planning changes required for the fulfillment of practice, and professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication, and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Programme Specific Outcomes:

PSO 1: Will be able to design, develop and implement efficient software for a given real life problem.

PSO 2: Will be able to apply knowledge of AI, Machine Learning and Data Mining in analyzing big data forextracting useful information from it and for performing predictive analysis.

PSO 3: Will be able to design, manage and secure wired/ wireless computer networks for transfer and sharing ofinformation.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
III SEM	BP304T	3	2	3	1	-	-	1	-	-	3	2				

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICS
Course Handout
Course : PHARMACEUTICAL ENGINEERING THEORY
Course Code : BP304T, Crédits : 04, Session :2021-22 (Odd Sem.), Class : B.Pharm. 2nd Year
Faculty Name: Dr. V. Murugesan

A. **Introduction:** This course is designed to impart fundamental knowledge on the art and science of various unit operations used in the pharmaceutical industry.

B. **Course Outcomes:** At the end of the course, students will be able to:

BP304T.1. **Define** various unit operations used in pharmaceutical industries.

BP304T.2. **Relate** the material handling techniques according to the available materials.

BP304T.3. **Explain** various processes & equipment involved in the pharmaceutical manufacturing process.

BP304T.4. **Analys**e various conditions & precautions to prevent environmental pollution.

BP304T.5. **Analyse & Plan** plant layout design for optimum use of resources.

BP304T.6 Utilize various preventive methods used for corrosion control in pharmaceutical industries.

C. **Programme Outcomes:**

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during

daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Programme Specific Outcomes:

PSO 1: Will be able to design, develop and implement efficient software for a given real life problem.

PSO 2: Will be able to apply knowledge of AI, Machine Learning and Data Mining in analyzing big data forextracting useful information from it and for performing predictive analysis.

PSO 3: Will be able to design, manage and secure wired/ wireless computer networks for transfer and sharing ofinformation.

E. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

F. Syllabus

UNIT – I

Flow of fluids: Types of manometers, Reynolds number and its significance, Bernoulli's theorem and its applications, Energy losses, Orifice meter, Venturimeter, Pitot tube and Rotometer.

Size Reduction: Objectives, Mechanisms & Laws governing size reduction, factors affecting size reduction, principles, construction, working, uses, merits and demerits of Hammer mill, ball mill, fluid energy mill, Edge runner mill & end runner mill.

Size Separation: Objectives, applications & mechanism of size separation, official standards of powders, sieves, size separation Principles, construction, working, uses, merits and demerits of Sieve shaker, cyclone separator, Air separator, Bag filter & elutriation tank.

UNIT – II

Heat Transfer: Objectives, applications & Heat transfer mechanisms. Fourier's law, Heat transfer by conduction, convection & radiation. Heat interchangers & heat exchangers.

Evaporation: Objectives, applications and factors influencing evaporation, differences between evaporation and other heat process. principles, construction, working, uses,

merits and demerits of Steam jacketed kettle, horizontal tube evaporator, climbing film evaporator, forced circulation evaporator, multiple effect evaporator& Economy of multiple effect evaporator.

Distillation: Basic Principles and methodology of simple distillation, flash distillation, fractional distillation, distillation under reduced pressure, steam distillation & molecular distillation

UNIT – III

Drying: Objectives, applications & mechanism of drying process, measurements & applications of Equilibrium Moisture content, rate of drying curve. principles, construction, working, uses, merits and demerits of Tray dryer, drum dryer spray dryer, fluidized bed dryer, vacuum dryer, freeze dryer.

Mixing: Objectives, applications & factors affecting mixing, Difference between solid and liquid mixing, mechanism of solid mixing, liquids mixing and semisolids mixing. Principles, Construction, Working, uses, Merits and Demerits of Double cone blender, twin shell blender, ribbon blender, Sigma blade mixer, planetary mixers, Propellers, Turbines, Paddles & Silverson Emulsifier,

UNIT – IV

Filtration: Objectives, applications, Theories & Factors influencing filtration, filter aids, filter medias. Principle, Construction, Working, Uses, Merits and demerits of plate & frame filter, filter leaf, rotary drum filter, Meta filter & Cartridge filter, membrane filters and Seidtz filter.

Centrifugation: Objectives, principle & applications of Centrifugation, principles, construction, working, uses, merits and demerits of Perforated basket centrifuge, Non-perforated basket centrifuge, semi continuous centrifuge & super centrifuge.

UNIV – V

Materials of pharmaceutical plant construction, Corrosion and its prevention: Factors affecting during materials selected for Pharmaceutical plant construction, Theories of corrosion, types of corrosion and there prevention. Ferrous and nonferrous metals, inorganic and organic non metals, basic of material handling systems.

G. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

H. Suggested Text/Reference Books:

1. Introduction to chemical engineering – Walter L Badger & Julius Banchero, Latest edition.

2. Solid phase extraction, Principles, techniques and applications by Nigel J.K. Simpson-Latest edition.

3. Unit operation of chemical engineering – Mcabe Smith, Latest edition.

4. Pharmaceutical engineering principles and practices – C.V.S Subrahmanyam et al., Latest edition.

5. Remington practice of pharmacy- Martin, Latest edition.

6. Theory and practice of industrial pharmacy by Lachmann., Latest edition.

7. Physical pharmaceutics- C.V.S Subrahmanyam et al., Latest edition. 8. Cooper and Gunn's Tutorial pharmacy, S.J. Carter, Latest edition.

I. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Introduction to flow of fluid and simple manometer	Lecture	2	Mid Term-1, Quiz & End Sem Exam
2	Differential and inclined manometer, Energy losses	Lecture	2,5	Mid Term-1, Quiz & End Sem Exam
3	Reynolds number and its significance	Lecture	3	Mid Term-1, Quiz & End Sem Exam
4	Doubt clearing session	Tutorial	2,3,5	Mid Term-1, Quiz & End Sem Exam
5	Bernoulli's theorem and its applications	Lecture	2	Mid Term-1, Quiz & End Sem Exam
6	Orifice meter, Venturimeter	Lecture	2	Mid Term-1, Quiz & End Sem Exam
7	Pitot tube, Rotameter	Lecture	2	Mid Term-1, Quiz & End Sem Exam
8	Revision of fluid flow	Tutorial	2.3.5	Mid Term-1, Quiz & End Sem Exam
9	Objectives, Mechanisms & Laws governing size reduction, factors affecting size reduction	Lecture	1	Mid Term-1, Quiz & End Sem Exam
10	Hammer mill, ball mill	Lecture	2, 3	Mid Term-1, Quiz & End Sem Exam
11	fluid energy mill, Edge runner mill & end runner mill	Lecture	2, 3. 5	Mid Term-1, Quiz & End Sem Exam

12	Class test	Tutorial	2,3,5	Mid Term-1, Quiz & End Sem Exam
13	Objectives, applications & mechanism of size separation, official standards of powders	Lecture	1, 2	Mid Term-1, Quiz & End Sem Exam
14	official standards of sieves, size separation Principles, construction, working, uses, merits and demerits of cyclone separator, Sieve shaker	Lecture	2,3,4	Mid Term-1, Quiz & End Sem Exam
15	Air separator, Bag filter & elutriation tank	Lecture	2,3,4	Mid Term-1, Quiz & End Sem Exam
16	Corelative discussion of size reduction & size separation	Tutorial	1,2,3,4,5	Mid Term-1, Quiz & End Sem Exam
17	Objectives, applications & Heat transfer mechanisms	Lecture	1,	Mid Term-1, Quiz & End Sem Exam
18	Heat transfer by conduction	Lecture	1	Mid Term-1, Quiz & End Sem Exam
19	Heat transfer by convection & radiation	Lecture	1	Mid Term-1, Quiz & End Sem Exam
20	Group discussion on different topics	Tutorial	1,2,3,4,5	Mid Term-1, Quiz & End Sem Exam
21	Heat interchangers	Lecture	2,3,4	Mid Term-1, Quiz & End Sem Exam
22	heat exchangers	Lecture	2,3,4	Mid Term-1, Quiz & End Sem Exam
23	Objectives, applications and factors influencing evaporation, differences between evaporation and other heat process, Steam jacketed kettle,	Lecture	1,2	Mid Term-1, Quiz & End Sem Exam
24	Revision of heat chapter	Tutorial	1,2,3,4	Mid Term-1, Quiz & End Sem Exam
25	principles, construction,	Lecture	2,3,4	Mid Term-1,

	working, uses, merits and demerits of horizontal tube evaporator, climbing film evaporator			Quiz & End Sem Exam
26	forced circulation evaporator, multiple effect evaporator & Economy of multiple effect evaporator	Lecture	2,3,4	Mid Term-1, Quiz & End Sem Exam
27	Basic Principles and methodology of simple distillation, steam distillation	Lecture	2,3,4	Mid Term-1, Quiz & End Sem Exam
28	Model making	Tutorial	3	Mid Term-1, Quiz & End Sem Exam
29	flash distillation,	Lecture	2,3,4	Mid Term-1, Quiz & End Sem Exam
30	molecular distillation	Lecture	2,3,4	Mid Term-1, Quiz & End Sem Exam
31	distillation under reduced pressure	Lecture	2,3,4	Mid Term-2, Quiz & End Sem Exam
32	Group discussion on ditillation	Tutorial	1,2,3,4,5	Mid Term-2, Quiz & End Sem Exam
33	fractional distillation	Lecture	2,3,4	Mid Term-2, Quiz & End Sem Exam
34	Drying: Objectives, applications & mechanism of drying process, measurements & applications of Equilibrium Moisture content	Lecture	2,3,4	Mid Term-2, Quiz & End Sem Exam
35	rate of drying curve, principles, construction, working, uses, merits and demerits of Tray dryer	Lecture	2,3,4	Mid Term-2, Quiz & End Sem Exam
36	Class test	Tutorial	1,2,3,4,5	Mid Term-2, Quiz & End Sem Exam
37	drum dryer, spray dryer	Lecture	2,3,4	Mid Term-2, Quiz & End Sem Exam
38	fluidized bed dryer, vacuum	Lecture	2,3,4	Mid Term-2,

	dryer			Quiz & End Sem Exam
39	freeze dryer,	Lecture	2,3,4	Mid Term-2, Quiz & End Sem Exam
40	Quiz	Tutorial	1,2,3,4,5	Mid Term-2, Quiz & End Sem Exam
41	Objectives, applications & factors affecting mixing, Difference between solid and liquid mixing	Lecture	1,2	Mid Term-2, Quiz & End Sem Exam
42	mechanism of solid mixing, liquids mixing and semisolids mixing	Lecture	2,3,4	Mid Term-2, Quiz & End Sem Exam
43	Principles, Construction, Working, uses, Merits and Demerits of Double cone blender, twin shell blender	Lecture	2,3,4	Mid Term-2, Quiz & End Sem Exam
44	Seminar	Tutorial	1,2,3,4,5	Mid Term-2, Quiz & End Sem Exam
45	ribbon blender, Sigma blade mixer, planetary mixers	Lecture	2,3,4	Mid Term-2, Quiz & End Sem Exam
46	Propellers, Turbines, Paddles & Silverson Emulsifier	Lecture	2,3,4	Mid Term-2, Quiz & End Sem Exam
47	Objectives, applications, Theories & Factors influencing filtration, filter aids	Lecture	1,2	Quiz & End Sem Exam
48	Discussion	Tutorial	1,2,3,4,5	Quiz & End Sem Exam
49	filter medias, rotary drum filter	Lecture	2,3,4	Quiz & End Sem Exam
50	Principle, Construction, Working, Uses, Merits and demerits of plate & frame filter	Lecture	2,3,4	Quiz & End Sem Exam
51	filter leaf, Meta filter & Cartridge filter, membrane filters and Seidtz filter	Lecture	2,3,4	Quiz & End Sem Exam
52	Model making	Tutorial	3	Quiz & End Sem Exam
53	Objectives, principle & applications of Centrifugation,	Lecture	1,2	Quiz & End Sem Exam

Dr. Dhananjay

54	principles, construction, working, uses, merits and demerits of Perforated basket centrifuge, Non -perforated basket centrifuge	Lecture	2,3,4	Quiz & End Sem Exam
55	semi continuous centrifuge & super centrifuge	Lecture	2,3,4	Quiz & End Sem Exam
56	Test	Tutorial	1,2,3,4,5	Quiz & End Sem Exam
57	types of corrosion and there prevention	Lecture	1,2,5, 6	Quiz & End Sem Exam
58	Ferrous and nonferrous metals, inorganic and organic non metals	Lecture	1,2,5, 6	Quiz & End Sem Exam
59	basic of material handling systems	Lecture	1,2,5, 6	Quiz & End Sem Exam
60	Unit test	Tutorial	1,2,3,4,5 ,6	Quiz & End Sem Exam

J. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP304T.1	Define various unit operations used in pharmaceutical industries.	3	1	1	-	-	-	-	-	-	-	-				
BP304T.2.	Relate the material handling techniques according to the available materials.	3	3	3	2	-	-	-	-	-	1	2				

BP304T.3.	Explain various processes & equipment involved in the pharmaceutical manufacturing process.	3	1	1	2	-	-	-	-	-	2	1				
BP304T.4.	Analyze various conditions & precautions to prevent environmental pollution.	3	3	2	1	-	-	3	-	-	3	3				
BP304T.5.	Analyze & plan plant layout design for optimum use of resources.	3	3	2	1	-	-	3	-	-	3	3				
BP304T.6.	Utilize various preventive methods used for corrosion control in pharmaceutical industries.	3	3	3	1	-	-	-	-	-	3	1				

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutics I MID-SEMESTER (SEM –IIIrd) 2021-22						
Class: B.Pharm, III Semester						
Subject Name: BP304T Pharmaceutical Engineering Theory		Time: 1 Hrs		Max. Marks: 30		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,2,4	Q.3,5	Q.7,9	Q. 8,		

Students will be able to
CO1: List the broad perceptive of cloud architecture and model.
CO2: Apply different cloud programming models as per need.

CO Map	Question No.	Question	Marks
CO2	Q.1	How solubility can be enhanced by the reduction in the particle size of a solid material?	2
CO3	Q.2	What are the basic objectives of size reduction?	2
CO3	Q.3	Explain the term “sieve number” & Nominal size of the aperture.	2
CO3	Q.4	Which working principle is there for the hammer mill.	2
CO2	Q.5	Illustrate the types of energy losses that can occur when a fluid is flowing through a closed pipe.	2
	Q.6	Derive the basic equation for the flow of fluid through the pipe and discuss its applications.	10
CO3	Q.7	Make use of a suitable diagram of a tray dryer for explaining its principle, construction, working, uses, advantages and disadvantages.	10
CO2	Q.8	List the types of distillation.	5
CO4	Q.9	Identify the various factors that can affect the size reduction of raw materials.	5
CO3	Q.10	Explain the Reynolds classic experiment elucidating different types of flow patterns when a liquid flows through a closed channel.	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

94.7 % Percentage of students secured more than 60% marks, so this course Pharmaceutical Engineering – Theory (BP304T) attained Level 3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)
Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharmacy), Academic Year – 2021-2022

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturingpractices.

[PO.2].Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meetdeadlines.

[PO.3].Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensibledecisions.

[PO.4].Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5].Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6].Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7].Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values,

communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8].**Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clearinstructions.

[PO.9].**The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacypractice.

[PO.10].**Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11].**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoingbasis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMMEARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11				
III SEM	BP305P	3	3	3	3	-	-	1		1	-	3		-	-	-

Dr. Mohanraty

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICAL CHEMISTRY
Course Handout
Course : PHARMACEUTICAL ORGANIC CHEMISTRY-II (Practical)
Course Code : BP305P, Crédits : 02, Session : 2021-22 (Odd Sem.), Class : B.Pharm. 2nd Year
Faculty Name : Dr. ParameshwarRavula, Dr. S. Vijayraj

Introduction: This subject imparts knowledge on synthesis of organic compounds that could involve with design, chemical synthesis and development of medicinal compounds. Further, characterization of oils including standardization of their reagents.

A. ***Course Outcomes:***At the end of the course

BP305P.1. Students will be able to understand principle and procedure of melting point determination, purification and steam distillation.

BP305P.2. Students will be able to **estimate** different analytical constantstofindthequalityofoils.

BP305P.3. Students will be able to **acquire** knowledge about pharmaceutical organic compounds, with emphasis on their synthetic methods.

BP305P.4. Students will be able to **illustrate** the experiments relating to preparations of organic compounds.

BP305P.5. Students will be able to **apply**reagents and various named reactions for synthesis of organic compounds.

B. Programme Outcomes:

[PO.1].Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturingpractices.

[PO.2].Planning Abilities: Demonstrate effective planning abilities including

time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meetdeadlines.

[PO.3].**Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensibledecisions.

[PO.4].Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5].**Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6].**Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers,employees).

[PO.7].**Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with thedecisions.

[PO.8].**Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clearinstructions.

[PO.9].**The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and

the consequent responsibilities relevant to the professional pharmacypractice.

[PO.10].Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainabledevelopment.

[PO.11].Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoingbasis.

C. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance isrequiredtobemaintainedbyastudentto be qualified for taking up the EndSemester examination. The allowanceof 20%includesalltypesofleaves includingmedicalleaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

D. Syllabus

I . Experiments involving laboratory techniques

- Recrystallization
- Steam distillation

II . Determination of following oil values (including standardization of reagents)

- Acid value
- Saponification value

- Iodine value

III . **Preparation of compounds**

- Benzanilide/Phenyl benzoate/Acetanilide from Aniline/ Phenol /Aniline by acylation reaction.
- 2,4,6-Tribromo aniline/Para bromo acetanilide from Aniline/Acetanilide by halogenation (Bromination) reaction.
- 5-Nitro salicylic acid/Meta di nitro benzene from Salicylic acid / Nitro benzene by nitration reaction.
- Benzoic acid from Benzyl chloride by oxidation reaction.
- Benzoic acid/ Salicylic acid from alkyl benzoate/ alkyl salicylate by hydrolysis reaction.
- 1-Phenyl azo-2-napthol from Aniline by diazotization and coupling reactions.
- Benzil from Benzoin by oxidation reaction.
- Dibenzal acetone from Benzaldehyde by Claison Schmidt reaction
- Cinnammic acid from Benzaldehyde by Perkin reaction

E. Examination Scheme:

Components	A	CT	LR	V	EE
Weightage (%)	2	10	1	2	35

LT: Lab Test,PR/RVV: Practical Records/ Regular viva voce, EE: End Semester Examination; A: Attendance

F. Suggested Text/Reference Books:

- Organic chemistry by I.L. Finar, Volume-I & II.
- A text book of organic chemistry – Arun Bahl, B.S. Bahl.
- Heterocyclic Chemistry by Raj K. Bansal
- Organic Chemistry byMorrison and Boyd

G. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Recrystallization	Practical	BP305P.1	Mid Term-1, PR/RVV&End Sem Exam
2	Steam distillation	Practical	BP305P.1	Mid Term-1, PR/RVV & End Sem Exam
3	Melting point	Practical	BP305P.1	Mid Term-1,

				PR/RVV & End Sem Exam
4	Acid value	Practical	BP305P.2	Mid Term-1, PR/RVV & End Sem Exam
5	Saponification value	Practical	BP305P.2	Mid Term-1, PR/RVV & End Sem Exam
6	Iodine value	Practical	BP305P.2	Mid Term-1, PR/RVV & End Sem Exam
7	Benzanilide/Phenyl benzoate/Acetanilide from Aniline/ Phenol /Aniline by acylation reaction.	Practical	BP305P.3 & BP305P.4	Mid Term-1, PR/RVV & End Sem Exam
8	2,4,6-Tribromo aniline/Para bromo acetanilide from Aniline/Acetanilide by halogenation (Bromination)	Practical	BP305P.3 & BP305P.4	Mid Term-1, PR/RVV & End Sem Exam
9	5-Nitro salicylic acid/Meta di nitro benzene from Salicylic acid / Nitro benzene by nitration reaction.	Practical	BP305P.3 & BP305P.4	Mid Term-2, PR/RVV & End Sem Exam
10	Benzoic acid from Benzyl chloride by oxidation reaction.	Practical	BP305P.3 & BP305P.5	Mid Term-2, PR/RVV & End Sem Exam
11	Benzoic acid from alkyl benzoate by hydrolysis reaction.	Practical	BP305P.3 & BP305P.5	Mid Term-2, PR/RVV & End Sem Exam
12	1-Phenyl azo-2-napthol from Aniline by diazotization and coupling reactions.	Practical	BP305P.3 & BP305P.4	Mid Term-2, PR/RVV & End Sem Exam
13	Benzil from Benzoin by oxidation reaction.	Practical	BP305P.3 & BP305P.4	Mid Term-2, PR/RVV & End Sem

				Exam
14	Dibenzal acetone from Benzaldehyde by Claison Schmidt reaction	Practical	BP305P.3 & BP305P.4	Mid Term-2, PR/RVV & End Sem Exam
15	Cinnammic acid from Benzaldehyde by Perkin reaction	Practical	BP305P.3 & BP305P.4	Mid Term-2, PR/RVV & End Sem Exam
16	Salicylic acid from alkyl salicylate by hydrolysis reaction.	Practical	BP305P.3 & BP305P.5	Mid Term-2, PR/RVV & End Sem Exam

H. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP305P.1.	Students will be able to understand principle and procedure of melting point determination, purification and steam distillation..	3	3	3	3				1	1		3
BP305P.2.	Students will be able to **estimate** different analytical constantstofindthequalityof oils.	3	3	3	3				1	2		3
BP305P.3.	Students will be able to **acquire** knowledge about pharmaceutical organic compounds, with emphasis on their synthetic methods.	3	3	3	3				1	3		3
BP305P.4.	Students will be able to **illustrate** the experiments relating to preparations of organic compounds.	3	3	3	3				2	2		3

BP305P.5.	Students will be able to **apply** reagents and various named reactions for synthesis of organic compounds.	3	3	3	3				2	2		3

SampleQuestionPaper

Amity Institute of pharmacy DepartmentofPharmaceutical Chemistry IIMID-SEMESTER(SEM–III)2021-22						
Class:B.PharmacyIIISemester						
SubjectName: BP305PPHARMACEUTICAL ORGANIC CHEMISTRY-II PRACTICALS		Time:4Hr		Max.Marks:40		
Levels of thequestions as perBloomsTaxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
QuestionMapping	Q5	Q.1,2	Q.3, 4			

CO.1. Students will be able to **understand** principle and procedure of melting point determination, purification and steam distillation.

CO.2. Students will be able to **estimate** different analytical constantstofindthequalityofoils.

CO.3. Students will be able to **acquire** knowledge about pharmaceutical organic compounds, with emphasis on their synthetic methods.

CO.4. Students will be able to **illustrate** the experiments relating to preparations of organic compounds.

CO.5. Students will be able to **apply** reagents and various named reactions for synthesis of organic compounds.

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COMap	QuestionNo.	Question	Marks
CO3	Q.1	Explain the principle involved in the preparation of tribromo aniline	5

CO3	Q.2	Explain the principle involved in the preparation of 1-Phenyl azo-2-napthol	5
CO4 &CO5	Q.3	To prepare, submit and report the percentage yield of Dibenzal acetone	10
CO4 & CO5	Q.4	To prepare, submit and report the percentage yield of Benzoic acid	15
CO4 & CO5	Q5	Viva	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

100 % Percentage of students secured more than 60% marks, so this course Pharmaceutical Organic Chemistry II – Practical (BP305P) attained Level 3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)
Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOLOGY

PROGRAMME OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1].**Pharmacy Knowledge:** Posses knowledge and compression of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions

[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

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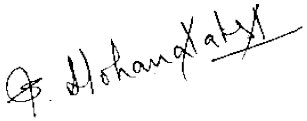
[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.



[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "-"

PROGRAMME ARTICULATION MATRIX												
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
III SEM	BP 307P	2	2	2	3	1	2	2	1	3	2	3

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACOLOGY
Course Handout
Course : Pharmaceutical Microbiology (Practical)
Course Code : BP307P, Credits : 02, Session : 2021-22 (Odd Sem.), Class : B. Pharm. 2nd Year
Faculty Name : Mrs Monika Kaushik, Dr. M. Sathish Kumar

Introduction: This subject is designed to impart fundamental and practical knowledge of pharmaceutical *microbiology* and various categories of microorganisms especially for the production of alcohol, antibiotics, vaccines, vitamins enzymes etc.

A. Course Outcomes: At the end of the course, students will be able to:

BP307P: 1. Understand working of different equipment's used in experimental microbiology.
BP307P: 2 Sterilization methods of glassware, preparation and sterilization of media.
BP307P: 3 Preparation of culture media and Sub culturing of bacteria and fungus.
BP307P: 4 Staining methods for identification of microorganisms.
BP307P: 5 Microbiological assays of antibiotics and amino acids.
BP307P: 6 Process of Sterility testing of pharmaceuticals.

B. Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

C. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

PR: Practical Records, RV: Regular viva, As: Assignment

D. Syllabus

1. Introduction and study of different equipments and processing, e.g., B.O.D. incubator, laminar flow, aseptic hood, autoclave, hot air sterilizer, deep freezer, refrigerator, microscopes used in experimental microbiology.
2. Sterilization of glassware, preparation and sterilization of media.
3. Sub culturing of bacteria and fungus. Nutrient stabs and slants preparations.
4. Staining methods- Simple, Grams staining and acid fast staining (Demonstration with practical).
5. Isolation of pure culture of micro-organisms by multiple streak plate technique and other techniques.
6. Microbiological assay of antibiotics by cup plate method and other methods
7. Motility determination by Hanging drop method.
8. Sterility testing of pharmaceuticals.
9. Bacteriological analysis of water
10. Biochemical test.

E. Examination Scheme:

Components	A	CT	LR	V	EE
Weightage (%)	2	10	1	2	35

PR: Practical Records, RV: Regular viva, As: Assignment

F. Suggested Text/Reference Books:

1. W.B. Hugo and A.D. Russel: Pharmaceutical Microbiology, Blackwell Scientific publications, Oxford London.
2. Prescott and Dunn., Industrial Microbiology, 4th edition, CBS Publishers & Distributors, Delhi.
3. Pelczar, Chan Kreig, Microbiology, Tata McGraw Hill edn.
4. Malcolm Harris, Balliere Tindall and Cox: Pharmaceutical Microbiology.
5. Rose: Industrial Microbiology.
6. Probisher, Hinsdill et al: Fundamentals of Microbiology, 9th ed. Japan
7. Cooper and Gunn's: Tutorial Pharmacy, CBS Publisher and Distribution.
8. Peppler: Microbial Technology.
9. I.P., B.P., U.S.P.- latest editions.
10. Ananthnarayan : Text Book of Microbiology, Orient-Longman, Chennai
11. Edward: Fundamentals of Microbiology.
12. N.K.Jain: Pharmaceutical Microbiology, Vallabh Prakashan, Delhi
13. Bergeys manual of systematic bacteriology, Williams and Wilkins- A Waverly company

G. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1.	Introduction and study of different equipments and processing used in experimental microbiology, e.g., B.O.D. incubator,	Practical	CO4	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both

	laminar flow.			
2.	Introduction and study of different equipments and processing used in experimental microbiology, e.g aseptic hood, autoclave, hot air sterilizer.	Practical	CO4	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
3.	Introduction and study of different equipments and processing used in experimental microbiology, e.g deep freezer, refrigerator, microscopes	Practical	CO4	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
4.	Sterilization of glassware, preparation and sterilization of media.	Practical	CO4, 9	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
5.	Sub culturing of bacteria and fungus. Nutrient stabs and slants preparations.	Practical	CO4, 11	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
6.	Staining methods- Simple, Grams staining and acid fast staining (Demonstration with practical).	Practical	CO4, 9	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
7.	Isolation of pure culture of micro-organisms by multiple streak plate technique and other techniques.	Practical	CO4, 9, 10, 11	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
8.	Microbiological assay of antibiotics by cup plate method	Practical	CO4, 10, 11	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
9.	Microbiological assay of antibiotics by turbidity method	Practical	CO4, 9	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
10.	Motility determination by Hanging drop method.	Practical	CO4	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
11.	Sterility testing of pharmaceuticals.	Practical	CO4, 10	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
12.	Bacteriological analysis of	Practical	CO4,11	Mid Term-2 & End Sem

	water			Exam as Synopsis/ Experiments/ Viva voce for both
13.	Biochemical test for determination of microbials.	Practical	CO4, 11	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both

H. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP307P: 1.	Understand working of different equipment's used in experimental microbiology.	1	1	1	3	1	-	-	1	2	2	3
BP307P: 2	Sterilization methods of glassware, preparation and sterilization of media.	2	1	1	3	1	-	1	1	2	2	2
BP307P: 3	Preparation of culture media and Sub culturing of bacteria and fungus.	1	1	1	2	1	-	-	1	1	2	2
BP307P: 4	Staining methods for identification of microorganisms.	2	1	1	3	1	-	1	1	2	3	2
BP307P: 5	Microbiological assays of antibiotics and amino acids.	2	1	1	3	1	-	1	1	2	2	2
BP307P: 6	Process of Sterility testing of pharmaceuticals.	3	1	1	2	1	-	1	1	2	2	2

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacology I MID-SEMESTER (SEM–III) 2021-22						
Class: B. Pharm III Semester						
Subject Name: Pharmaceutical Microbiology BP 307P (Practical)		Time: 4 Hrs			Max. Marks: 40	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3	Q.2	Q.3	Q.2	Q.2	
Student will be able to CO1: Understand the different equipments used in experimental microbiology. CO2: Preparation of culture media and Sub culturing of bacteria and fungus.						

CO Map	Question No.	Question	Marks
CO1 CO2	Q.1	Synopsis	10
CO1	Q.2	To identify morphology of bacteria by gram staining methods.	25
CO1 and CO2	Q.3	Viva voce	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

100% Percentage of students secured more than 60% marks, so this course Ppharmaceutical Microbiology – Practical (BP307P) attained Level 3.

AMITY UNIVERSITY
MADHYA PRADESH
Established vide Government of Madhya Pradesh Act No. 27 of 2010

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)
Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICS

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
III SEM	BP308P	3	-	3	2	-	3	-	--	1	3	1				

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DEPARTMENT OF Pharmaceutics
Course Handout
Course : PHARMACEUTICAL ENGINEERING PRACTICAL
Course Code : BP308P, Crédits : 02, Session :2021-22 (Odd Sem.), Class : B.Pharm. 2nd Year
Faculty Name: Dr. V. Murugesan

A. Introduction: The course is designed to impart skill development in the arts and science of preparing the different conventional dosage forms.

B. Course Outcomes: At the end of the course, students will be able to:

BP308P.1. To recall the principles used in the preparation of solid, liquid, and semi-solid dosage forms.

BP308P.2. Operate equipment used in the manufacturing of different dosage forms

BP308P.3. Formulate various conventional dosage forms such as solid dosage forms.

BP308P.4. Design various liquid dosage forms and semi-solid dosage forms.

BP308P.5. Estimate the ingredients calculation for preparation of dosage form

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

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[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	Description	Code	Weightage %
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

E. Syllabus

I. Determination of radiation constant of brass, iron, unpainted and painted glass.

II. Steam distillation – To calculate the efficiency of steam distillation.

III. To determine the overall heat transfer coefficient by heat exchanger.

IV. Construction of drying curves (for calcium carbonate and starch).

V. Determination of moisture content and loss on drying.

VI. Determination of humidity of air – i) From wet and dry bulb temperatures – use of Dew point method.

VII. Description of Construction working and application of Pharmaceutical Machinery such as rotary tablet machine, fluidized bed coater, fluid energy mill, de humidifier.

VIII. Size analysis by sieving – To evaluate size distribution of tablet granulations – Construction of various size frequency curves including arithmetic andlogarithmic probability plots.

IX. Size reduction: To verify the laws of size reduction using ball mill and determining Kicks, Rittinger's, Bond's coefficients, power requirement and critical speed of Ball Mill.

X. Demonstration of colloid mill, planetary mixer, fluidized bed dryer, freeze dryer and such othermajor equipment.

XI. Factors affecting Rate of Filtration and Evaporation (Surface area, Concentration and Thickness/ viscosity

XII. To study the effect of time on the Rate of Crystallization.

XIII. To calculate the uniformity Index for given sample by using Double Cone Blender.

F. Examination Scheme:

Components	A	CT	LR	V	EE
Weightage (%)	2	10	1	2	35

CT: Class Test, LR: Lab Record, V: Viva, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

- Laboratory Manual of Pharmaceutical Engineering C.V.S Subrahmanyam et. al
- Practical Pharmaceutical Engineering, Gary Prager
- Practical Manual Of Pharmaceutical Engineering By Mrs. B. Jeevana Jyothi
- Cooper and Gunn's Tutorial pharmacy, S.J. Carter, Latest edition

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Demonstrate the pharmaceutical machinery available in the lab	Practical	1, 2	Mid Term-1, Quiz & End Sem Exam
2	Explain the construction, working, and application of pharmaceutical equipment including fluidized bed coater, fluid energy mill, Silverson emulsifier	Practical	1,2	Mid Term-1, Quiz & End Sem Exam
3	Determine the effect of surface area on the rate of evaporation.	Practical	3	Mid Term-1, Quiz & End Sem Exam
4	Determine the effect of filter aid on the rate of filtration.	Practical	3, 5	Mid Term-1, Quiz & End Sem Exam
5	Deternine the crystalline behavior of	Practical	3, 5	Mid Term-1,

	copper sulfate by shock cooling method.			Quiz & End Sem Exam
6	Determine the effect of drying time on the moisture content of calcium carbonate slurry.	Practical	3,5	Mid Term-1, Quiz & End Sem Exam
7	Design the drying rate curve for given sample.	Practical	3, 5	Mid Term-1, Quiz & End Sem Exam
8	Determine the effect of surface area on the rate of drying.	Practical	3, 5	Mid Term-2, Quiz & End Sem Exam
9	Determine the humidity of the air by the dew point method	Practical	1, 3, 4, 5	Mid Term-2, Quiz & End Sem Exam
10	Demonstrate the working and construction of tablet punching machine.	Practical	1, 2, 3, 4	Mid Term-2, Quiz & End Sem Exam
11	Analyze the effect of number and size of ball on size reduction of given granular material by using a ball mill.	Practical	1, 2, 3, 4	Mid Term-2, Quiz & End Sem Exam
12	Determine the particle size distribution of a given sample by the sieving method.	Practical	1	Mid Term-2, Quiz & End Sem Exam
13	Determine the particle size distribution of a given sample by the microscopic method.	Practical	1, 3, 4	Mid Term-2, Quiz & End Sem Exam
14	Determine the effect of	Practical	3, 5	Mid

	concentration on the rate of filtration			Term-2, Quiz & End Sem Exam
15	Evaluate the effect of centrifugation speed & time on the rate of sedimentation.	Practical	3, 5	Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	
BP308P.1	Relate theoretical knowledge of equipment's practically, available in the lab	3	-	3	1	-	1	-	-	1	3	2	
BP308P.2.	Understanding of construction, working, applications and principles of various instruments available in lab.	3	2	3	3	-	1	-	-	1	3	2	
BP308P.3.	Study of various factors affecting different unit processes.	3	2	3	-	-	1	-	-	1	3	1	
BP308P.4.	Checking of working efficiency of various instruments available in lab through proper practical approach	3	3	3	3	-	3	1	-	-	1	2	

BP308P. 5.	Verification of various theories applicable to different principles of instruments	3	1	2	1	-	1	-	-	-	3	-	

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutics I MID-SEMESTER (SEM –Ist) 2021-22						
Class: B.Pharm, I Semester						
Subject Name: BP308P Pharmaceuticcal Engineering- Practical		Time: 4 Hrs		Max. Marks: 40		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3			Q.2		

Student will be able to

CO.1. Relate theoretical knowledge of equipment's practically, available in the lab

CO.2. Understanding of construction, working, applications and principles of various instruments available in lab.

CO.3. Study of various factors affecting different unit processes.

CO.4. Checking of working efficiency of various instruments available in lab through proper practical approach

CO.5. Verification of various theories applicable to different principles of instruments

CO Map	Question No.	Question	Marks
CO2	Q.1a	Synopsis- What is the principle of ball mill?	2
CO2	Q.1b	Synopsis- Compare V-cone blender & Double cone blender.	2
CO1,2,3	Q.1c	Synopsis- Which speed is correct for efficient working of ball mill and why?	2

CO1,2,4	Q.1d	Synopsis- compare double cone & V cone blender.	2
CO3,5	Q.1e	Synopsis- What is the function of cam track in tablet punching machine and write the application of humidity meausrement in manufcaturing units?	2
CO1,2, 3,4,5	Q.2	Experiment To dry $CaCo_3$ slurry and plot the drying rate curve.	25
CO1,2,3,4,5	Q.3	Viva	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

100% Percentage of students secured more than 60% marks, so this course Pharmaceutical Engineering– Practical (BP308P) attained Level 3.

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AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharmacy), Academic Year – 2021-22

Programme Outcomes:

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Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11				
IV SEM	BP401T	3	3	2	2	-	-	2	2	1	-	2		-	-	-

Dr. Mohanty

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICAL CHEMISTRY
Course Handout
Course : PHARMACEUTICAL ORGANIC CHEMISTRY-III (Theory)
Course Code : BP401T, Crédits : 04, Session :2021-22(Even Sem.), Class : B.Pharm. 2nd Year
Faculty Name : Dr. Parameshwar Ravula

A. Introduction: This subject imparts knowledge on stereo-chemical aspects of organic compounds and organic reactions, important named reactions, chemistry of important hetero cyclic compounds. It also emphasizes on medicinal and other uses of organic compounds.

B. ***Course Outcomes:*** At the end of the course

BP401T.1. Students will be able to **study** optical isomerism of compounds that could help the students to understand the chirality, sequence rules, reacemic modification of organic compounds.

BP401T.2. Students will be able to **acquire** knowledge about geometricsl isomerism of pharmaceutical organic compounds, with emphasis on their synthetic process, physical and chemical properties.

BP401T.3. Students will be able to **write** synthesis, reactions and medicinal uses different heterocyclic compounds.

BP401T.4. Students will be able to **analyze** various reactions for the synthesis of higher organic compounds.

BP401T.5. Students will be able to **apply** reagents and various named reactions for the design of organic medicinal compounds.

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

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D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal	Mid Term 1	CT	15%

Evaluation	Mid Term 2 quiz, assignment, open book test, field work, group discussion and seminar)		
	Seminar/ Assignment/Quiz/ Open book test	S/As/Q/OBT	3%
Interaction	Student-Teacher interaction	ST	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

Unit-1: Stereo isomerism

Optical isomerism–Optical activity, enantiomerism, diastereoisomerism, meso compounds,Elements of symmetry, chiral and achiral molecules DL system of nomenclature of optical isomers, sequence rules, RS system of nomenclature of optical isomers, Reactions of chiral molecules, Racemic modification and resolution of racemic mixture. Asymmetric synthesis: partial and absolute

Unit-2: Geometrical isomerism

Nomenclature of geometrical isomers (Cis Trans, EZ, Syn Anti systems)
Methods of determination of configuration of geometrical isomers.
Conformational isomerism in Ethane, n-Butane and Cyclohexane.
Stereo isomerism in biphenyl compounds (Atropisomerism) and conditions for optical activity.
Stereospecific and stereoselective reactions

Unit-3: Heterocyclic compounds:

Nomenclature and classification,Synthesis, reactions and medicinal uses of following compounds/derivatives Pyrrole, Furan, and Thiophene - Relative aromaticity, reactivity and Basicity of pyrrole

Unit-4: Synthesis, reactions and medicinal uses of following compounds/derivatives

Pyrazole, Imidazole, Oxazole and Thiazole., Pyridine, Quinoline, Isoquinoline, Acridine and Indole. Basicity of pyridine, Synthesis and medicinal uses of Pyrimidine, Purine, azepines and their derivatives

Unit-5: Reactions of synthetic importance

Metal hydride reduction (NaBH4 and LiAlH4), Clemmensen reduction, Birch reduction, Wolff Kishner reduction. Oppenauer-oxidation and Dakin reaction. Beckmanns rearrangement and Schmidt rearrangement. Claisen-Schmidt condensation.

F. Examination Scheme:

Components	A	ST	CT	S/As/Q/OBT	EE
Weightage (%)	4	3	15	3	75

CT: Class Test, As: Assignment, ST: Student teacher interaction, S/A/Q/OBT: Seminar/ Assignment/Quiz/ Open book test, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

- Organic chemistry by I.L. Finar, Volume-I & II.
- A text book of organic chemistry – Arun Bahl, B.S. Bahl.
- Heterocyclic Chemistry by Raj K. Bansal
- Organic Chemistry byMorrison and Boyd

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Optical activity	Lecture	BP401T.1	Mid Term-1, Quiz & End Sem Exam
2	Enantiomerism	Lecture	BP401T.1	Mid Term-1, Quiz & End Sem Exam
3	Meso compounds	Lecture	BP401T.1	Mid Term-1, Quiz & End Sem Exam
4	Tutorial class Optical activity	Lecture	BP401T.1	Mid Term-1, Assignment ,Quiz & End Sem Exam
5	diastereoisomerism	Lecture	BP401T.1	Mid Term-1, Quiz & End Sem Exam
6	Elements of symmetry	Lecture	BP401T.1	Mid Term-1, Quiz & End Sem Exam
7	Chiral and achiral molecules,	Lecture	BP401T.1	Mid Term-1, Quiz & End Sem Exam
8	Tutorial class Elements of symmetry	Lecture	BP401T.1	Mid Term-1, Quiz, Class test & End Sem Exam
9	Resolution	Lecture	BP401T.1	Mid Term-1, Quiz & End Sem Exam
10	DL system of nomenclature of optical isomers	Lecture	BP401T.1	Mid Term-1, Quiz & End Sem Exam
11	Sequence rules	Lecture	BP401T.1	Mid Term-1, Quiz & End Sem Exam
12	*Tutorial class:* R and S	Lecture	BP401T.1	Mid Term-1, Assignment ,Quiz & End Sem Exam

13	Racemic modification	Lecture	BP401T.1	Mid Term-1, Quiz & End Sem Exam
14	Reactions	Lecture	BP401T.1	Mid Term-1, Quiz & End Sem Exam
15	Asymmetric synthesis	Lecture	BP401T.1	Mid Term-1, Quiz & End Sem Exam
16	*Tutorial class* Asymmetric synthesis	Lecture	BP401T.1	Mid Term-1, Class test, Quiz & End Sem Exam
17	Geometrical isomerism	Lecture	BP401T.2	Mid Term-1, Quiz & End Sem Exam
18	Cis-Trans	Lecture	BP401T.2	Mid Term-1, Quiz & End Sem Exam
19	EZ	Lecture	BP401T.2	Mid Term-1, Quiz & End Sem Exam
20	*Tutorial class* Geometrical isomerism	Lecture	BP401T.2	Mid Term-1, Assignment ,Quiz & End Sem Exam
21	Syn Anti systems	Lecture	BP401T.2	Mid Term-1, Quiz & End Sem Exam
22	Methods of determination of configuration of geometrical isomers	Lecture	BP401T.2	Mid Term-1, Quiz & End Sem Exam
23	Conformational isomerism	Lecture	BP401T.2	Mid Term-1, Quiz & End Sem Exam
24	*Tutorial class* Configuration of geometrical isomers	Lecture	BP401T.2	Mid Term-1, Quiz & End Sem Exam
25	Conditions for optical activity.	Lecture	BP401T.2	Mid Term-1, Quiz & End Sem Exam
26	Stereospecific and stereoselective reactions	Lecture	BP401T.2	Mid Term-1, Quiz & End Sem Exam
27	Nomenclature of heterocyclic compounds	Lecture	BP401T.3	Mid Term-1, Quiz & End Sem Exam
28	*Tutorial class* Nomenclature	Lecture	BP401T.3	Mid Term-2, Seminar,Quiz & End Sem

				Exam
29	Classification of heterocyclic compounds	Lecture	BP401T.3	Mid Term-2, Quiz & End Sem Exam
30	Pyrrole	Lecture	BP401T.3 & BP401T.4	Mid Term-2, Quiz & End Sem Exam
31	Furan	Lecture	BP401T.3 & BP401T.4	Mid Term-2, Quiz & End Sem Exam
32	*Tutorial class* Pyrrole	Lecture	BP401T.3	Mid Term-2, Quiz & End Sem Exam
33	Thiophene.	Lecture	BP401T.3 & BP401T.4	Mid Term-2, Quiz & End Sem Exam
34	Relative aromaticity	Lecture	BP401T.3	Mid Term-2, Quiz & End Sem Exam
35	Reactivity	Lecture	BP401T.3	Mid Term-2, Quiz & End Sem Exam
36	*Tutorial class* Relative aromaticity	Lecture	BP401T.3	Mid Term-2, Assignment ,Quiz & End Sem Exam
37	Basicity of pyrrole	Lecture	BP401T.3	Mid Term-2, Quiz & End Sem Exam
38	Pyrazole	Lecture	BP401T.3	Mid Term-2, Quiz & End Sem Exam
39	Imidazole	Lecture	BP401T.3	Mid Term-2, Quiz & End Sem Exam
40	*Tutorial class* Pyrazole	Lecture	BP401T.3	Mid Term-2, Quiz & End Sem Exam
41	Oxazole	Lecture	BP401T.3 & BP401T.4	Mid Term-2, Quiz & End Sem Exam
42	Thiazole	Lecture	BP401T.3 & BP401T.4	Mid Term-2, Quiz & End Sem Exam
43	Pyridine	Lecture	BP401T.3 & BP401T.4	Mid Term-2, Quiz & End Sem Exam
44	*Tutorial class* Thiazole	Lecture	BP401T.3	Mid Term-2, Seminar, Quiz & End

P. Mohanaraty

				Sem Exam
45	Quinoline and Isoquinoline	Lecture	BP401T.3 & BP401T.4	Mid Term-2, Quiz & End Sem Exam
46	Acridine and Indole	Lecture	BP401T.3 & BP401T.4	Mid Term-2, Quiz & End Sem Exam
47	Basicity of pyridine	Lecture	BP401T.3 & BP401T.4	Mid Term-2, Quiz & End Sem Exam
48	*Tutorial class* Basicity of pyridine	Lecture	BP401T.3 & BP401T.4	Mid Term-2, Seminar, Quiz & End Sem Exam
49	Synthesis and medicinal uses of Pyrimidine, Purine, azepines	Lecture	BP401T.3 & BP401T.4	Mid Term-2, Quiz & End Sem Exam
50	Metal hydride reduction	Lecture	BP401T.5	Mid Term-2, Quiz & End Sem Exam
51	Clemmensen reduction	Lecture	BP401T.5	Mid Term-2, Quiz & End Sem Exam
52	*Tutorial class* Metal hydride reduction	Lecture	BP401T.5	Mid Term-2, Assignment ,Quiz & End Sem Exam
53	Birch reduction	Lecture	BP401T.5	Mid Term-2, Quiz & End Sem Exam
54	Wolff Kishner reduction	Lecture	BP401T.5	Mid Term-2, Quiz & End Sem Exam
55	Oppenauer-oxidation	Lecture	BP401T.5	Mid Term-2, Quiz & End Sem Exam
56	*Tutorial class* Wolff Kishner reduction	Lecture	BP401T.5	Mid Term-2, Quiz & End Sem Exam
57	Dakin reaction.	Lecture	BP401T.5	Mid Term-2, Quiz & End Sem Exam
58	Beckmanns rearrangement	Lecture	BP401T.5	Mid Term-2, Quiz & End Sem Exam
59	Schmidt rearrangement and Claisen-Schmidt condensation	Lecture	BP401T.5	Mid Term-2, Quiz & End Sem Exam
60	*Tutorial class* Claisen-Schmidt	Lecture	BP401T.5	Mid Term-2, Seminar,Qui

	condensation			z & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP401T.1.	Students will be able to study optical isomerism of compounds that could help the students to understand the chirality, sequence rules, reacemic modification of organic compounds.	3	3	3	2					1		2
BP401T.2.	Students will be able to **acquire** knowledge about geometricsl isomerism of pharmaceutical organic compounds, with emphasis on their synthetic process, physical and chemical properties.	3	3	3	3					2		2
BP401T.3.	Students will be able to **write** synthesis, reactions and medicinal uses different heterocyclic compounds.	3	3	3	3					3		2
BP401T.4.	Students will be able to analyze various reactions for the synthesis of higher organic compounds.	3	3	3	2				2	2		2

BP401T.5.	Students will be able to **apply** reagents and various named reactions for the design of organic medicinal compounds.	3	3	3	3				2	2		3

Sample Question Paper

Amity Institute of pharmacy
Department of Pharmaceutical Chemistry
II MID-SEMESTER (SEM –IV) 2021-22

Class: B.Pharmacy IV Semester

Subject Name: BP401T PHARMACEUTICAL ORGANIC CHEMISTRY-III	Time: 1 Hr	Max. Marks: 30

Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.4,5	Q.2,3,6,7,8,9		Q.1		

Student will be

CO.1. Students will be able to **study** optical isomerism of compounds that could help the students to understand the chirality, sequence rules, reacemic modification of organic compounds.

CO.2. Students will be able to **acquire** knowledge about geometricsl isomerism of pharmaceutical organic compounds, with emphasis on their synthetic process, physical and chemical properties.

CO.3. Students will be able to **write** synthesis, reactions and medicinal uses different heterocyclic compounds.

CO.4. Students will be able to **analyze** various reactions for the synthesis of higher organic compounds.

CO.5. Students will be able to **apply** reagents and various named reactions for the design of organic medicinal compounds.

CO Map	Question No.	Question	Marks
CO3	Q.1	Why pyridine is less basic than aliphatic amines	2
CO5	Q.2	Discuss the mechanism of wolff kishner reduction.	2
	Q.3	Explain the reaction and synthetic applications of schmidt rearrangement.	2
CO3	Q.4	Draw any three structures of pyridine containing drugs	2
CO5	Q.5	Give a brief account on applications of NaBH4	2
	Q.6	Explain the relative reactivity of pyrrole, furan and	10

CO4		thiphene	
	Q.7	Discuss the reaction, mechanism and synthetic applications of beckmann rearrangement	10
CO3	Q 8	Describe aromaticity and chemical reactions of indole	5
CO4&CO4	Q.9	Explain the mechanism and synthetic applications of clemmensen reduction	5
CO3&CO4	Q 10	Explain the chemical reactions and medicinal importance of imidazole	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

No Attainment Level :

Attainment Below Level-1:

50.9 % of students secured more than 60% marks, so this course Physical Pharmaceutics II – Theory (BP403T) attainment is below level 1.

AMITY UNIVERSITY
MADHYA PRADESH
Established vide Government of Madhya Pradesh Act No. 27 of 2010

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)
Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

AMITY UNIVERSITY
MADHYA PRADESH
Established vide Government of Madhya Pradesh Act No. 27 of 2010

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-2022

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2].Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMMEARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
IVSEM	BP402T	3	-	2	-	1	3	2	1	1	-	2				
	-															
	-															
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AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICAL CHMISTRY
Course Handout
Course : **MEDICINAL CHEMISTRY – I THEORY**
Course Code : BP402T, Crédits: 04, Session : **2021-2022** (Even Sem.), Class : B.Pharm. 2ndYear
Faculty Name: **Dr. Srabanti Jana**

A. Introduction: The course is designed to impart fundamental knowledge on the preparatory
pharmacy with arts and science of preparing the different conventional dosage forms.

B. Course Outcomes: At the end of the course, students will be able to:

BP402T.1. Knowledge on Physicochemical properties of drugs in relation to biological action.

BP402T.2. Able to gain knowledge on Autonomic Nervous System like sympathomimetics, and sympahtholytics.

BP402T.3. To gain Knowledge on Cholinergic neurotransmitters like Parasympathomimetic and lytics.

BP402T.4. To gain Knowledge onDrugs acting on Central Nervous System like Benzodiazepines and Barbiturtes.

BP402T.5. To gain Knowledge onDrugs acting on Central Nervous System like General anesthetics, Narcotic and non-narcotic analgesics.

C. Programme Outcomes:

[PO.1].Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and

administrative pharmacy sciences; and manufacturing practices.

[PO.2].Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and

ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance isrequiredtobemaintainedbyastudentto be qualified for taking up the EndSemester examination. The allowanceof 20%includesalltypesofleaves includingmedicalleaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

UNIT – I

Introduction to Medicinal Chemistry

History and development of medicinal chemistry Physicochemical properties in relation to biological action Ionization, Solubility, Partition Coefficient, Hydrogen bonding, Protein binding, Chelation, Bioisosterism, Optical and Geometrical isomerism. Drug metabolism Drug metabolism principles- Phase I and Phase II. Factors affecting drug metabolism including stereo chemical aspects.

UNIT – II

Drugs acting on Autonomic Nervous System Adrenergic Neurotransmitters: Biosynthesis and catabolism of catecholamine. Adrenergic receptors (Alpha & Beta) and their

distribution. Sympathomimetic agents: SAR of Sympathomimetic agents Direct acting: Nor-epinephrine, Epinephrine, Phenylephrine*, Dopamine, Agents with mixed mechanism: Ephedrine, Metaraminol. Indirect acting agents: Hydroxyamphetamine, Pseudoephedrine, Propylhexedrine. Methyldopa, Clonidine, Dobutamine, Isoproterenol, Terbutaline, Salbutamol*, Bitolterol, Naphazoline, Oxymetazoline and Xylometazoline. Adrenergic Antagonists: Alpha adrenergic blockers: Tolazoline*, Phentolamine, Phenoxybenzamine, Prazosin, Dihydroergotamine, Methysergide. Beta adrenergic blockers: SAR of beta blockers, Propranolol*, Metibranolol, Atenolol,Betazolol, Bisoprolol, Esmolol, Metoprolol, Labetolol, Carvedilol.

UNIT – III

Cholinergic neurotransmitters: Biosynthesis and catabolism of acetylcholine. Cholinergic receptors (Muscarinic & Nicotinic) and their distribution. Parasympathomimetic agents: SAR of Parasympathomimetic agents Direct acting agents: Acetylcholine, Carbachol, Bethanechol, Methacholine, Pilocarpine. Indirect acting/ Cholinesterase inhibitors (Reversible & Irreversible): Physostigmine, Neostigmine*, Pyridostigmine, Edrophonium chloride, Tacrine hydrochloride, Ambenonium chloride, Isofluorphate, Echothiophate iodide, Parathione, Malathion. Cholinesterase reactivator: Pralidoxime chloride. Cholinergic Blocking agents: SAR of cholinolytic agents Solanaceous alkaloids and analogues: Atropine sulphate, Hyoscyamine sulphate, Scopolamine hydrobromide, Homatropine hydrobromide, Ipratropium bromide*. Synthetic cholinergic blocking agents: Tropicamide, Cyclopentolate hydrochloride, Clidinium bromide, Dicyclomine hydrochloride*, Glycopyrrolate, Methantheline bromide, Propantheline bromide, Benztropine mesylate, Orphenadrine citrate, Biperidine hydrochloride, Procyclidine hydrochloride*, Tridihexethyl chloride, Isopropamide iodide, Ethopropazine hydrochloride.

UNIT – IV

Drugs acting on Central Nervous System, A. Sedatives and Hypnotics: Benzodiazepines: SAR of Benzodiazepines, Chlordiazepoxide, Diazepam*, Oxazepam, Chlorazepate, Lorazepam, Alprazolam, Zolpidem Barbiturtes: SAR of barbiturates, Barbital*, Phenobarbital, Mephobarbital, Amobarbital, Butabarbital, Pentobarbital, Secobarbital Miscelleneous: Amides & imides: Glutethmide. Alcohol & their carbamate derivatives: Meprobomate, Ethchlorvynol. Aldehyde & their derivatives: Triclofos sodium, Paraldehyde. B. Antipsychotics Phenothiazeines: SAR of Phenothiazeines - Promazine hydrochloride, Chlorpromazine hydrochloride*, Triflupromazine, Thioridazine hydrochloride, Piperacetazine hydrochloride, Prochlorperazine maleate, Trifluoperazine hydrochloride.

UNIV – V

Drugs acting on Central Nervous System

General anesthetics: Inhalation anesthetics: Halothane*, Methoxyflurane, Enflurane, Sevoflurane, Isoflurane, Desflurane. Ultra short acting barbitutrates: Methohexital sodium*, Thiamylal sodium, Thiopental sodium. Dissociative anesthetics: Ketamine hydrochloride.* Narcotic and non-narcotic analgesics Morphine and related drugs: SAR of Morphine analogues, Morphine sulphate, Codeine, Meperidine hydrochloride, Anilerdine hydrochloride, Diphenoxylate hydrochloride, Loperamide hydrochloride, Fentanyl citrate*, Methadone hydrochloride*, Propoxyphene hydrochloride, Pentazocine, Levorphanol

tartarate. Narcotic antagonists: Nalorphine hydrochloride, Levallorphantartarate, Naloxone hydrochloride. Anti-inflammatory agents: Sodium salicylate, Aspirin, Mefenamic acid*, Meclofenamate, Indomethacin, Sulindac, Tolmetin, Zomepriac, Diclofenac, Ketorolac, Ibuprofen*, Naproxen, Piroxicam, Phenacetin, Acetaminophen, Antipyrine, Phenylbutazone.

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

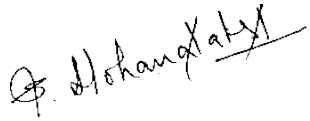
G. Suggested Text/Reference Books:

1. Wilson and Giswold's Organic medicinal and Pharmaceutical Chemistry.
2. Foye's Principles of Medicinal Chemistry.
3. Burger's Medicinal Chemistry, Vol I to IV.
4. Introduction to principles of drug design- Smith and Williams.
5. Remington's Pharmaceutical Sciences.
6. Martindale's extra pharmacopoeia.

Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Introduction to Medicinal Chemistry History and development of medicinal chemistry	Lecture	1	Mid Term-1, Quiz & End Sem Exam
2	Physicochemical properties of drugs	Lecture	1	Mid Term-1, Quiz & End Sem Exam
3	Ionization, Solubility, Partition Coefficient, Hydrogen bonding,	Lecture	2	Mid Term-1, Quiz & End Sem Exam
4	Protein binding, Chelation, Bioisosterism, Optical and Geometrical isomerism	Tutorial	1	Mid Term-1, Quiz & End Sem Exam
5	Drug metabolism Drug metabolism principles-	Lecture	2	Mid Term-1, Quiz & End Sem Exam
6	Phase I and Phase II.	Lecture	2	Mid Term-1, Quiz & End Sem Exam
7	Factors affecting drug metabolism including stereo chemical aspects	Lecture	1	Mid Term-1, Quiz & End Sem Exam
8	Unit test	Tutorial		Mid Term-1, Quiz & End Sem Exam

9	Drugs acting on Autonomic Nervous System Adrenergic Neurotransmitters:**UNIT II**	Lecture	1	Mid Term-1, Quiz & End Sem Exam
10	Biosynthesis and catabolism of catecholamine. Adrenergic receptors (Alpha & Beta) and their distribution.	Lecture	1	Mid Term-1, Quiz & End Sem Exam
11	**Sympathomimetic agents:** SAR of Sympathomimetic agents Direct acting:	Lecture	1	Mid Term-1, Quiz & End Sem Exam
12	Nor-epinephrine, Epinephrine, Phenylephrine*, Dopamine	Lecture	1	Mid Term-1, Quiz & End Sem Exam
13	**Indirect acting agents:**Hydroxyamphetamine, Pseudoephedrine, Propylhexedrine.	Lecture	1	Mid Term-1, Quiz & End Sem Exam
14	Methyldopa, Clonidine, Dobutamine, Isoproterenol, Terbutaline, Salbutamol, Bitolterol, Naphazoline, Oxymetazoline and Xylometazoline.	Lecture	2	Mid Term-1, Quiz & End Sem Exam
15	**Alpha adrenergic blockers:** Tolazoline*, Phentolamine, Phenoxybenzamine, Prazosin, Dihydroergotamine, Methysergide. Beta adrenergic blockers: SAR of beta blockers, Propranolol*, Metibranolol, Atenolol, Betazolol, Bisoprolol, Esmolol, Metoprolol, Labetolol, Carvedilol	Lecture	3	Mid Term-1, Quiz & End Sem Exam
16	Unit test	Tutorial		Mid Term-1, Quiz & End Sem Exam
17	**Cholinergic neurotransmitters:UNIT III** iosynthesis and catabolism of acetylcholine. Cholinergic receptors (Muscarinic & Nicotinic) and their	Lecture	1	Mid Term-1, Quiz & End Sem Exam
18	**Parasympathomimetic agents:** SAR of Parasympathomimetic agents Direct acting agents: Acetylcholine, Carbachol*, Bethanechol, Methacholine, Pilocarpine	Lecture	1	Mid Term-1, Quiz & End Sem Exam
19	**Indirect acting/ Cholinesterase**	Lecture	1	Mid Term-1, Quiz



	inhibitors (Reversible & Irreversible): Physostigmine, Neostigmine*, Pyridostigmine, Edrophonium chloride, Tacrine hydrochloride			& End Sem Exam
20	**Cholinesterase reactivator:** Pralidoxime chloride. Cholinergic Blocking agents: SAR of cholinolytic agents Solanaceous alkaloids and analogues: Atropine sulphate, Hyoscyamine sulphate, Scopolamine hydrobromide, Homatropine hydrobromide, Ipratropium bromide*.	Tutorial	2	Mid Term-2, Quiz & End Sem Exam
21	Synthetic cholinergic blocking agents: Tropicamide, Cyclopentolate hydrochloride, Clidinium bromide, Dicyclomine hydrochloride*	Lecture	2	Mid Term-2, Quiz & End Sem Exam
22	Glycopyrrolate, Methantheline bromide, Propantheline bromide, Benztropine mesylate, Orphenadrine citrate	Lecture	1	Mid Term-2, Quiz & End Sem Exam
23	Biperidine hydrochloride, Procyclidine hydrochloride*, Tridihexethyl chloride, Isopropamide iodide, Ethopropazine hydrochloride.	Lecture	2	Mid Term-2, Quiz & End Sem Exam
24	Quiz	Tutorial		Mid Term-2, Quiz & End Sem Exam
25	Drugs acting on Central (**UNIT-4**) Nervous System A. Sedatives and Hypnotics: Benzodiazepines: SAR of Benzodiazepines, Chlordiazepoxide, Diazepam*, Oxazepam, Chlorazepate, Lorazepam, Alprazolam, Zolpidem	Lecture	1	Mid Term-2, Quiz & End Sem Exam
26	Barbiturtes: SAR of barbiturates, Barbital*, Phenobarbital, Mephobarbital, Amobarbital, Butabarbital, Pentobarbital, Secobarbital	Lecture	1	Mid Term-2, Quiz & End Sem Exam
27	Miscelleneous: Amides & imides: Glutethmide. Alcohol	Lecture	1	Mid Term-2, Quiz & End Sem Exam

	& their carbamate derivatives: Meprobomate, Ethchlorvynol. Aldehyde & their derivatives: Triclofos sodium, Paraldehyde.			
28	B. Antipsychotics Phenothiazeines: SAR of Phenothiazeines - Promazine hydrochloride, Chlorpromazine hydrochloride*, Trifluprомazine, Thioridazine hydrochloride, Piperacetazine hydrochloride, Prochlorperazine maleate, Trifluoperazine hydrochloride.	Lecture	2	Mid Term-2, Quiz & End Sem Exam
29	C. Anticonvulsants: SAR of Anticonvulsants, mechanism of anticonvulsant action Barbiturates: Phenobarbitone, Methabarbital. Hydantoins: Phenytoin*, Mephenytoin, Ethotoin Oxazolidine diones: Trimethadione, Paramethadione	Lecture	1	Mid Term-2, Quiz & End Sem Exam
30	Succinimides:Phensuximide, Methsuximide, Ethosuximide* Urea and monoacylureas:	Lecture	2	Mid Term-2, Quiz & End Sem Exam
31	Phenacemide, Carbamazepine* Benzodiazepines:Clonazepam Miscellaneous:Primidone, Valproic acid , Gabapentin, Felbamate	Lecture	1	Mid Term-2, Quiz & End Sem Exam
32	**Drugs acting on Central Nervous System: UNIT V** General anesthetics:Inhalation anesthetics: Halothane*, Methoxyflurane, Enflurane, Sevoflurane, Isoflurane, Desflurane.	Lecture	1	Mid Term-2, Quiz & End Sem Exam
33	Ultra short acting barbitutrates:Methohexital sodium*, Thiamylal sodium, Thiopental sodium. Dissociative anesthetics: Ketamine hydrochloride.*	Lecture	1	Mid Term-2, Quiz & End Sem Exam

34	Narcotic and non-narcotic analgesics Morphine and related drugs: SAR of Morphine analogues, Morphine sulphate, Codeine, Meperidine hydrochloride,	Lecture	1	Mid Term-2, Quiz & End Sem Exam
35	Anilerdine hydrochloride, Diphenoxylate hydrochloride, Loperamide hydrochloride, Fentanyl citrate*, Methadone hydrochloride*, Propoxyphene hydrochloride, Pentazocine, Levorphanol tartarate.	Lecture	2	Mid Term-2, Quiz & End Sem Exam
36	Seminar	Tutorial		Mid Term-2, Quiz & End Sem Exam
37	Narcotic antagonists: Nalorphine hydrochloride, Levallorphantartarate, Naloxone hydrochloride.	Lecture	1	Mid Term-2, Quiz & End Sem Exam
38	Anti-inflammatory agents: Sodium salicylate, Aspirin, Mefenamic acid*, Meclofenamate,	Lecture	1	Mid Term-2, Quiz & End Sem Exam
39	Indomethacin, Sulindac, Tolmetin, Zomepriac, Diclofenac, Ketorolac, Ibuprofen*, Naproxen,	Lecture	1	Mid Term-2, Quiz & End Sem Exam
40	Unit test	Tutorial		Mid Term-2, Quiz & End Sem Exam
41	Piroxicam, Phenacetin, Acetaminophen, Antipyrine, Phenylbutazone	Lecture	1	Mid Term-2, Quiz & End Sem Exam
42	Quiz	Tutorial		Quiz & End Sem Exam
43	Unit test	Tutorial		Quiz & End Sem Exam

TOTAL CLASSES REQUIRED: 48
TOTAL CLASSES GIVEN: 45

H. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP*402*T.1	**BP402T.1**. Relate history and study of physicchemical properties in relation to biological action	1	2	-	-	2	3	1	-	1	-	-				
BP*402*T.2.	**BP402T.2**. Classify the different types of Drugs acting on Autonomic Nervous System MOAS, SAR studies	2	-	-	3	-	2	-	-	-	-	3				
BP402T.3.	**BP402T.3**. Classify the different types of Drugs acting on Cholinergic neurotransmitters, MOAS, SAR studies	2	3	-	2	-	3	-	-	-	-	3				
BP402T.4.	**BP402T.4**. Drugs acting on Central Nervous System, Benzodiazepines, Barbiturates, Antipsychotics, SAR, MOAs.	2	3	3	3	-	2	-	-	-	-	3				
BP402T.5.	**BP402T.5**.Drugs acting on Central Nervous System General anesthetics, Narcotic and non-narcotic analgesics, SAR, MOAs.	2	-	2	-	3	-	-	-	-	-	3				

SampleQuestionPaper

Amity Institute of Pharmacy
Department of Pharmaceutical Chemistry
IMID-SEMESTER(SEM–IV)2021-22

Class:B.Pharm, IV Semester

Subject Name: BP402T-MEDICINAL CHEMISTRY-I Theory	Time:1Hrs	Max.Marks:30

Levels of thequestions as perBloomsTaxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
QuestionMapping	Q.1,3,4,5	Q.6,8,9	Q.2	Q.7, 10		

The student willbeableto

CO1. Relate history and development of molecules based on study of different physicochemical properties of drugs.

CO2. Classify the different types of Drugs acting on Autonomic Nervous System MOAS, SAR studies.

CO3. Classify the different types of Drugs acting on Cholinergic neurotransmitters, MOAS, SAR studies.

CO4. Able to study of Drugs acting on Central Nervous System, Benzodiazepines, Barbiturates, Antipsychotics, SAR, MOAs.

CO5. Drugs acting on Central Nervous System General anesthetics, Narcotic and non-narcotic analgesics, SAR, MOAs.

COMap	QuestionNo.	Question	Marks
CO4	Q.1	Enlist the different different physicochemical properties of drugs and its activity.	2
CO5	Q.2	Classify the Drugs acting on Autonomic Nervous SystemMOAS, SAR studies.	2
CO1	Q.3	What is the mode of action of narcotic analgesics?	2
CO2	Q.4	Classify structurally the barbiturates and discuss the SAR.	2
CO2	Q.5	Classify structurally the General anesthetics.	2
CO1	Q.6	Classify structurally the Antipsychotics and discuss its SAR.	10
CO4	Q.7	Write the synthesis of Dicyclomine hydrochloride.	10
CO3	Q.8	Discuss the SAR of Narcotic analgesiscs..	5

CO2	Q.9	Illustrate the classification of Benzodiazepines and SAR.	5
CO4	Q.10	Classify the Anti-inflammatory agents.	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Below Level-1:

45.6 % of students secured more than 60% marks, so this course Physical Pharmaceutics II – Theory (BP403T) attainment is below level 1.

AMITY UNIVERSITY
MADHYA PRADESH
Established vide Government of Madhya Pradesh Act No. 27 of 2010

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)
Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

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AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
AMITY INSTITUTE OF PHARMACY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2022-23

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge asscoited with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions

[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
VI SEM	BP403T	3	3	3	3	1	2	2	1	3	1	1	-	-	-

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACY
Course Handout
Course : Physcial Pharmacy (Theory)
Course Code : BP403T, Crédits : 04, Session : 2021-22 (Even Sem.), Class : B. Pharm. 6th Year
Faculty Name : Dr. Neeraj Mishra

A. Introduction: This course is designed to impart fundamental knowledge on pharmaceutical product development and translation from laboratory to market. Upon completion of the course, the student shall be able to:

1. Know the process of pilot plant and scale up of pharmaceutical dosage forms
2. Understand the process of technology transfer from lab scale to commercial batch
3. Know different Laws and Acts that regulate pharmaceutical industry
4. Understand the approval process and regulatory requirements for drug products

B. Course Outcomes: At the end of the course, students will be able to:

BP605T.1. Understand various physicochemical properties of drug molecules in the designing the dosage forms

BP605T.2. Know the principles of chemical kinetics & to use them for stability testing

BP605T.3. Discuss the use of chemical kinetics in determination of expiry date of formulations

BP605T.4. Demonstrate use of physicochemical properties in the formulation development

BP605T.5. Understand the evaluation parameters of dosage form

C. Programme Outcomes:

[PO.1].**Pharmacy Knowledge:** Posses knowledge and compression of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

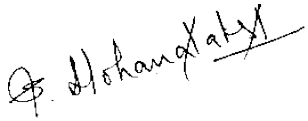
[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.



[PO.11]. **Life-long learning:** Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	10%
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves Including medical leaves.	A	5%
End Semester Examination	End Semester Examination	EE	70%
Total			**100%**

E. Syllabus

Module I

a) Brief introduction to Biotechnology with reference to Pharmaceutical Sciences. b) Enzyme Biotechnology- Methods of enzyme immobilization and applications. c) Biosensors- Working and applications of biosensors in Pharmaceutical Industries. d) Brief introduction to Protein Engineering. e) Use of microbes in industry. Production of Enzymes- General consideration - Amylase, Catalase, Peroxidase, Lipase, Protease, Penicillinase. f) Basic principles of genetic engineering.

Module II

a) Study of cloning vectors, restriction endonucleases and DNA ligase. b) Recombinant DNA technology. Application of genetic engineering in medicine. c) Application of r DNA technology and genetic engineering in the production of: i) Interferon ii) Vaccines-hepatitis- B iii) Hormones-Insulin. d) Brief introduction to PCR

Module III

Types of immunity- humoral immunity, cellular immunity a) Structure of Immunoglobulins b) Structure and Function of MHC c) Hypersensitivity reactions, Immune stimulation and Immune suppressions. d) General method of the preparation of bacterial vaccines, toxoids, viral vaccine, antitoxins, serum-immune blood derivatives and other products relative to immunity. e) Storage conditions and stability of official vaccines f) Hybridoma technology- Production, Purification and Applications g) Blood products and Plasma Substituties.

Module IV

a) Immuno blotting techniques- ELISA, Western blotting, Southern blotting. b) Genetic organization of Eukaryotes and Prokaryotes c) Microbial genetics including transformation, transduction, conjugation, plasmids and transposons. d) Introduction to Microbial biotransformation and applications. e) Mutation: Types of mutation/mutants

Module V

a) Fermentation methods and general requirements, study of media, equipment's, sterilization methods, aeration process, stirring.

b) Large scale production fermenter design and its various controls.

c) Study of the production of - penicillin's, citric acid, Vitamin B12, Glutamic acid, Griseofulvin,

d) Blood Products: Collection, Processing and Storage of whole human blood, dried human plasma, plasma Substitutes.

Examination Scheme:

Components	**A**	**CT**	**S/V/Q/HA**	**EE**
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; A: Attendance

F. Suggested Text/Reference Books:

1. B.R. Glick and J.J. Pasternak: Molecular Biotechnology: Principles and Applications of RecombinantDNA: ASM Press Washington D.C.

2. RA Goldshy et. al., : Kuby Immunology.

3. J.W. Goding: Monoclonal Antibodies.

4. J.M. Walker and E.B. Gingold: Molecular Biology and Biotechnology by Royal8 Society of Chemistry.

5. Zaborsky: Immobilized Enzymes, CRC Press, Degraland, Ohio.

6. S.B. Primrose: Molecular Biotechnology (Second Edition) Blackwell Scientific Publication.

7. Stanbury F., P., Whitakar A., and Hall J., S., Principles of fermentation technology, 2nd edition, Aditya books Ltd., New Delhi

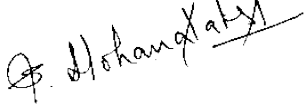
G. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Classification of dispersed systems	Lecture	BP403T.1	Mid Term-1, Quiz & End Sem Exam
2	General characteristics, size & shapes of colloidal particles	Lecture	BP403T.1	Mid Term-1, Quiz & End Sem Exam
3	Classification of colloids & comparative account of their general properties	Lecture	BP403T.1	Mid Term-1, Quiz & End Sem Exam
4	Optical and kinetic properties of colloids	Lecture	BP403T.1	Mid Term-1, Quiz & End Sem Exam
5	Electrical, kinetic properties of colloids	Lecture	BP403T.1	Mid Term-1, Quiz & End Sem Exam
6	Effect of electrolytes, coacervation,	Lecture	BP403T.1	Mid Term-1, Quiz & End Sem Exam
7	Peptization of colloids	Lecture	BP403T.1	Mid Term-1, Quiz & End Sem Exam
8	Protective action	Lecture	BP403T.1	Mid Term-1,

	of colloids			Quiz & End Sem Exam
9	Newtonian systems and law of flow	Lecture	BP403T.2	Mid Term-1, Quiz & End Sem Exam
10	kinematic viscosity, effect of temperature,	Lecture	BP403T.2	Mid Term-1, Quiz & End Sem Exam
11	non-Newtonian systems, Dilatant	Lecture	BP403T.2	Mid Term-1, Quiz & End Sem Exam
12	Plastic and Pseudoplastic	Lecture	BP403T.2	
13	Thixotropy and its importance in pharmacy	Lecture	BP403T.2	Mid Term-1, Quiz & End Sem Exam
14	Thixotropy determination in pharmacy	Lecture	BP403T.2	Mid Term-1, Quiz & End Sem Exam
15	Determination of viscosity by capillary viscometer	Lecture	BP403T.2	Mid Term-1, Quiz & End Sem Exam
16	Determination of viscosity by falling Sphere, rotational viscometers	Lecture	BP403T.2	Mid Term-1, Quiz & End Sem Exam
17	Plastic and elastic deformation	Lecture	BP403T.2	Mid Term-1, Quiz & End Sem Exam
18	Heckel equation	Lecture	BP403T.2	Mid Term-1, Quiz & End Sem Exam
19	Stress, Strain and Elastic Modulus	Lecture	BP403T.2	Mid Term-1, Quiz & End Sem Exam
20	Suspension	Lecture	BP403T.3	Mid Term-2, Quiz & End Sem Exam
21	Interfacial properties of suspended particles	Lecture	BP403T.3	Mid Term-2, Quiz & End Sem Exam
22	Settling in	Lecture	BP403T.3	Mid Term-2,

	suspensions			Quiz & End Sem Exam
23	Flocculated and deflocculated suspensions.	Lecture	BP403T.3	Mid Term-2, Quiz & End Sem Exam
24	Formulation of suspensions	Lecture	BP403T.3	Mid Term-2, Quiz & End Sem Exam
25	Emulsions	Lecture	BP403T.3	Mid Term-2, Quiz & End Sem Exam
26	Theories of emulsification	Lecture	BP403T.3	Mid Term-2, Quiz & End Sem Exam
27	Microemulsion and multiple emulsions,	Lecture	BP403T.3	Mid Term-2, Quiz & End Sem Exam
28	Stability of emulsions	Lecture	BP403T.3	Mid Term-2, Quiz & End Sem Exam
29	Preservation of emulsions	Lecture	BP403T.3	Mid Term-2, Quiz & End Sem Exam
30	Rheological properties of emulsions	Lecture	BP403T.3	Mid Term-2, Quiz & End Sem Exam
31	emulsion formulation by HLB method.	Lecture	BP403T.3	Mid Term-2, Quiz & End Sem Exam
32	Particle size and distribution, mean particle size	Lecture	BP403T.3	Mid Term-2, Quiz & End Sem Exam
33	Number and weight distribution, particle number	Lecture	BP403T.4	Mid Term-2, Quiz & End Sem Exam
35	Methods for determining particle size by different methods, counting and separation method, particle shape, specific	Lecture	BP403T.4	Mid Term-2, Quiz & End Sem Exam

	surface			
36	Methods for determining surface area	Lecture	BP403T.4	Mid Term-2, Quiz & End Sem Exam
37	Methods for determining permeability and absorption	Lecture	BP403T.4	Mid Term-2, Quiz & End Sem Exam
38	Porosity, packing arrangement	Lecture	BP403T.4	Mid Term-2, Quiz & End Sem Exam
39	Densities, bulkiness, and Flow properties	Lecture	BP403T.4	Mid Term-2, Quiz & End Sem Exam
40	Drug Stability and Reaction kinetics: zero, pseudo-zero	Lecture	BP403T.5	Mid Term-2, Quiz & End Sem Exam
41	First & second order, units of basic rate constants	Lecture	BP403T.5	Mid Term-2, Quiz & End Sem Exam
42	Determination of reaction order	Lecture	BP403T.5	Mid Term-2, Quiz & End Sem Exam
43	Physical and chemical factors influencing the chemical degradation of pharmaceutical product: temperature, solvent, ionic strength, dielectric constant	Lecture	BP403T.5	Mid Term-2, Quiz & End Sem Exam
44	specific & general acid base catalysis, Simple numerical problems.	Lecture	BP403T.5	Mid Term-2, Quiz & End Sem Exam
45	Stabilization of medicinal agents against common reactions like	Lecture	BP403T.5	Mid Term-2, Quiz & End Sem Exam



	hydrolysis & oxidation			
46	Accelerated stability testing in expiration dating of pharmaceutical dosage forms. Photolytic degradation and its prevention	Lecture	BP403T.5	Mid Term-2, Quiz & End Sem Exam

H. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP403T.1	*Understand various physicochemical properties of drug molecules in the designing the dosage forms*	3	3	3	1	-	1	2	1	-	-	1
BP403T.2	Know the principles of chemical kinetics & to use them for stability testing	2	2	2	3	-	1	1	1	-	-	1
BP403T.3	*Discuss the use of chemical kinetics in determination of expiry date of formulations*	2	1	1	-	-	1	3	2	-	-	-
BP403T.4	*Demonstrate use of physicochemical properties in the formulation development*	2	2	2	1	-	1	-	-	-	-	-
BP403T.5	Understand the evaluation parameters of dosage form	2	1	-	-	-	2	1	1	-	-	1

Amity Institute of Pharmacy
Department of Pharmaceutics
I MID-SEMESTER (SEM –VIII) 2021-22

Class: B.Pharm, IV Semester

Subject Name: BP704T.Novel Drug Delivery System (Theory)	Time: 1 Hr	Max. Marks: 30

Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3,4,5	Q.6,8,9	Q.2	Q.7, 10		

The student will be able to

CO1. ***Understand various physicochemical properties of drug molecules in the designing the dosage forms***

CO2. Know the principles of chemical kinetics & to use them for stability testing

CO3. ***Discuss the use of chemical kinetics in determination of expiry date of formulations***

CO.4. ***Demonstrate use of physicochemical properties in the formulation development***

CO.5. Understand the evaluation parameters of dosage form

CO Map	Question No.	Question	Marks
CO2	Q.1	Define the term thixotropy?	2
CO1	Q.2	Define the term hydrophilic and hydrophobic colloids with examples.	2
CO4	Q.3	Define methods of determining particle size of powder.	2
CO5	Q.4	What is zero order rate of reaction and give formula of the same.	2
CO4	Q.5	Explain the methods of determining angle of repose.	2
CO1 & 2	Q.6	Define kinetic properties of colloids and explain shear thickening systems with suitable example.	10
CO5	Q.7	Discuss the importance of stability testing and zero, pseudo-zero, first & second order of reaction.	10
CO2	Q.8	Define the term Stress, Strain, Elastic Modulus.	5
CO3	Q.9	Define the methods of preparation of flocculated suspensions.	5
CO1	Q.10	Discuss the importance of thixotropy in pharmacy.	5

Dr. Mohanty

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Below Level-1:

29.8 % of students secured more than 60% marks, so this course Physical Pharmaceutics II – Theory (BP403T) attainment is below level 1.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR

AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)

Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOLOGY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

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[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Programme Specific Outcomes:

PSO 1: This subject is designed to understand what drugs do to the living organisms and how their effects can be applied to therapeutics.

PSO 2: The subject covers the information about the drugs like, mechanism of action, physiological and biochemical effects (pharmacodynamics)

PSO 3: This subject also cover the information about absorption, distribution, metabolism and excretion (pharmacokinetics) along with the adverse effects, clinical uses, interactions, doses, contraindications and routes of administration of different classes of drugs.

PSO 4: The subject provides the basic knowledge required to understand the various disciplines of pharmacy

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
IV SEM	BP404T	-	3	2	1	-	1	3	2	1	3	2	2			
	-															
	-															
	-															
	-															
	-															
	-															
	-															

AMITY UNIVERSITY
MADHYA PRADESH
Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACOLOGY
Course Handout
Course : PHARMACOLOGY – I THEORY
Course Code : BP404T, Crédits : 04, Session :2021-22 (Even Sem.), Class : B.Pharm. 2nd Year
Faculty Name: Dr. Shvetank Bhatt

A. Introduction: This course is designed to impart fundamental knowledge on the structure and functions of the various systems of the human body. It also helps in understanding both homeostatic mechanisms. The subject provides the basic knowledge required to understand the various disciplines of pharmacy.

B. Course Outcomes: At the end of the course, students will be able to:

BP404T.CO1. a. Introduction to Pharmacology.
BP404T.CO2. Pharmacodynamics- Principles and mechanisms of drug action.
BP404T.CO3. Pharmacology of drugs acting on peripheral nervous system
BP404T.CO4. *Pharmacology of drugs acting on central nervous system*
BP404T.CO5. Pharmacology of drugs acting on central nervous system

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyse and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behaviour that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Programme Specific Outcomes:

PSO 1: Will be able to understand anatomy and physiology of human body system and how the human body maintain internal environment so that different organs perform work properly.

PSO 2: Will be able to give the information about how the cell communicate and maintain their functions and various disorders of different human organs so that we

can give the appropriate therapy.

PSO 3: Will be able to understand organization at the different level of human body.

Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

Unit I

Introduction to Pharmacology- Definition, historical landmarks and scope of pharmacology, nature and source of drugs, essential drugs concept and routes of drug administration, Agonists, antagonists(competitive and non competitive), spare receptors, addiction, tolerance, dependence, tachyphylaxis, idiosyncrasy, allergy. b. Pharmacokinetics- Membrane transport, absorption, distribution, metabolism and excretion of drugs .Enzyme induction, enzyme inhibition, kinetics of elimination.

Unit II

Pharmacodynamics- Principles and mechanisms of drug action. Receptor theories and classification of receptors, regulation of receptors. drug receptors interactions signal transduction mechanisms, G-protein–coupled receptors, ion channel receptor, transmembrane enzyme linked receptors, transmembrane JAK-STAT binding receptor and receptors that regulate transcription factors, dose response relationship, therapeutic index, combined effects of drugs and factors modifying drug action. b. Adverse drug reactions. c. Drug interactions (pharmacokinetic and pharmacodynamic) d. Drug discovery and clinical evaluation of new drugs -Drug discovery phase, preclinical evaluation phase, clinical trial phase, phases of clinical trials and pharmacovigilance.

Unit III

Pharmacology of drugs acting on peripheral nervous system a. Organization and function of ANS. b.Neurohumoral transmission,co-transmission and classification of neurotransmitters. c. Parasympathomimetics, Parasympatholytics, Sympathomimetics, sympatholytics. d. Neuromuscular blocking agents and skeletal muscle relaxants (peripheral). e. Local anesthetic agents. f. Drugs used in myasthenia gravis and glaucoma

Unit IV

Pharmacology of drugs acting on central nervous system a. Neurohumoral transmission in the C.N.S.special emphasis on importance of various neurotransmitters like with GABA, Glutamate, Glycine, serotonin, dopamine. b. General anesthetics and pre-anesthetics. c. Sedatives, hypnotics and centrally acting muscle relaxants. d. Anti-epileptics e. Alcohols and disulfiram

Unit V

Pharmacology of drugs acting on central nervous system a. Psychopharmacological agents: Antipsychotics, antidepressants, anti-anxiety agents, anti-manics and hallucinogens. b. Drugs used in Parkinsons disease and Alzheimer's disease. c. CNS stimulants and nootropics. d. Opioid analgesics and antagonists e. Drug addiction, drug abuse, tolerance and dependence.

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1.Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology,.Churchil Livingstone Elsevier

2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill

3. Goodman and Gilman's, The Pharmacological Basis of Therapeutics

4. Marry Anne K. K., Lloyd Yee Y., Brian K. A., Robbin L.C., Joseph G. B., Wayne A. K., Bradley R.W., Applied Therapeutics, The Clinical use of Drugs, The Point Lippincott Williams & Wilkins

5. Mycek M.J, Gelnet S.B and Perper M.M. Lippincott's Illustrated Reviews-Pharmacology

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Introduction to Pharmacology- Definition, historical landmarks and scope of pharmacology,	Lecture	Unit-1 CO1	Mid Term-1, Quiz & End Sem Exam
2	Nature and source of drugs, essential drugs concept and routes of drug administration,	Lecture	CO1	Mid Term-1, Quiz & End Sem Exam
3	Agonists, antagonists(competitive and non competitive),	Lecture	CO1	Mid Term-1, Quiz & End Sem Exam
4	spare receptors, addiction, tolerance, dependence, tachyphylaxis, idiosyncrasy, allergy.	Tutorial	CO1	Mid Term-1, Quiz & End Sem Exam
5	Pharmacokinetics- Membrane transport, absorption, distribution, metabolism and excretion of drugs .	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
6	Pharmacokinetics- Membrane transport, absorption, distribution, metabolism and excretion of drugs	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
7	Enzyme induction, enzyme inhibition, kinetics of elimination	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
8	Quiz	Tutorial		Mid Term-1, Quiz & End Sem Exam
9	Pharmacodynamics- Principles and mechanisms of drug action.	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
10	Receptor theories and classification of receptors, regulation of receptors. drug receptors interactions signal transduction mechanisms	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
11	Receptor theories and classification of receptors, regulation of receptors.	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
12	Revision	Tutorial		Mid Term-1, Quiz & End Sem Exam
13	transmembrane enzyme linked receptors, transmembrane JAK-STAT	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam

Dr. Dhananjay Yadav

	binding receptor and receptors that regulate transcription factors, dose response relationship			
14	therapeutic index, combined effects of drugs and factors modifying drug action.	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
15	therapeutic index, combined effects of drugs and factors modifying drug action.	Lecture	CO1 CO2	Mid Term-1, Quiz & End Sem Exam
16	Unit test	Tutorial		Mid Term-1, Quiz & End Sem Exam
17	Adverse drug reactions. c. Drug interactions (pharmacokinetic and pharmacodynamic)	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
18	Adverse drug reactions. c. Drug interactions (pharmacokinetic and pharmacodynamic)	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
19	Drug discovery and clinical evaluation of new drugs -Drug discovery phase,	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
20	preclinical evaluation phase, clinical trial phase, phases of clinical trials and pharmacovigilance.	Tutorial	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
21	Organization and function of ANS. b.Neurohumoral transmission,co-transmission and classification of neurotransmitters.	Lecture	Unit-2 CO3	Mid Term-1, Quiz & End Sem Exam
22	Organization and function of ANS. b.Neurohumoral transmission,co-transmission and classification of neurotransmitters.	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
23	. Parasympathomimetics, Parasympatholytics,	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam

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	Sympathomimetics, sympatholytics. d. Neuromuscular blocking agents and skeletal muscle relaxants (peripheral).			
24	Quiz	Tutorial		Mid Term-1, Quiz & End Sem Exam
25	. Parasympathomimetics, Parasympatholytics, Sympathomimetics, sympatholytics. d.	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
26	Neuromuscular blocking agents and skeletal muscle relaxants (peripheral).	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
27	Neuromuscular blocking agents and skeletal muscle relaxants (peripheral).	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
28	Local anesthetic agents. f. Drugs used in myasthenia gravis and glaucoma	Tutorial		Mid Term-1, Quiz & End Sem Exam
29	Local anesthetic agents. f. Drugs used in myasthenia gravis and glaucoma	Lecture	CO1	Mid Term-1, Quiz & End Sem Exam
30	Local anesthetic agents. f. Drugs used in myasthenia gravis and glaucoma	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
31	Local anesthetic agents. f. Drugs used in myasthenia gravis and glaucoma	Lecture	CO1 CO3	Mid Term-1, Quiz & End Sem Exam
32	Neurohumoral transmission in the C.N.S.special emphasis on importance of various neurotransmitters like with GABA, Glutamate, Glycine, serotonin, dopamine	Tutorial	Unit-3 CO4	Mid Term-2, Quiz & End Sem Exam
33	Neurohumoral transmission in the C.N.S.special emphasis on importance of various neurotransmitters like with GABA, Glutamate, Glycine, serotonin, dopamine	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
34	Neurohumoral transmission in the C.N.S.special emphasis on	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam

	importance of various neurotransmitters like with GABA, Glutamate, Glycine, serotonin, dopamine			
35	General anesthetics and pre-anesthetics. c. Sedatives, hypnotics and centrally acting muscle relaxants.	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
36	Seminar	Tutorial		Mid Term-2, Quiz & End Sem Exam
37	General anesthetics and pre-anesthetics. c. Sedatives, hypnotics and centrally acting muscle relaxants.	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
38	General anesthetics and pre-anesthetics. c. Sedatives, hypnotics and centrally acting muscle relaxants.	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
39	Anti-epileptics e. Alcohols and disulfiram	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
40	Unit test	Tutorial		Mid Term-2, Quiz & End Sem Exam
41	Anti-epileptics e. Alcohols and disulfiram	Lecture	Unit-4	Mid Term-2, Quiz & End Sem Exam
42	Psychopharmacological agents: Antipsychotics, antidepressants,	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
43	Psychopharmacological agents: Antipsychotics, antidepressants,	Lecture	CO1	Mid Term-2, Quiz & End Sem Exam
44	Seminar	Tutorial		Mid Term-2, Quiz & End Sem Exam
45	anti-anxiety agents, anti-manics and hallucinogens.	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
46	anti-anxiety agents, anti-manics and hallucinogens.	Lecture	CO1 CO4	Mid Term-2, Quiz & End Sem Exam
47	anti-anxiety agents, anti-manics and hallucinogens.	Lecture	CO1	Quiz & End Sem Exam
48	anti-anxiety agents, anti-manics and hallucinogens.	Tutorial		Quiz & End Sem Exam
49	Drugs used in Parkinsons disease and Alzheimer's	Lecture	Unit-5	Quiz & End Sem Exam

	disease.			
50	Drugs used in Parkinsons disease and Alzheimer's disease.	Lecture	CO1 CO5	Quiz & End Sem Exam
51	*Drugs used in Parkinsons disease and Alzheimer's disease.*	Lecture	CO1 CO5	Quiz & End Sem Exam
52	*Drugs used in Parkinsons disease and Alzheimer's disease.*	Tutorial	CO1 CO5	Quiz & End Sem Exam
53	*CNS stimulants and nootropics.*	Lecture	CO1 CO5	Quiz & End Sem Exam
54	CNS stimulants and nootropics.	Lecture	CO1 CO5	Quiz & End Sem Exam
55	Opioid analgesics and antagonists	Lecture	CO1 CO5	Quiz & End Sem Exam
56	Unit test	Tutorial		Quiz & End Sem Exam
57	Opioid analgesics and antagonists	Lecture	CO1 CO5	Quiz & End Sem Exam
58	Drug addiction, drug abuse, tolerance and dependence	Lecture	CO1 CO5	Quiz & End Sem Exam
59	Drug addiction, drug abuse, tolerance and dependence	Lecture	CO1 CO5	Quiz & End Sem Exam
60	Unit test	Tutorial		Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP404T.1	Understand the pharmacological actions of different	3	-	-	-	2	2	1	-	-	-	-		3	2	1

	categories of drugs															
BP404T.2.	Explain the mechanism of drug action at organ system/sub cellular/ macromolecular levels.	3	-	-	1	-	2	-	-	-	-	3		2	3	1
BP404T.3.	Apply the basic pharmacological knowledge in the prevention and treatment of various diseases.	3	2	-	3	-	2	-	-	-	-	3		1	2	3
BP404T.4.	Observe the effect of drugs on animals by simulated experiments	2	2	3	3	-	1	-	-	-	-	3		2	3	2
BP404T.5.	Appreciate correlation of pharmacology with other bio medical science	3	-	2	-	2	-	-	-	-	-	3		2	3	3

Sample Question Paper

Amity Institute of Pharmacy
Department of Pharmacology
I MID-SEMESTER (SEM –IVth) 2021-22

Class: B.Pharm, IV Semester

Subject Name: BP404T Pharmacology-I Theory	Time: 1 Hrs	Max. Marks: 30

Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,2,4,10	Q.8,9,6	Q.5,3	Q.7		

Student will be able to

CO1.

Understand the pharmacological actions of different categories of drugs. Explain the mechanism of drug action at organ system/sub cellular/ macromolecular levels

CO2.

Apply the basic pharmacological knowledge in the prevention and treatment of various diseases.

CO3.

Observe the effect of drugs on animals by simulated experiments 5. Appreciate correlation of pharmacology with other bio medical sciences

CO Map	Question No.	Question	Marks
CO1	Q.1	What is agonist and antagonist.	2
CO1	Q.2	Define tachyphylaxis and idiosyncrasy.	2
CO1	Q.3	Make use of clinical pharmacology.	2
CO2	Q.4	Define therapeutic index.	2
CO2	Q.5	What is drug tolerance.	2
CO3	Q.6	Explain Neurohumoral transmission.	10
CO2	Q.7	Write combined effects of drugs and factors modifying drug action.	10
CO2	Q.8	Give Drug discovery and clinical evaluation of new drugs	5
CO3	Q.9	Give the Neuromuscular blocking agents and skeletal muscle relaxants	5
CO1 CO2	Q.10	What is Adverse drug reactions.	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Below Level-1:

36.8 % of students secured more than 60% marks, so this course Pharmacology I – Theory (BP404T) attainment is below level 1.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)
Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

AMITY UNIVERSITY
MADHYA PRADESH
Established vide Government of Madhya Pradesh Act No. 27 of 2010

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUE OF PHARMACY
DEPARTMENT OF PHARMACOGNOSY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharmacy), Academic Year – 2021-22

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

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[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

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Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11				
IV SEM	BP405 T	3	2	2	1	-	-	2	-	2	2	1		-	-	-

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACOGNOSY
Course Handout
Course : PHARMACOGNOSY & PHYTOCHEMISTRY I (Theory)
Course Code : BP 405T, Crédits : 04, Session : 2021-22(Even Sem.), Class : B.Pharm. II Year
Faculty Name : Dr. S. Mohana Lakshmi

A. Introduction: This course deals with the fundamentals of analytical chemistry and principles of electrochemical analysis of drugs. It aims to understand the principles of volumetric and electro chemical analysis and carryout various volumetric and electrochemical titrations.

B. Course Outcomes: At the end of the course, students will be:

BP405T.1. Define Pharmacognosy, classify the crude drugs and explain methods of drug evaluation

BP405T.2. Explain the techniques and methods involved in cultivation and collection production of crude drug. Illustrate the plant tissue culture and its applications. Brief note on edible vaccines.

BP405T.3. Explain role of Pharmacognosy in allopathy & traditional system of medicine (Ayurveda, Siddha, Unani & Homeopathy)

BP405T.4. Study of primary & secondary metabolites from natural sources-carbohydrates, proteins, lipids, Alkaloids, Glycosides, steroids, volatile oils, tannins, resins and plant fibre products like Cotton, Jute & Hemp & Hallucinogens, Teratogens, Natural allergens

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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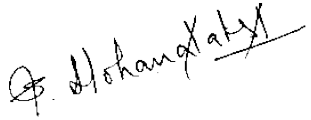
[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.



[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

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D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2 quiz, assignment, open book test, field work, group discussion and seminar)		
	Seminar/ Assignment/Quiz/ Open book test	S/As/Q/OBT	3%
Interaction	Student-Teacher interaction	ST	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

UNIT-I 10 Hours

Introduction to Pharmacognosy:

(a) Definition, history, scope and development of Pharmacognosy

(b) Sources of Drugs – Plants, Animals, Marine & Tissue culture

(c) Organized drugs, unorganized drugs (dried latex, dried juices, dried extracts, gums and mucilage, oleoresins and oleo- gum -resins).

Classification of drugs:

Alphabetical, morphological, taxonomical, chemical, pharmacological, chemo and serotaxonomical classification of drugs

Quality control of Drugs of Natural Origin:

Adulteration of drugs of natural origin. Evaluation by organoleptic, microscopic, physical, chemical and biological methods and properties.

Quantitative microscopy of crude drugs including lycopodium spore method, leaf constants, camera lucida and diagrams of microscopic objects to scale with camera lucida.

UNIT-II 10 Hours

Cultivation, Collection, Processing and storage of drugs of natural origin:

Cultivation and Collection of drugs of natural origin Factors influencing cultivation of medicinal plants. Plant hormones and their applications.

Polyploidy, mutation and hybridization with reference to medicinal plants

Conservation of medicinal plants

UNIT-III 07 Hours

Plant tissue culture:

Historical development of plant tissue culture, types of cultures, Nutritional requirements, growth and their maintenance.

Applications of plant tissue culture in Pharmacognosy. Edible vaccines

UNIT-IV 10 Hours

Pharmacognosy in various systems of medicine:

Role of Pharmacognosy in allopathy and traditional systems of medicine namely, Ayurveda, Unani, Siddha, Homeopathy and Chinese systems of medicine.

Introduction to secondary metabolites:

Definition, classification, properties and test for identification of Alkaloids, Glycosides, Flavonoids, Tannins, Volatile oil and Resins

UNIT V 8 Hours

Study of biological source, chemical nature and uses of drugs of natural origin containing following drugs

Plant Products:

Fibers - Cotton, Jute, Hemp

Hallucinogens, Teratogens, Natural allergens

Primary metabolites:

General introduction, detailed study with respect to chemistry, sources, preparation, evaluation, preservation, storage, therapeutic used and commercial utility as Pharmaceutical Aids and/or Medicines for the following Primary metabolites:

Carbohydrates: Acacia, Agar, Tragacanth, Honey

Proteins and Enzymes: Gelatin, casein, proteolytic enzymes (Papain, bromelain, serratiopeptidase, urokinase, streptokinase, pepsin).

Lipids (Waxes, fats, fixed oils) : Castor oil, Chaulmoogra oil, Wool Fat, Bees Wax

Marine Drugs:

Novel medicinal agents from marine sources

F. Examination Scheme:

Components	A	ST	CT	S/As/Q/OBT	EE
Weightage (%)	4	3	15	3	75

CT: Class Test, As: Assignment, ST: Student teacher interaction, S/A/Q/OBT: Seminar/ Assignment/Quiz/ Open book test, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. W.C.Evans, Trease and Evans Pharmacognosy, 16th edition, W.B. Sounders & Co., London, 2009.

2. Mohammad Ali. Pharmacognosy and Phytochemistry, CBS Publishers & Distribution, New Delhi.

3. Text book of Pharmacognosy by C.K. Kokate, Purohit, Gokhlae (2007), 37th Edition, Nirali Prakashan, New Delhi.

4. Herbal drug industry by R.D. Choudhary (1996), Ist Edn, Eastern Publisher, New Delhi.

5. Essentials of Pharmacognosy, Dr.SH.Ansari, IInd edition, Birla publications, New Delhi, 2007

6. Herbal Cosmetics by H.Pande, Asia Pacific Business press, Inc, New Delhi.

7. A.N. Kalia, Textbook of Industrial Pharmacognosy, CBS Publishers, New Delhi, 2005.

8. R Endress, Plant cell Biotechnology, Springer-Verlag, Berlin, 1994.

9. Pharmacognosy & Pharmacobiotechnology. James Bobbers, Marilyn KS, VE Tylor.

10. The formulation and preparation of cosmetic, fragrances and flavours.

11. Remington's Pharmaceutical sciences.

12. Text Book of Biotechnology by Vyas and Dixit.

13. Text Book of Biotechnology by R.C. Dubey

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Definition, history, scope and development of Pharmacognosy	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
2	Definition, history, scope and development of Pharmacognosy	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
3	Sources of Drugs – Plants, Animals	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
4	Marine & Tissue culture	Lecture	BP405T.1	Mid Term-1, Assignment ,Quiz & End Sem Exam
5	Organized drugs, unorganized drugs	Tutorial	BP405T.1	Mid Term-1, Quiz & End Sem Exam
6	Practical demonstration of Organized drugs & unorganized drugs differences	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
7	**Classification of drugs: introduction** :	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
8	Alphabetical, morphological	Lecture	BP405T.1	Mid Term-1, Quiz, Class test & End Sem Exam
9	taxonomical, chemical, pharmacological	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
10	chemo and serotaxonomical classification of drugs	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
11	**Quality control of Drugs of Natural Origin: introduction**	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam

12	Adulteration of drugs of natural origin	Lecture	BP405T.1	Mid Term-1, Assignment ,Quiz & End Sem Exam
13	Types of adulteration with examples	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
14	Evaluation by organoleptic, microscopic evaluation	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
15	Physical, chemical and biological methods of evaluation	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
16	Quantitative microscopy of crude drugs	Lecture	BP405T.1	Mid Term-1, Class test, Quiz & End Sem Exam
17	Lycopodium spore method, leaf constants, camera lucida and diagrams of microscopic objects to scale with camera lucida.	Lecture	**BP405T.1**	Mid Term-1, Quiz & End Sem Exam
18	**Cultivation, Collection, Processing and storage of drugs of natural origin – introduction**	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
19	Cultivation and Collection of drugs of natural origin	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
20	Factors influencing cultivation of medicinal plants	Lecture	BP405T.1	Mid Term-1, Assignment,Quiz & End Sem Exam
21	Plant hormones and their applications.	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
22	Polyploidy, mutation	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
23	hybridization with reference to medicinal plants	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
24	Conservation of medicinal plants	Lecture	BP405T.1	Mid Term-1, Quiz & End Sem Exam
25	**Plant tissue culture: History and introduction**	Lecture	BP405T.2	Mid Term-1, Quiz & End Sem Exam
26	types of cultures, Nutritional requirements,	Lecture	BP405T.2	Mid Term-1, Quiz &

				End Sem Exam
27	growth and their maintenance of tissue cultured cells	Lecture	BP405T.2	Mid Term-1, Quiz & End Sem Exam
28	Applications of plant tissue culture in Pharmacognosy.	Lecture	BP405T.2	Mid Term-1, Seminar,Quiz & End Sem Exam
29	Edible vaccines 1	Lecture	BP405T.2	Mid Term-1, Quiz & End Sem Exam
30	Edible vaccines 2	Lecture	**BP405T.2**	Mid Term-1, Quiz & End Sem Exam
31	**Pharmacognosy in various systems of medicine:**	Lecture	BP405T.3	Mid Term-2, Quiz & End Sem Exam
32	Role of Pharmacognosy in allopathy	Lecture	BP405T.3	Mid Term-2, Quiz & End Sem Exam
33	UNIT test – Discussion	Tutorial	BP405T.3	Mid Term-2, Quiz & End Sem Exam
34	Role of Pharmacognosy in Ayurveda	Lecture	BP405T.3	Mid Term-2, Quiz & End Sem Exam
35	Role of Pharmacognosy in SIDDHA	Lecture	BP405T.3	Mid Term-2, Quiz & End Sem Exam
36	Role of Pharmacognosy in HOMEOPATHY	Lecture	BP405T.3	Mid Term-2, Assignment ,Quiz & End Sem Exam
37	Role of Pharmacognosy in UNANI	Lecture	BP405T.3	Mid Term-2, Quiz & End Sem Exam
38	**Introduction to plant secondary metabolites**	Lecture	BP405T.3	Mid Term-2, Quiz & End Sem Exam
39	Definition, classification, properties and test for identification of Alkaloids, Glycosides,	Lecture	BP405T.3	Mid Term-2, Quiz & End Sem Exam
40	Quiz	Tutorial		Mid Term-2, Quiz & End Sem Exam
41	Flavonoids, Tannins, Volatile oil and Resins	Lecture	BP405T.3	Mid Term-2, Quiz & End Sem Exam

42	Study of biological source, chemical nature and uses of drugs of natural origin containing following drugs - introduction	Lecture	BP405T.4	Mid Term-2, Quiz & End Sem Exam
43	**Plant Products:** Fibers - Cotton, Jute, Hemp Hallucinogens, Teratogens,	Lecture	BP504T.4	Mid Term-2, Quiz & End Sem Exam
44	Natural allergens	Lecture	BP405T.1	Mid Term-2, Seminar, Quiz & End Sem Exam
45	**Primary metabolites: introduction**	Lecture	BP405T.1	Mid Term-2, Quiz & End Sem Exam
46	General introduction, detailed study with respect to chemistry, sources, preparation, evaluation, preservation, storage, therapeutic used and commercial utility as Pharmaceutical Aids and/or Medicines for the following Primary metabolites:	Lecture	BP405T.1	Mid Term-2, Quiz & End Sem Exam
47	**Carbohydrates:** Acacia, Agar	Tutorial		Mid Term-2, Quiz & End Sem Exam
48	Tragacanth, Honey	Lecture	BP405T.1	Mid Term-2, Seminar, Quiz & End Sem Exam
49	**Proteins and Enzymes**	Lecture	BP405T.1	Mid Term-2, Quiz & End Sem Exam
50	Gelatin,	Lecture	BP405T.1	Mid Term-2, Quiz & End Sem Exam
51	casein, proteolytic enzymes	Lecture	BP405T.1	Mid Term-2, Quiz & End Sem Exam
52	Papain, bromelain, serratiopeptidase, urokinase,	Lecture	BP405T.1	Mid Term-2, Assignment ,Quiz & End Sem Exam
53	Streptokinase, pepsin.	Lecture	BP405T.1	Mid Term-2, Quiz & End Sem Exam
54	**Lipids(Waxes, fats, fixed oils)** :	Tutorial	BP405T.1	Mid Term-2, Quiz & End Sem Exam
55	Castor oil, Chaulmoogra oil Spectroscopic studies, Electrophoresis	Lecture	BP405T.1	Mid Term-2, Quiz & End Sem Exam
56	Wool Fat, Bees Wax	Lecture	BP405T.1	Mid Term-2, Quiz &

				End Sem Exam
57	**Marine Drugs:**	Lecture	BP405T.1	Mid Term-2, Quiz & End Sem Exam
58	Novel medicinal agents from marine sources	Lecture	BP405T.1	Mid Term-2, Quiz & End Sem Exam
59	Revision 1	Lecture	BP405T.1	Mid Term-2, Quiz & End Sem Exam
60	Revision 2	Lecture	BP405T.1	Mid Term-2, Seminar,Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP405T.1.	Define Pharmacognosy, classify the crude drugs and explain methods of drug evaluation	3	2	1	2	1				1		2
BP405T.2.	Explain the techniques and methods involved in cultivation and collection production of crude drug. Illustrate the plant tissue culture and its applications. Brief note on edible vaccines.	3	1	1	1	2				2		2
BP405T.3.	Explain role of Pharmacognosy in allopathy & traditional system of medicine (Ayurveda, Siddha, Unani & Homeopathy)	3	3	2	2	2			2	2		2

BP405T.4	Study of primary & secondary metabolites from natural sources- carbohydrates, proteins, lipids, Alkaloids, Glycosides, steroids, volatile oils, tannins, resins and plant fibre products like Cotton, Jute & Hemp & Hallucinogens, Teratogens, Natural allergens	3	3	2	2	1			2	2		3

Sample Question Paper

Amity Institute of pharmacy Department of Pharmacognosy II MID-SEMESTER (SEM –IV) 2021-22						
Class: B Pharmacy IV Semester						
Subject Name: BP405T PHARMACOGNOSY & PHYTOCHEMISTRY I		Time: 1 Hr			Max. Marks: 30	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping						

Student will be

BP405 CO 1. Define Pharmacognosy, classify the crude drugs and explain methods of drug evaluation

BP 405 CO.2. Explain the techniques and methods involved in cultivation and collection production of crude drug. Illustrate the p*lant tissue culture and its* applications. Brief note on edible vaccines.

BP 405 CO.3. Explain role of Pharmacognosy in allopathy & traditional system of medicine (Ayurveda, Siddha, Unani & Homeopathy)

BP 405 CO.4. Study of primary & secondary metabolites from natural sources-carbohydrates, proteins, lipids, Alkaloids, Glycosides, steroids, volatile oils, tannins, resins and plant fiber products like Cotton, Jute & Hemp & Hallucinogens, Teratogens, Natural allergens

CO Map	Question No.	Question	Marks
	Q.1		
	Q.2		
	Q.3		
	Q.4		
	Q.5		
	Q.6		
	Q.7		
	Q 8		
	Q.9		
	Q 10		

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Below Level-1:

40.4 % of students secured more than 60% marks, so this course Pharmacognosy and Phytochemistry I– Theory (BP405T) attainment is below level 1.

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AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
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Programme Educational Objectives (PEOs)
Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.),Academic Year – 2021-22

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2].Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMMEARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
IVSEM	-															
	-															
	-															
	-															
	BP406P	3	1	2	1	1	2		2		3	2				
	-															
	-															
	-															

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DEPARTMENT OF PHARMACEUTICAL CHEMISTRY
Course Handout
Course : MEDICINAL CHEMISTRY– I PRACTICAL
Course Code : B406P, Crédits : 02, Session :2021-22 (Odd Sem.), Class : B.Pharm. IIndYear
Faculty Name: Dr. Srabanti Jana

A. **Scope:** This subject is designed to impart fundamental knowledge on the structure, chemistry and therapeutic value of drugs. The subject on synthetic methods of some drugs and assay of some selective drugs.

B. **Course Outcomes:** At the end of the course, students will be able to:

BP406P.1. Preparation of drugs/ intermediates like 1,3-pyrazole, 1,3-oxazole, Benzimidazole, Benztriazole, 2,3- diphenyl quinoxaline, Benzocaine, Phenytoin, Phenothiazine and Barbiturate.

BP406P.2. Assay of Chlorpromazine, Phenobarbitone, Atropine, Ibuprofen, Aspirin and Furosemide.

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2].Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during

daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

C. Assessment Plan:

Component of Evaluation	Description	Code	Weightage %

Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance isrequiredtobemaintainedbyastudentto be qualified for taking up the EndSemester examination. The allowanceof 20%includesalltypesofleaves includingmedicalleaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

D. Syllabus

BP406P.1. Preparation of drugs/ intermediates

1. 1,3-pyrazole
2. 1,3-oxazole
3. Benzimidazole
4. Benztriazole
5. 2,3- diphenyl quinoxaline
6. Benzocaine
7. Phenytoin
8. Phenothiazine
9. Barbiturate.

BP406P.2. Assay of Following drugs

1. Chlorpromazine
2. Phenobarbitone
3. Atropine
4. Ibuprofen
5. Aspirin
6. Furosemide.

BP406P.3. Determination of Partition coefficient for any two drugs

E. Examination Scheme:

Components	A	CT	LR	V	EE
Weightage (%)	2	10	1	2	35

CT: Class Test, LR: Lab Record, V: Viva,EE: End Semester Examination; A: Attendance

F. Suggested Text/Reference Books:

1. Wilson and Giswold's Organic medicinal and Pharmaceutical Chemistry.
2. Foye's Principles of Medicinal Chemistry.
3. Burger's Medicinal Chemistry, Vol I to IV.
4. Introduction to principles of drug design- Smith and Williams.
5. Remington's Pharmaceutical Sciences.
6. Martindale's extra pharmacopoeia.
7.Organic Chemistry by I.L. Finar, Vol. II.
8. The Organic Chemistry of Drug Synthesis by Lednicer, Vol. 1-5.
9. Indian Pharmacopoeia.
10. Text book of practical organic chemistry- A.I.Vogel.

G. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	To Synthesize, submit & report %yield of 1,3-pyrazole.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
2	To Synthesize, submit & report %yield of 1,3-oxazole.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
3	To Synthesize, submit & report %yield of Benzimidazole.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
4	To Synthesize, submit & report %yield Benztriazole.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
5	To Synthesize, submit & report %yield of 2,3- diphenyl quinoxaline.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
6	To Synthesize, submit & report %yield of Benzocaine.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
7	To Synthesize, submit & report %yield of phenytoin.	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
8	To Synthesize, submit & report %yield of Phenothiazine.	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
9	To Synthesize, submit & report %yield of Barbiturate.	Practical	CO1, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
10	To perform the assay and report the % purity of Chlorpromazine.	Practical	CO1, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
11	To perform the assay and report the % purity of Phenobarbitone.	Practical	CO1, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam

12	To perform the assay and report the % purity of atropine.	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
13	To perform the assay and report the % purity of ibuprofen.	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
14	To perform the assay and report the % purity of Aspirin.	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
15	To perform the assay and report the % purity of 6 Furosemide	Practical	CO1, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam

H. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	
BP406P.1	Preparation of drugs/ intermediates like 1,3-pyrazole, 1,3-oxazole, Benzimidazole, Benztriazole, 2,3-diphenyl quinoxaline, Benzocaine, Phenytoin, Phenothiazine and Barbiturate.	3		2	1	2	1	-	2	1	2	1	
BP406P.2.	Assay of Chlorpromazine, Phenobarbitone, Atropine, Ibuprofen, Aspirin and Furosemide.	2	-	-	1	-	1	-	-	-	-	3	

SampleQuestionPaper

Amity Institute of Pharmacy
Departmentof Pharmaceutical Chemistry
I MID-SEMESTER(SEM–IV)2021-22

Class:B.Pharm, IV-Semester						
SubjectName: BP406PMedical Chemistry-I Practical		Time:4Hrs		Max.Marks:40		
Levels of thequestions as perBloomsTaxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
QuestionMapping	Q.1,4	Q.2,3	Q.4	Q.2,5,6		

Student willbeableto

CO.1. To recall the principles used synthesis of different medicinal compounds

CO.2. Operate equipment used in the preparation of compounds.

CO.3. Estimation of different medicinal compounds by titrimetry.

CO.4. Assay and reporting the percentage purity of compounds.

CO.5. Determination of Partition coefficient for any two drugs.

COMap	QuestionNo.	Question	Marks
CO1,2,4	Q.1a	Synopsis-principles in synthesis of benzimidazole.	2
CO1,2,4	Q.1b	Synopsis- principle for assay of ibuprofen.	2
CO1,2,4	Q.1c	Synopsis- principle in preparation of benzocaine.	2
CO1,2,4	Q.1d	Synopsis- principle in preparation of phenetoin.	2
CO1,2,4	Q.1e	Synopsis- Principle in determination of partition-coefficient (logP)	2
CO1,2, 4,5	Q.2	Experiment To Assay and report the percentage purity of Ibuprofen	25
CO1,2,3,4,5	Q.3	Viva	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

100% Percentage of students secured more than 60% marks, so this course Medicinal Chemistry I – Practical (BP406PT) attained Level -3.

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PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

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DEPARTMENT OF PHARMACY
Course Handout
Course : PHYSICAL PHARMACEUTICS II
Course Code : BP407 P, Programme : II.B. Pharmacy IV-Semester **Crédits : 02, Session :2021-22 (Even Sem.)**
Faculty Name : Dr. Jovita Kanoujia

A. Scope: The course deals with the various physical and physicochemical properties, and principle involved in dosage forms/formulations. Theory and practical components of the subject help the student to get a better insight into various areas of formulation research and development, and stability studies of pharmaceutical dosage forms.

B. Course Outcome: ***At the end of each course, the student will be able to:***

C407.1	To ddetermine the particle size, particle size distribution using sieving method or microscopic method
C407.2	To uunderstand various physicochemical properties of drug molecules in the designing the dosage forms
C407.3	To know the principles of chemical kinetics & to use them for stability testing and determination of expiry date of formulations
C407.4	To Determine the angle of repose and influence of lubricant on angle of repose
C407.5	To ddetermine of reaction rate constant
C407.6	To demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms.

C. 1.Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices**.**
2. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.
3. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice.
Find, analyze, evaluate and apply information systematically and shall make defensible decisions.
4. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

5. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well-being.

6. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

7. Pharmaceutical Ethics: Honor personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

8. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

9. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional Pharmacy Practice

10. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

11. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively

D.Programme specific outcomes:

1. Scientific Thinking: Enable student's knowledge in scientific perception to understand the concepts and to solve the problems positively while making pharmaceutical formulations.
2. Analytical Skills: Assimilate and develop analytical skills using advanced equipment to design and evaluate pharmaceutical products, also to assess their quality.
3. Resource Management: Utilize and manage resources from natural, semi synthetic and synthetic origin to develop real time products with utmost benefit and safety.
4.Public Health Care: Promote and empower the healthy living in the community by various means of awareness and health strategies.
5. Entrepreneurship: Acquire and develop entrepreneurship and administration skills to establish community pharmacy, learning and training centers for the long term wellbeing of society.

E. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	LT	10%
	Mid Term 2		
	Practical Records/ Regular viva voce	PR/RVV	1% / 2%
Attendance	A minimum of 80% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 20% includes all	A	2%

	types of leaves including medical leaves.		
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

F. Syllabus

1. Determination of particle size, particle size distribution using sieving method
2. Determination of particle size, particle size distribution using microscopic method
3. Determination of bulk density, true density and porosity
4. Determine the angle of repose and influence of lubricant on angle of repose
5. Determination of viscosity of liquid using Ostwald's viscometer
6. Determination sedimentation volume with effect of different suspending agent
7. Determination sedimentation volume with effect of different concentration of single suspending agent
8. Determination of viscosity of semisolid by using Brookfield viscometer
9. Determination of reaction rate constant first order.
10. Determination of reaction rate constant second order
11. Accelerated stability studies

G. Examination Scheme:

Components	**A**	**LT**	**PR/RVV**	**EE**
Weightage (%)	2	10	1/2	35

LT: Lab Test, PR/RVV: Practical Records/ Regular viva voce, EE: End Semester Examination; A: Attendance

H. Suggested Text/Reference Books:

1. Physical Pharmacy by Alfred Martin
2. Experimental Pharmaceutics by Eugene, Parott.
3. Tutorial Pharmacy by Cooper and Gunn.
4. Stocklosam J. Pharmaceutical Calculations, Lea &Febiger, Philadelphia.
5. Liberman H.A, Lachman C., Pharmaceutical Dosage forms, Tablets, Volume-1 to 3, MarcelDekkar Inc.
6. Liberman H.A, Lachman C, Pharmaceutical Dosage forms. Disperse systems, volume 1, 2, 3. Marcel Dekkar Inc.
7. Physical Pharmaceutics by Ramasamy C and ManavalanR.
8. Laboratory Manual of Physical Pharmaceutics, C.V.S. Subramanian, J. Thimma settee
9. Physical Pharmaceutics by C.V.S. Subramanyam

I. Lecture Plan

Lecture	**Topics**	**Mode of Delivery**	**Corresponding CO**	**Mode of Assessing CO**
1	Determination of particle size, particle size distribution using sieving method	Practical	C407.1	Mid Term-1, PR/RVV & End Sem Exam
2	Determination of particle size, particle size distribution using Microscopic method	Practical	C407.1, C407.6	Mid Term-1, PR/RVV & End Sem Exam
3	Determination of bulk density, true density and porosity	Practical	C407.2	Mid Term-1, PR/RVV & End Sem

				Exam
4	Determine the angle of repose and influence of lubricant on angle of repose	Practical	C407.4	Mid Term-1, PR/RVV & End Sem Exam
5	Determination of viscosity of liquid using Ostwald's viscometer	Practical	C407.2& C407.3	Mid Term-1, PR/RVV & End Sem Exam
6	Determination sedimentation volume with effect of different suspending agent	Practical	C407.2& C407.3	Mid Term-1, PR/RVV & End Sem Exam
7	Determination sedimentation volume with effect of different concentration of single suspending agent	Practical	C407.2& C407.3	Mid Term-1, PR/RVV & End Sem Exam
8	Determination of viscosity of semisolid by using Brookfield viscometer	Practical	C407.2& C407.3	Mid Term-1, PR/RVV & End Sem Exam
9	Determination of reaction rate constant first order.	Practical	C407.5	Mid Term-2, PR/RVV & End Sem Exam
10	Determination of reaction rate constant second order	Practical	C407.5& C407.3	Mid Term-2, PR/RVV & End Sem Exam
11	To perform Accelerated stability studies	Practical	C407.3& C407.6	Mid Term-2, PR/RVV & End Sem Exam
12	To classify dispersed systems & their general characteristics, size & shapes of colloidal particles	Practical	C407.2 & C407.3	Mid Term-2, PR/RVV & End Sem Exam
13	To classify of colloids & comparative account of their general properties. Optical, kinetic & electrical properties	Practical	C407.2 & C407.3	Mid Term-2, PR/RVV & End Sem Exam
14	To know newtonian systems, law of flow, kinematic viscosity,	Practical	C407.2& C407.3	Mid Term-2, PR/RVV & End Sem Exam
15	To determine rheological properties of emulsions and emulsion formulation by HLB method.	Practical	C407.2& C407.3	Mid Term-2, PR/RVV & End Sem Exam

Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
C407.1	3	1	2	2	3	2	1	-	-	1	-
C407.2	1	-	3	1	-	-	1	-	2	1	1
C407.3	1	2	-	1	2	-	2	1	-	-	1
C407.4	2	1	1	1	-	1	2	-	1	-	2
C407.5	1	2	2	-	1	-	1	1	1	2	3
C407.6	3	1	1	1	-	1	2	-	1	-	2
Average	1.8	1.16	1.5	1	1.0	0.66	1.3	0.3	0.83	0.66	1.5

I. Course Articulation Matrix (Mapping of COs with POs)

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutics I MID-SEMESTER (SEM –IV) 2021-22						
Class: B.Pharm, IV Semester						
Subject Name: BP407P Physical Pharmaceutics-II Practical		Time: 4 Hrs			Max. Marks: 40	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,4	Q.2,3	Q.4	Q.2,5,6		

Student will be able to

C407.1	To determine the particle size, particle size distribution using sieving method or microscopic method
C407.2	To understand various physicochemical properties of drug molecules in the designing the dosage forms
C407.3	To know the principles of chemical kinetics & to use them for stability testing and determination of expiry date of formulations
C407.4	To Determine the angle of repose and influence of lubricant on angle of repose
C407.5	To ddetermine of reaction rate constant
C407.6	To demonstrate use of physicochemical properties in the formulation

	development and evaluation of dosage forms.

CO Map	Question No.	Question	Marks
C407.1,2, 3	Q.1a	Synopsis- What is porosity? Write its method of determination.	5
C407.1,2, 3	Q.1b	Synopsis- Write the principle involved in determination of sedimentation volume.	5
C407.1,2, 4,6	Q.2	Experiment To determine the viscosity of semisolid by using Brookfield viscometer.	25
C407.1,2,3,4, 5,6	Q.3	Viva	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

96.5 % Percentage of students secured more than 60% marks, so this course Physical Pharmaceutics II – Practical (BP407P) attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR

AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)

Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

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MADHYA PRADESH
Established vide Government of Madhya Pradesh Act No. 27 of 2010

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOLOGY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1]. Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Programme Specific Outcomes:

Programme Specific Outcomes:

PSO 1: This subject is designed to understand what drugs do to the living organisms and how their effects can be applied to therapeutics.

PSO 2: The subject covers the information about the drugs like, mechanism of action, physiological and biochemical effects (pharmacodynamics)

PSO 3: This subject also cover the information about absorption, distribution, metabolism and excretion (pharmacokinetics) along with the adverse effects, clinical uses, interactions, doses, contraindications and routes of administration of different classes of drugs.

PSO 4: The subject provides the basic knowledge required to understand the various disciplines of pharmacy

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
IV SEM	BP408P	3	1	2	-	1	3	2	1	3	2	2				
	-															
	-															
	-															
	-															
	-															
	-															
	-															

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACOLOGY
Course Handout
Course : PHARMACOLOGY – I PRACTICAL
Course Code : BP408P, Crédits : 02, Session :2021-22 (IVth SEM), Class : B.Pharm. 2nd Year
Faculty Name: Dr. Shvetank Bhatt

A. Introduction: This course is designed to impart fundamental knowledge on the structure and functions of the various systems of the human body. It also helps in understanding both homeostatic mechanisms. The subject provides the basic knowledge required to understand the various disciplines of pharmacy.

B. Course Outcomes: At the end of the course, students will be able to:

BP408P.CO1. Introduction to experimental pharmacology.
BP408P.CO2. Study of different routes of drugs administration in mice/rats.
BP408P.CO3. Study of effect of hepatic microsomal enzyme inducers on the phenobarbitone sleeping time in mice.
BP408P.CO4. Effects of skeletal muscle relaxants using rota-rod apparatus.
BP408P.CO5. Study of stereotype and anti-catatonic activity of drugs on rats/mice.
BP408P.CO6. Study of local anesthetics by different methods

Programme Outcomes:

[PO.1]. Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time

management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

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[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

C. Programme Specific Outcomes:

PSO 1: Understand the pharmacological actions of different categories of drugs. Explain the mechanism of drug action at organ system/sub cellular/ macromolecular levels.

PSO 2: Apply the basic pharmacological knowledge in the prevention and treatment of various diseases.

PSO 3: Observe the effect of drugs on animals by simulated experiments

PSO 4: Appreciate correlation of pharmacology with other bio medical sciences

Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

D. Syllabus

1. Introduction to experimental pharmacology.
2. Commonly used instruments in experimental pharmacology.
3. Study of common laboratory animals.
4. Maintenance of laboratory animals as per CPCSEA guidelines.
5. Common laboratory techniques. Blood withdrawal, serum and plasma separation, anesthetics and euthanasia used for animal studies.
6. Study of different routes of drugs administration in mice/rats.
7. Study of effect of hepatic microsomal enzyme inducers on the phenobarbitone sleeping time in mice.
8. Effect of drugs on ciliary motility of frog oesophagus
9. Effect of drugs on rabbit eye.

10. Effects of skeletal muscle relaxants using rota-rod apparatus.
11. Effect of drugs on locomotor activity using actophotometer.
12. Anticonvulsant effect of drugs by MES and PTZ method.
13. Study of stereotype and anti-catatonic activity of drugs on rats/mice.
14. Study of anxiolytic activity of drugs using rats/mice.
15. Study of local anesthetics by different method

Examination Scheme:

Components	A	CT	LR	V	EE
Weightage (%)	2	10	1	2	35

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

E. **Suggested Text/Reference Books:**

1.Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology,.Churchil Livingstone Elsevier
2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill
3. Goodman and Gilman's, The Pharmacological Basis of Therapeutics
4. Marry Anne K. K., Lloyd Yee Y., Brian K. A., Robbin L.C., Joseph G. B., Wayne A. K., Bradley R.W., Applied Therapeutics, The Clinical use of Drugs, The Point Lippincott Williams & Wilkins
5. Mycek M.J, Gelnet S.B and Perper M.M. Lippincott's Illustrated Reviews-Pharmacology
6. SK Kulkarni.

Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Introduction to experimental pharmacology.	Lecture	Unit-1 CO1	Mid Term-1 and 2, Quiz & End Sem Exam
2	Introduction to experimental pharmacology.	Lecture	CO4	Mid Term-1 and 2, Quiz & End Sem Exam
3	Commonly used instruments in experimental pharmacology.	Lecture	CO4	Mid Term-1 and 2, Quiz & End Sem Exam
4	Commonly used instruments in experimental pharmacology.	Tutorial	CO3	Mid Term-1 and 2, Quiz & End Sem Exam
5	Study of common laboratory animals	Lecture	CO3	Mid Term-1 and 2, Quiz & End Sem Exam

6	Maintenance of laboratory animals as per CPCSEA guidelines	Lecture	CO2	Mid Term-1 and 2, Quiz & End Sem Exam
7	Common laboratory techniques. Blood withdrawal, serum and plasma separation, anesthetics and euthanasia used for animal studies.	Lecture	CO5	Mid Term-1 and 2, Quiz & End Sem Exam
8	Study of different routes of drugs administration in mice/rats	Tutorial		Mid Term-1 and 2, Quiz & End Sem Exam
9	Study of effect of hepatic microsomal enzyme inducers on the phenobarbitone sleeping time in mice.	Lecture	CO5	Mid Term-1 and 2, Quiz & End Sem Exam
10	Effect of drugs on ciliary motility of frog oesophagus	Lecture	CO5	Mid Term-1 and 2, Quiz & End Sem Exam
11	Effect of drugs on rabbit	Lecture	CO5	Mid Term-1 and 2, Quiz & End Sem Exam
12	Effects of skeletal muscle relaxants using rota-rod apparatus	Tutorial		Mid Term-1 and 2, Quiz & End Sem Exam
13	Effect of drugs on locomotor activity using actophotometer.	Lecture	CO5	Mid Term-1 and 2, Quiz & End Sem Exam
14	Anticonvulsant effect of drugs by MES and PTZ metho	Lecture	CO5	Mid Term-1 and 2, Quiz & End Sem Exam
15	Study of stereotype and anti-catatonic activity of drugs on rats/mice.	Lecture	CO5	Mid Term-1 and 2, Quiz & End Sem Exam
16	Unit test	Tutorial		Mid Term-1 and 2, Quiz & End Sem Exam
17	Study of anxiolytic activity of drugs using rats/mice.	Lecture	CO6	Mid Term-1 and 2, Quiz & End Sem Exam
18	Study of local anesthetics by different methods	Lecture	CO6	Mid Term-1 and 2, Quiz & End Sem Exam

F. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP408P.1	1 Introduction to experimental pharmacology. 2. Commonly used instruments in experimental pharmacology. 3. Study of common laboratory animals. 4. Maintenance of laboratory animals as per CPCSEA guidelines.	3	-	-	-	1	2	1	-	-	-	-		3	2	1
BP408P.2.	Common laboratory techniques. Blood withdrawal, serum and plasma separation, anesthetics and euthanasia used for animal studies. 6. Study of different routes of drugs administration in mice/rats. 7. Study of effect of hepatic microsomal enzyme inducers on the phenobarbitone	3	-	-	1	-	1	-	-	-	-	2		2	3	1

	sleeping time in mice.															
BP408P.3.	Effect of drugs on ciliary motility of frog oesophagus 9. Effect of drugs on rabbit eye. 10. Effects of skeletal muscle relaxants using rota-rod apparatus.	3	2	-	3	-	2	-	-	-	-	3		1	2	3
BP408P.4.	Effect of drugs on locomotor activity using actophotometer. 12. Anticonvulsant effect of drugs by MES and PTZ method.	2	2	1	3	-	1	-	-	-	-	2		2	3	2
BP408P.5.	Study of stereotype and anti-catatonic activity of drugs on rats/mice. 14. Study of anxiolytic activity of drugs using rats/mice.	3	-	1	-	2	-	-	-	-	-	2		2	3	3
BP408P.6	Study of local anesthetics by different methods.	3			1							1		3	1	2

P. Mohanakalyani

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacology I MID-SEMESTER (SEM –IV) 2021-22						
Class: B.Pharm, IV Semester						
Subject Name: BP408P Pharmacology-I		Time: 4 Hrs			Max. Marks: 40	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,2,	Q.3,4	Q.5,6	Q.7		

Student will be able to

CO1.

1. Introduction to experimental pharmacology.
2. Commonly used instruments in experimental pharmacology.
3. Study of common laboratory animals.

CO 2

4. Maintenance of laboratory animals as per CPCSEA guidelines.
5. Common laboratory techniques. Blood withdrawal, serum and plasma separation, anesthetics and euthanasia used for animal studies.
6. Study of different routes of drugs administration in mice/rats.

CO 3

7. Study of effect of hepatic microsomal enzyme inducers on the phenobarbitone sleeping time in mice.
8. Effect of drugs on ciliary motility of frog oesophagus
9. Effect of drugs on rabbit eye.

CO 4

10. Effects of skeletal muscle relaxants using rota-rod apparatus.
11. Effect of drugs on locomotor activity using actophotometer.
12. Anticonvulsant effect of drugs by MES and PTZ method.

CO5

13. Study of stereotype and anti-catatonic activity of drugs on rats/mice.
14. Study of anxiolytic activity of drugs using rats/mice.

CO6

15. Study of local anesthetics by different method

Demonstration of total blood count by cell analyser Permanent slides of vital organs and gonads			
CO Map	Question No.	Question	Marks
CO4	Q.1a	*What is CPCSEA*	2
CO2	Q.1b	Define Pharmacokintics.	2
CO2	Q.1c	Make use of animal anaesthetics.	2
CO3	Q.1d	What are different routes of blood withdrawal.	2
CO2 CO3	Q.1e	Give the use of rotarod.	2
	Q.2	Experiment: Commonly used instruments in experimental pharmacology.	25
	Q.3	Viva	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

100 % Percentage of students secured more than 60% marks, so this course Pharmacology I – Practical (BP408P) attained Level -3.

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AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)
Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

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AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOGNOSY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
IV SEM	-	3	1	3	2	1	2	2	2	2	2	3				
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AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACOGNOSY
Course Handout
Course : PHARMACOGNOSY AND PHYTOCHEMISTRY – I PRACTICAL
Course Code : BP409P, Crédits : 02, Session :2021-22 (Even Sem.), Class : B.Pharm. 2nd Year
Faculty Name: Ms Ankita Kishore

A. Introduction: The subject involves the fundamentals of Pharmacognosy like scope, classification of
crude drugs, their identification and evaluation, phytochemicals present in them and their
medicinal properties

B. Course Outcomes: At the end of the course, students will be able to:

BP409P.1. To know the techniques in the cultivation and production of crude drugs

BP409P.2. To know the crude drugs, their uses and chemical nature

BP409P.3. To know the evaluation techniques for the herbal drugs

BP409P.4. To carry out the microscopic and morphological evaluation of crude drugs

BP409P.5. To know the classification ,identification and medicinal properties of herbal drugs

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to

identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

E. Syllabus

1. Analysis of crude drugs by chemical tests: **(**i)Tragaccanth (ii) Acacia (iii)Agar (iv) Gelatin (v) starch (vi) Honey (vii) Castor oil
2. Determination of stomatal number and index
3. Determination of vein islet number, vein islet termination and paliside ratio.
4. Determination of size of starch grains, calcium oxalate crystals by eye piece micrometer
5. Determination of Fiber length and width
6. Determination of number of starch grains by Lycopodium spore method
7. Determination of Ash value
8. Determination of Extractive values of crude drugs
9. Determination of moisture content of crude drugs
10. Determination of swelling index and foaming

F. Examination Scheme:

Components	**A**	**CT**	**LR**	**V**	**EE**
Weightage (%)	2	10	1	2	35

CT: Class Test, LR: Lab Record, V: Viva, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

- W.C.Evans, Trease and Evans Pharmacognosy, 16th edition, W.B. Sounders & Co., London, 2009.
- 2. Tyler, V.E., Brady, L.R. and Robbers, J.E., Pharmacognosy, 9th Edn., Lea and Febiger, Philadelphia, 1988.
- 3. Text Book of Pharmacognosy by T.E. Wallis
- 4. Mohammad Ali. Pharmacognosy and Phytochemistry, CBS Publishers & Distribution, New Delhi.
- 5. Text book of Pharmacognosy by C.K. Kokate, Purohit, Gokhlae (2007), 37th Edition,
  Nirali Prakashan, New Delhi.
- 6. Herbal drug industry by R.D. Choudhary (1996), Ist Edn, Eastern Publisher, New Delhi.
- 7. Essentials of Pharmacognosy, Dr.SH.Ansari, IInd edition, Birla publications, New
  Delhi, 2007
- 8. Practical Pharmacognosy: C.K. Kokate, Purohit, Gokhlae
- 9. Anatomy of Crude Drugs by M.A. Iyengar

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	To Perform Morphological study and Chemical Identification test for Tragaccanth , Acacia and Benzoin	Practical	CO 1,2, 3,4, 5	Mid Term-1, Quiz & End Sem Exam
2	To Perform Morphological study and Chemical Identification test for Agar , Gelatin and Starch	Practical	CO1, 2,3, 4, 5	Mid Term-1, Quiz & End Sem Exam
3	To Perform Morphological study and Chemical Identification test for Castor oil , Asafoetida and Honey	Practical	CO1, 2,3, 4, 5	Mid Term-1, Quiz & End Sem Exam
4	Determination of stomatal number and index	Practical	CO1, 2, 3,4, 5	Mid Term-1, Quiz &

				End Sem Exam
5	Determination of vein islet number, vein islet termination and paliside ratio	Practical	CO1, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
6	Determination of size of starch grains, calcium oxalate crystals by eye piece Micrometer	Practical	CO, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
7	Determination of Fiber length and width	Practical	CO, 2, 4, 5	Mid Term-1, Quiz & End Sem Exam
8	Determination of number of starch grains by Lycopodium spore method	Practical	CO, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
9	Determination of total Ash value for given crude drug	Practical	CO, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
10	Determination of acid insoluble Ash value for given crude drug	Practical	CO, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
11	Determination of Extractive values of crude drugs	Practical	CO, 2, 3, 5	Mid Term-2, Quiz & End Sem Exam
12	Determination of moisture content of crude drugs	Practical	CO, 2, 4, 5	Mid Term-2, Quiz & End Sem Exam
13	Determination of swelling index and foaming index of	Practical	CO, 2, 4, 5	Mid Term-2, Quiz &

	crude drug			End Sem Exam
14	To perform morphological and microscopical evaluation of given crude drug	Practical	CO1, 2,3 4, 5	Mid Term-2, Quiz & End Sem Exam
15	To perform morphological and microscopical evaluation of given crude drug	Practical	CO1, 2,3 4, 5	Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	
BP409P.1	To know the techniques in the cultivation and production of crude drugs	3		2	3	-	1	-	2	1	1	1	
BP409P.2.	To know the crude drugs, their uses and chemical nature	2	-	-	1	-	1	-	-	-	-	3	
BP409P.3.	To know the evaluation techniques for the herbal drugs	3	-	2	3	-	2	1	2	1	1	3	

BP409P .4.	To carry out the microscopic and morphological evaluation of crude drugs	2	-	2	1	-	2	1	2	-	1	3	
BP409P .5.	To know the classification ,identification and medicinal properties of herbal drugs	1	-	1	-	-	1	-	2	-	-	3	

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacognosy I MID-SEMESTER (SEM –IVth) 2021-22						
Class: B.Pharm, IVth Semester						
Subject Name: BP409P Pharmacognosy and phytochemistry-I Practical		Time: 4 Hrs		Max. Marks: 40		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,4	Q.2,3	Q.4	Q.2,5,6		

Student will be able to

CO.1. . To know the techniques in the cultivation and production of crude drugs

CO.2. To know the crude drugs, their uses and chemical nature

CO.3. . To know the evaluation techniques for the herbal drugs

CO.4. To carry out the microscopic and morphological evaluation of crude drugs

CO.5. To know the classification ,identification and medicinal properties of herbal drugs

CO Map	Question No.	Question	Marks
CO1,2,4	Q.1a	Synopsis- What are difference between histological and morphological evaluation ?	2
CO1,2,4	Q.1b	Synopsis- Define stomatal no and stomatal index?	2
CO1,2,4	Q.1c	Synopsis- Define Glycosides?	2
CO1,2,4	Q.1d	Synopsis- Give active constituents and uses of Agar,Acacia,Tragacanth and Honey?	2
CO1,2,4	Q.1e	Synopsis- What are volatile oils classify them with suitable examples?	2
CO1,2, 4,5	Q.2	Experiment Determination of size of starch grains, calcium oxalate crystals by eye piece micrometer	25
CO1,2,3,4,5	Q.3	Viva	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3 :

100.0 % Percentage of students secured more than 60% marks, so this course Pharmacognosy and Phytochemistry I – Practical (BP409PT) attained Level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)
Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

AMITY UNIVERSITY
MADHYA PRADESH
Established vide Government of Madhya Pradesh Act No. 27 of 2010

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

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Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I SEM																

II SEM																
III SEM																
IV SEM	-															
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V SEM	BP103T	3	-	2	-	1	3	2	-	-	-	-	-	-	-	-
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Dr. Mohanty

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICAL CHEMISTRY
Course Handout
Course : MEDICINAL CHEMISTRY – II THEORY
Course Code : BP501T, Crédits : 04, Session : 2021-22 (Odd Sem.), Class : B.Pharm. IIIrd Year
Faculty Name: Dr. Srabanti Jana

A. Introduction: The course is designed to impart fundamental knowledge on the preparatory
pharmacy with arts and science of preparing the different conventional dosage forms.

B. Course Outcomes: At the end of the course, students will be able to:

BP501T.1. Understand the chemistry of drugs with respect to their pharmacological activity

BP501T.2. Understand the drug metabolic pathways, adverse effect and therapeutic value of
drugs

BP501T.3. Understand the mechanism of action.

BP501T.4. Know the Structural Activity Relationship of different class of drugs.

BP501T.5. Study the chemical synthesis of selected drugs.

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

UNIT – I

Antihistaminic agents: Histamine, receptors and their distribution in the Humanbody .H1–antagonists: Diphenhydramine hydrochloride*, Dimenhydrinate, Doxylamines cuccinate, Clemastine fumarate, Diphenylphyraline hydrochloride, Tripelenamine hydrochloride, Chlorcyclizine hydrochloride, Meclizine hydrochloride, Buclizine hydrochloride, Chlorpheniramine maleate, Triprolidine hydrochloride*, Phenidamine tartarate, Promethazine hydrochloride*, Trimeprazine tartrate, Cyproheptadine hydrochloride, Azatidine maleate, Astemizole, Loratadine, Cetirizine, Levocetrazine Cromolyn sodium

H2-antagonists: Cimetidine*, Famotidine, Ranitidin.

Gastric Proton pump inhibitors: Omeprazole, Lansoprazole, Rabeprazole, Pantoprazole.

Anti-neoplastic agents: Alkylating agents: Meclorethamine*, Cyclophosphamide, Melphalan,

UNIT – II

Anti-anginal: Vasodilators: Amyl nitrite, Nitroglycerin*, Pentaerythritol tetranitrate, Isosorbide dinitrite*, Dipyridamole. Calcium channel blockers: Verapamil, Bepridil hydrochloride, Diltiazem hydrochloride, Nifedipine, Amlodipine, Felodipine, Nicardipine, Nimodipine.

Diuretics: Carbonic anhydrase inhibitors: Acetazolamide*, Methazolamide, Dichlorphenamide.

Thiazides: Chlorthiazide*, Hydrochlorothiazide, Hydroflumethiazide, Cyclothiazide, Loop diuretics: Furosemide*, Bumetanide, Ethacrynic acid. Potassium sparing Diuretics: Spironolactone, Triamterene, Amiloride. Osmotic Diuretics: Mannitol.

Anti-hypertensive Agents: Timolol, Captopril, Lisinopril, Enalapril, Benazepril hydrochloride, Quinapril hydrochloride, Methyldopate hydrochloride,* Clonidine hydrochloride, Guanethidine monosulphate, Guanabenz acetate, Sodium nitroprusside, Diazoxide,Minoxidil, Reserpine, Hydralazine hydrochloride.

UNIT – III

Anti-arrhythmic Drugs: Quinidine sulphate, Procainamide hydrochloride, Disopyramide phosphate*, Phenytoin sodium, Lidocaine hydrochloride, Tocainide hydrochloride, Mexiletine hydrochloride, Lorcainide hydrochloride, Amiodarone, Sotalol.

Anti-hyperlipidemic agents: Clofibrate, Lovastatin, Cholesteramine and Cholestipol

Coagulant & Anticoagulants: Menadione, Acetomenadione, Warfarin*, Anisindione, clopidogrel

Drugs used in Congestive Heart Failure: Digoxin, Digitoxin, Nesiritide, Bosentan, Tezosentan.

UNIT – IV

Drugs acting on Endocrine system: Nomenclature, Stereochemistry and metabolism of steroids Sex hormones: Testosterone, Nandralone, Progestrones, Oestriol, Oestradiol, Oestrione, Diethyl stilbestrol.

Drugs for erectile dysfunction: Sildenafil, Tadalafil. Oral contraceptives: Mifepristone, Norgestril, Levonorgestrol. Corticosteroids: Cortisone, Hydrocortisone, Prednisolone, Betamethasone, Dexamethasone. Thyroid and antithyroid drugs: L-Thyroxine, L-Thyronine, Propylthiouracil, Methimazole.

UNIV – V

Antidiabetic agents Insulin and its preparations Sulfonyl ureas: Tolbutamide*, Chlorpropamide, Glipizide, Glimepiride. Biguanides: Metformin. Thiazolidinediones: Pioglitazone, Rosiglitazone. Meglitinides: Repaglinide, Nateglinide. Glucosidase inhibitors: Acrabose, Voglibose.

Local Anesthetics: SAR of Local anesthetics**.** Benzoic Acid derivatives; Cocaine, Hexylcaine, Meprylcaine, Cyclomethycaine, Piperocaine. Amino Benzoic acid derivatives: Benzocaine*, Butamben, Procaine*, Butacaine, Propoxycaine, Tetracaine, Benoxinate. Lidocaine/Anilide derivatives: Lignocaine, Mepivacaine, Prilocaine, Etidocaine. Miscellaneous: Phenacaine, Diperodon, and Dibucaine.*

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. Wilson and Giswold's Organic medicinal and Pharmaceutical Chemistry.
2. Foye's Principles of Medicinal Chemistry.
3. Burger's Medicinal Chemistry, Vol I to IV.
4. Introduction to principles of drug design- Smith and Williams.
5. Remington's Pharmaceutical Sciences.
6. Martindale's extra pharmacopoeia.
7. Organic Chemistry by I.L. Finar, Vol. II.
8. The Organic Chemistry of Drug Synthesis by Lednicer, Vol. 1to 5.
9. Indian Pharmacopoeia.
10. Text book of practical organic chemistry- A.I.Vogel.

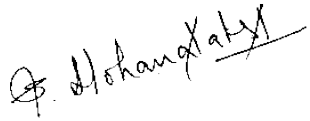
H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Antihistaminic agents: Histamine, receptors and their distribution in the Human body.	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
2	1–antagonists: Diphenhydramine hydrochloride*, Dimenhydrinate, Doxylamines cuccinate	Lecture	4,5	Mid Term-1, Quiz & End Sem Exam
3	lemastine fumarate, Diphenylphyraline hydrochloride, Tripelenamine hydrochloride, Chlorcyclizine hydrochloride, Meclizine hydrochloride, Buclizine hydrochloride, Chlorpheniramine maleate	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
4	Triprolidine hydrochloride*, Phenidamine tartarate, Promethazine hydrochloride*, Trimeprazine tartrate	Tutorial	1,2,3	Mid Term-1, Quiz & End Sem Exam
5	Cyproheptadine hydrochloride, Azatidine maleate, Astemizole, Loratadine, Cetirizine,	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam

	Levocetrazine Cromolyn sodium			
6	H2-antagonists: Cimetidine*, Famotidine, Ranitidine	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
7	Gastric Proton pump inhibitors: Omeprazole, Lansoprazole, Rabeprazole, Pantoprazole.	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
8	Anti-neoplastic agents: Alkylating agents: Meclorethamine*, Cyclophosphamide, Melphalan,	Tutorial	1,2,3,4	Mid Term-1, Quiz & End Sem Exam
9	Anti-anginal: Vasodilators: Amyl nitrite, Nitroglycerin*, Pentaerythritol tetranitrate, Isosorbide dinitrite*	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
10	Dipyridamole. Calcium channel blockers: Verapamil, Bepridil hydrochloride, Diltiazem hydrochloride, Nifedipine, Amlodipine, Felodipine, Nicardipine, Nimodipine.	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
11	Diuretics: Carbonic anhydrase inhibitors: Acetazolamide*, Methazolamide, Dichlorphenamide.	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
12	Thiazides: Chlorthiazide*, Hydrochlorothiazide, Hydroflumethiazide, Cyclothiazide, Loop diuretics: Furosemide*	Tutorial	4, 1,2,3	Mid Term-1, Quiz & End Sem Exam
13	Bumetanide, Ethacrynic acid. Potassium sparing Diuretics: Spironolactone, Triamterene, Amiloride. Osmotic Diuretics: Mannitol.	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
14	Anti-hypertensive Agents: Timolol, Captopril, Lisinopril, Enalapril, Benazepril hydrochloride, Quinapril	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam

	hydrochloride			
15	Methyldopate hydrochloride,* Clonidine hydrochloride, Guanethidine monosulphate,	Lecture	5,1,2,3	Mid Term-1, Quiz & End Sem Exam
16	Guanabenz acetate, Sodium nitroprusside, Diazoxide,Minoxidil, Reserpine, Hydralazine hydrochloride.	Tutorial	1,2,3	Mid Term-1, Quiz & End Sem Exam
17	Anti-arrhythmic Drugs: Quinidine sulphate, Procainamide hydrochloride, , Lorcainide hydrochloride, Amiodarone, Sotalol.	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
18	Disopyramide phosphate*, Phenytoin sodium, Lidocaine hydrochloride, Tocainide hydrochloride, Mexiletine hydrochloride	Lecture	5, 1,2,3	Mid Term-2, Quiz & End Sem Exam
19	Anti-hyperlipidemic agents: Clofibrate, Lovastatin, Cholesteramine and Cholestipol	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
20	Coagulant & Anticoagulants: Menadione, Acetomenadione,	Tutorial	1,2,3	Mid Term-2, Quiz & End Sem Exam
21	Warfarin*, Anisindione, clopidogrel	Lecture	5, 1,2,3	Mid Term-2, Quiz & End Sem Exam
22	Drugs used in Congestive Heart Failure	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
23	Digoxin, Digitoxin,	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
24	Nesiritide, Bosentan, Tezosentan.	Tutorial	1,2,3	Mid Term-2, Quiz & End Sem Exam
25	Drugs acting on Endocrine system	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
26	Nomenclature	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
27	Stereochemistry and	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
28	metabolism of steroids Sex hormones	Tutorial	1,2,3	Mid Term-2, Quiz & End Sem Exam
29	Testosterone, Nandralone, Progestrones, Oestriol, Oestradiol, Oestrione, Diethyl stilbestrol.	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam

30	Drugs for erectile dysfunction	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
31	Sildenafil, Tadalafil	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
32	Oral contraceptives: Mifepristone, Norgestril, Levonorgestrol.	Tutorial	1,2,3	Mid Term-2, Quiz & End Sem Exam
33	Corticosteroids: Cortisone, Hydrocortisone	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
34	Prednisolone, Betamethasone, Dexamethasone	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
35	Antidiabetic agents	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
36	Insulin and its preparations Sulfonyl ureas:, Glipizide	Tutorial	1,2,3	Mid Term-2, Quiz & End Sem Exam
37	Tolbutamide*, Chlorpropamide	Lecture	5, 1,2,3	Mid Term-2, Quiz & End Sem Exam
38	Glimepiride. Biguanides: Metformin	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
39	Thiazolidinediones: Pioglitazone, Rosiglitazone.	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
40	Meglitinides: Repaglinide, Nateglinide	Tutorial	1,2,3	Mid Term-2, Quiz & End Sem Exam
41	Glucosidase inhibitors:	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
42	Acrabose, Voglibose	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
43	Local Anesthetics:	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
44	SAR of Local anesthetics.	Tutorial	5	Mid Term-2, Quiz & End Sem Exam
45	Benzoic Acid derivatives	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
46	Cocaine, Hexylcaine	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
47	Meprylcaine, Cyclomethycaine,	Lecture	1,2,3	Quiz & End Sem Exam
48	Piperocaine.	Tutorial	1,2,3	Quiz & End Sem Exam
49	Amino Benzoic acid derivatives:	Lecture	1,2,3	Quiz & End Sem Exam
50	Benzocaine*, Butamben,	Lecture	5	Quiz & End Sem Exam



51	Procaine*, Butacaine,	Lecture	5	Quiz & End Sem Exam
52	Propoxycaine, Tetracaine	Tutorial	1,2,3	Quiz & End Sem Exam
53	Lidocaine/Anilide derivatives	Lecture	1,2,3	Quiz & End Sem Exam
54	Lignocaine, Mepivacaine,	Lecture	1,2,3	Quiz & End Sem Exam
55	*Prilocaine,*	Lecture	1,2,3	Quiz & End Sem Exam
56	Etidocaine.	Tutorial	1,2,3	Quiz & End Sem Exam
57	*Miscellaneous: Phenacaine,*	Lecture	1,2,3	Quiz & End Sem Exam
58	*Diperodon,*	Lecture	1,2,3	Quiz & End Sem Exam
59	*Dibucaine.**	Lecture	5	Quiz & End Sem Exam
60	*Synthesis of Dibucaine.**	Tutorial	5	Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP501T.1	***BP501T.1.*** Understand the chemistry of drugs with respect to their pharmacological activity	3	-	-	-	2	2	1	-	1	-	-				

BP501T.2.	**BP501T.2.** Understand the drug metabolic pathways, adverse effect and therapeutic value of drugs	3	-	-	1	-	2	-	-	-	-	3				
BP501T.3.	***BP501T.3.*** Understand the mechanism of action.	3	2	-	3	-	2	-	-	-	-	3				
BP501T.4.	**BP501T.4**. Know the Structural Activity Relationship of different class of drugs.	2	2	3	3	-	1	-	-	-	-	3				
BP501T.5.	***BP501T.5***. Study the chemical synthesis of selected drugs.	1	-	3	-	-	-	-	-	-	-	3				

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutical Chemistry I MID-SEMESTER (SEM –Ist) 2021-22						
Class: B.Pharm, V Semester						
Subject Name: BP501T. MEDICINAL CHEMISTRY – II (Theory)		Time: 1 Hrs			Max. Marks: 30	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3,4,5	Q.6,8,9	Q.2	Q.7, 10		

The student will be able to

CO1. Understand the chemistry of drugs with respect to their pharmacological activity

CO2. Understand the drug metabolic pathways, adverse effect and therapeutic value of drugs

CO3. Understand the mechanism of action.

CO.4. Know the Structural Activity Relationship of different class of drugs.

CO.5. Study the chemical synthesis of selected drugs.

CO Map	Question No.	Question	Marks
CO4	Q.1	How do histamine biosynthesized?	2
CO5	Q.2	Draw the chemical structures of chlorcyclizine hydrochloride, Meclizine Hydrochloride along with medicinal uses.	2
CO1	Q.3	Define antimetabolites with two suitable drug structural examples.	2
CO2	Q.4	Write the synthetic route chemical reaction of mercaptopurine	2
CO2	Q.5	Write the chemical structural difference between dactinomycin and daunorubicin	2
CO1	Q.6	Write the mechanism and synthetic route of diphenhydramine hydrochloride, cimetidine drugs along with structure activity relationship of H_1 receptor antagonists.	10
CO4	Q.7	)iscuss about the classification and mechanism of calcium channel blockers used in the hypertension along with suitable chemical structural examples.	10
CO3	Q.8	Write short notes on antibiotics and antimetabolites against the cancer disease.	5
CO2	Q.9	scuss about the mechanism and ADR of Loop diuretics and osmotic Diuretics with suitable chemical structural examples.	5
CO4	Q.10	Write short notes on gastric proton pump and inhibitors drugs.	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

88.9 % Percentage of students secured more than 60% marks, so this course Medicinal Chemistry II – Theory (BP501T) attained Level 3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)
Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICS

PROGRAMME OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions

[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess

societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10].**Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11].**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "-"

PROGRAMME ARTICULATION MATRIX												
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
V SEM	BP 502 T	3	3	3	3	1	3	1	-	2	2	2

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICS
Course Handout
Course : INDUSTRIAL PHARMACY-I(Theory)
Course Code : BP502T, Crédits : 04, Session :2021-22 (Odd Sem.), Class : B. Pharm. 3rd Year
Faculty Name : Dr. Neeraj Mishra

A. **Introduction:**Course enables the student to understand and appreciate the influence of pharmaceutical additives and various pharmaceutical dosage forms on the performance ofthe drug product.Upon completion of the course, the student shall be able to:

1. Know the various pharmaceutical dosage forms and their manufacturing techniques.
2. Know various considerations in development of pharmaceutical dosage forms
3. Formulate solid, liquid and semisolid dosage forms and evaluate them for their quality

B. **Course Outcomes:**At the end of the course, students will be able to:

BP502T.1 Outline the assessment of physicochemical properties of drugs as a tool in the optimization of solid, liquid oral and parenteral dosage forms and its impact on stability of dosage forms.

BP502T.2. Demonstrate tablets, capsules, liquid orals, cosmetics using established procedures and technology.

BP502T.3. Examine the facilities and standards necessary for the industrial production of sterile dosage forms and ophthalmic preparations.

BP502T.4. Analyzeappropriate packaging materials for various pharmaceutical dosage forms.

BP502T.5 Identify containers, closures, valves and propellants for different types of aerosol systems.

C. **Programme Outcomes:**

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

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[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

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[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10].**Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11].**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	A minimum of 80% attendance is required to be maintained by a student to be qualified for taking up the Odd Semester examination	A	4 %
	Quiz/ Assignment/Open book test/Field work/Group discussion/ Seminar	Q/A/OBT/FW/GD/S	3%
	Student – Teacher interaction	STA	3%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

Q: Quiz, A: Assignment, OBT: Open book test, FW: Field work, GD: Group discussion, S: Seminar

E. Syllabus

Module I: **Preformulation Studies:**

Introduction to preformulation, goals and objectives, study ofphysicochemical characteristics of drug substances.

a. Physical properties: Physical form (crystal & amorphous), particle size, shape, flowproperties, solubility profile (pKa, pH, partition coefficient), polymorphism

b. Chemical Properties: Hydrolysis, oxidation, reduction, racemisation, polymerizationBCS classification of drugs & its significant

Application of preformulation considerations in the development of solid, liquid oral andparenteral dosage forms and its impact on stability of dosage forms.

Module II: Tablets:

a. Introduction, ideal characteristics of tablets, classification of tablets. Excipients,Formulation of tablets, granulation methods, compression and processing problems.Equipments and tablet tooling.

b. Tablet coating: Types of coating, coating materials, formulation of coatingcomposition, methods ofcoating, equipment employed and defects in coating.

c. Quality control tests: In process and finished product tests

Liquid orals: Formulation and manufacturing consideration of syrups and elixirssuspensions and emulsions; Filling and packaging; evaluation of liquid oralsofficial in pharmacopoeia

Module III: Capsules:

a. Hard gelatin capsules: Introduction, Production of hard gelatin capsule shells. Sizeof capsules, Filling, finishing and special techniques of formulation of hard gelatine capsules, manufacturing defects. In process and final product quality control testsfor capsules.

b. Softgelatin capsules: Nature of shell and capsule content, size ofcapsules,importance of base adsorption and minim/gram factors, production, inprocess and final product quality control tests. Packing, storage and stability testingof soft gelatin capsules and their applications.

Pellets: Introduction, formulation requirements, pelletization process, equipments formanufacture of pellets

Module IV: Parenteral Products:

a. Definition, types, advantages and limitations. Preformulation factors and essentialrequirements, vehicles, additives, importance of isotonicity

b. Production procedure, production facilities and controls,aseptic processing

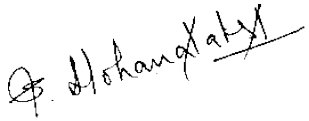
c. Formulation of injections, sterile powders, large volume parenterals andlyophilized products.

d. Containers and closures selection, filling and sealing of ampoules, vials and infusionfluids. Quality control tests of parenteral products.

Ophthalmic Preparations: Introduction, formulation considerations; formulation of eyedrops, eye ointments and eye lotions; methods of preparation; labeling, containers;evaluation of ophthalmic preparations

Module V: Cosmetics: Formulation and preparation of the following cosmetic preparations:
lipsticks, shampoos, cold cream and vanishing cream, tooth pastes, hair dyes andsunscreens.

Pharmaceutical Aerosols: Definition, propellants, containers, valves, types of aerosolsystems; formulation and manufacture of aerosols; Evaluation of aerosols; Qualitycontrol and stability studies.



Packaging Materials Science: Materials used for packaging of pharmaceutical products,factors influencing choice of containers, legal and official requirements for containers,stability aspects of packaging materials, quality control tests.

F. Examination Scheme:

Components	CT	A	Q/A/OBT/FW/GD/S	STI	EE
Weightage (%)	15	4	3	3	75

Q: Quiz, A: Assignment, OBT: Open book test, FW: Field work, GD: Group discussion, S: Seminar, STI: Student – Teacher interaction

G. Suggested Text/Reference Books:

1. Pharmaceutical dosage forms - Tablets, volume 1 -3 by H.A. Liberman, Leon Lachman&J.B.Schwartz
2. Pharmaceutical dosage form - Parenteral medication vol- 1&2 by Liberman &Lachman
3. Pharmaceutical dosage form disperse system VOL-1 by Liberman & Lachman
4. Modern Pharmaceutics by Gilbert S. Banker & C.T. Rhodes, 3rd Edition
5. Remington: The Science and Practice of Pharmacy, 20th edition PharmaceuticalScience (RPS)
6. Theory and Practice of Industrial Pharmacy by Liberman & Lachman
7. Pharmaceutics- The science of dosage form design by M.E.Aulton, Churchilllivingstone, Latest edition
8. Introduction to Pharmaceutical Dosage Forms by H. C.Ansel, Lea &Febiger,Philadelphia, 5thedition, 2005
9. Drug stability - Principles and practice by Cartensen& C.J. Rhodes, 3rd Edition,Marcel Dekker Series, Vol 107.
10. Khar RK. Lachman/liebermans: the theory and practice of industrial pharmacy. CBS Publishers & Distribution; 2013.

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1.	Introduction to preformulation, goals and objectives	Lecture	BP502T.1	Mid Term-1, Quiz/ Assignment/Open book test/& End Sem Exam
2.	Study of physicochemical characteristics of drug	Lecture	BP502T.1	Mid Term-1, Quiz/ Assignment/Open book test/& End Sem Exam
3.	Physical form (crystal & amorphous), particle size, shape	Lecture	BP502T.1	Mid Term-1, Quiz/ Assignment/Open book test/& End Sem Exam
4.	Tutorial 1	Tutorial 1	BP502T.1	
5.	Flowproperties, solubility profile (pKa, pH, (Maximum 1000 characters allowed)	Lecture	BP502T.1	Mid Term-1, Quiz/ Assignment/Open book test/& End Sem Exam
6.	Hydrolysis, oxidation, reduction, racemisation,	Lecture	BP502T.1	Mid Term-1, Quiz/ Assignment/Open

	polymerization			book test/& End Sem Exam
7.	Application of preformulation considerations in the development of soliddosage forms and its impact on stability of dosage forms.	Lecture	BP502T.1	Mid Term-1, Quiz/ Assignment/Ope n book test/& End Sem Exam
8.	Tutorial 2	Tutorial 2		
9.	Application of preformulation considerations in the development of liquid oraldosage forms and its impact on stability of dosage forms.	Lecture	BP502T.1	Mid Term-1, Quiz/ Assignment/Ope n book test/& End Sem Exam
10.	Tablets: Introduction, ideal characteristics of tablets. Classification of tablets.	Lecture	BP502T.1	Mid Term-1, Quiz/ Assignment/Open book test/& End Sem Exam
11.	Excipients,Formulation of tablets.	Lecture	BP502T.2	Mid Term-1, Quiz/ Assignment/Open book test/& End Sem Exam
12.	Tutorial 3	Tutorial 3	BP502T.2	
13.	Granulation methods, compression and processing problems	Lecture	BP502T.2	Mid Term-1, Quiz/ Assignment/Open book test/& End Sem Exam
14.	Equipments and tablet tooling.	Lecture	BP502T.2	Mid Term-1, Quiz/ Assignment/Open book test/& End Sem Exam
15.	Tablet coating: Types of coating, coating materials,	Lecture	BP502T.2	Mid Term-1, Quiz/ Assignment/Open book test/& End Sem Exam
16.	Tutorial 4	Tutorial 4	BP502T.2	
17.	Formulation of coating composition, methods of coating,	Lecture	BP502T.2	Mid Term-1, Quiz/ Assignment/Open book test/& End Sem Exam
18.	Equipment employed in coating and defects in coating.	Lecture	BP502T.2	Mid Term-1, Quiz/ Assignment/Open book test/& End Sem Exam
19.	Quality control tests: In process and finished product tests	Lecture	BP502T.2	Mid Term-1, Quiz/ Assignment/Open book test/& End Sem

				Exam
20.	Tutorial 5	Tutorial 5	BP502T.2	
21.	Liquid orals: Formulation and manufacturing consideration of syrups and elixirs. Filling and packaging; evaluation of liquid oralsofficial in pharmacopoeia	Lecture	BP502T.2	Mid Term-1, Quiz/ Assignment/Open book test/& End Sem Exam
22.	Formulation and manufacturing consideration of suspensions and emulsions	Lecture	BP502T.2	Mid Term-1, Quiz/ Assignment/Ope n book test/& End Sem Exam
23.	Filling and packaging;	Lecture	BP502T.2	Mid Term-1, Quiz/ Assignment/Ope n book test/& End Sem Exam
24.	Tutorial 6	Tutorial 6	BP502T.2	
25.	Evaluation of liquid orals official in pharmacopoeia	Lecture	BP502T.2	Mid Term-1, Quiz/ Assignment/Ope n book test/& End Sem Exam
26.	Hard gelatin capsules: Introduction, Production of hard gelatin capsule shells. Size of capsules	Lecture	BP502T.3	Mid Term-1, Quiz/ Assignment/Ope n book test/& End Sem Exam
27.	Filling, finishing and special techniques of formulation of hard gelatin capsules, manufacturing defects.	Lecture	BP502T.3	Mid Term-1, Quiz/ Assignment/Ope n book test/& End Sem Exam
28.	Tutorial 7	Tutorial 7	BP502T.2	
29.	In process and final product quality control tests for capsules.	Lecture	BP502T.3	Mid Term-1, Quiz/ Assignment/Ope n book test/& End Sem Exam
30.	Soft gelatin capsules: Nature of shell and capsule content, size of capsules	Lecture	BP502T.3	Mid Term-1, Quiz/ Assignment/Ope n book test/& End Sem Exam
31.	Importance of base adsorption and minim/gram factors. Production, in process and final product quality control tests.	Lecture	BP502T.3	Mid Term-1, Quiz/ Assignment/Ope n book test/& End Sem Exam
32.	Tutorial 8	Tutorial 8	BP502T.3	

33.	Packing, storage of soft gelatin capsules. Stability testing of soft gelatin capsules and their applications.	Lecture	BP502T.3	Mid Term-1, Quiz/ Assignment/Ope n book test/& End Sem Exam
34.	Pellets: Introduction, formulation requirements,	Lecture	BP502T.3	Mid Term-1, Quiz/ Assignment/Ope n book test/& End Sem Exam
35.	Pelletization process, equipments for manufacture of pellets	Lecture	BP502T.3	Mid Term-1, Quiz/ Assignment/Ope n book test/& End Sem Exam
36.	Tutorial 9	Tutorial 9	BP502T.3	
37.	Parenteral Products: a. Definition, types, advantages and limitations.	Lecture	BP502T.3	Mid Term-2, Quiz/ Assignment/Open book test/& End Sem Exam
38.	Preformulation factors and essentialrequirements, vehicles, additives, importance of isotonicity	Lecture	BP502T.3	Mid Term-2, Quiz/ Assignment/Open book test/& End Sem Exam
39.	b. Production procedure, production facilities and controls,aseptic processing	Lecture	BP502T.4	Mid Term-2, Quiz/ Assignment/Open book test/& End Sem Exam
40.	Tutorial 10	Tutorial 10	BP502T.4	
41.	Formulation of injections, sterile powders, large volume parenterals andlyophilized products.	Lecture	BP502T.4	Mid Term-2, Quiz/ Assignment/Open book test/& End Sem Exam
42.	Formulation of eye drops, and eye ointments methods of preparation	Lecture	BP502T.4	Mid Term-2, Quiz/ Assignment/Open book test/& End Sem Exam
43.	Containers and closures selection, filling and sealing of ampoules, vials and infusion fluids.	Lecture	BP502T.4	Mid Term-2, Quiz/ Assignment/Open book test/& End Sem Exam
44.	Tutorial 11	Tutorial 11	BP502T.4	
45.	Quality control tests of parenteral products.	Lecture	BP502T.4	Mid Term-2, Quiz/ Assignment/Open book test/& End Sem Exam
46.	Ophthalmic Preparations: Introduction, formulation considerations; formulation of eye drops, eye ointments and eye lotions;	Lecture	BP502T.4	Mid Term-2, Quiz/ Assignment/Open book test/& End Sem Exam

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47.	Methods of preparation; labeling, containers; evaluation of ophthalmic preparations	Lecture	BP502T.4	Mid Term-2, Quiz/ Assignment/Open book test/& End Sem Exam
48.	Tutorial 12	Tutorial 12	BP502T.4	
49.	Cosmetics: Formulation and preparation of the following cosmetic preparations: lipsticks, shampoos,	Lecture	BP502T.5	Mid Term-2, Quiz/ Assignment/Open book test/& End Sem Exam
50.	cold cream and vanishing cream, tooth pastes	Lecture	BP502T.5	Mid Term-2, Quiz/ Assignment/Open book test/& End Sem Exam
51.	Hair dyes andsunscreens.	Lecture	BP502T.5	Mid Term-2, Quiz/ Assignment/Open book test/& End Sem Exam
52.	Tutorial 13	Tutorial 13	BP502T.5	
53.	Pharmaceutical Aerosols: Definition, propellants, containers, valves, types of aerosolsystems	Lecture	BP502T.5	Mid Term-2, Quiz/ Assignment/Open book test/& End Sem Exam
54.	Formulation and manufacture of aerosols	Lecture	BP502T.5	Mid Term-2, Quiz/ Assignment/Open book test/& End Sem Exam
55.	Evaluation of aerosols; Quality control and stability studies.	Lecture	BP502T.5	Mid Term-2, Quiz/ Assignment/Open book test/& End Sem Exam
56.	Tutorial 14	Tutorial 14	BP502T.5	
57.	Packaging Materials Science: Materials used for packaging of pharmaceutical products, factors influencing choice of containers	Lecture	BP502T.5	Mid Term-2, Quiz/ Assignment/Open book test/& End Sem Exam
58.	Legal and official requirements for containers, stability aspects of packaging materials	Lecture	BP502T.5	Mid Term-2, Quiz/ Assignment/Open book test/& End Sem Exam
59.	Quality control tests	Lecture	BP502T.5	Mid Term-2, Quiz/ Assignment/Open book test/& End Sem Exam
60.	Tutorial 15	Tutorial 15	BP502T.5	

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP502T.1	Outline the assessment of physicochemical properties of drugs as a tool in the optimization of solid, liquid oral and parenteral dosage forms and its impact on stability of dosage forms.	3	1	2	3	1	1	2	1	1	2	2
BP502T.2	Demonstrate tablets, capsules, liquid orals, cosmetics using established procedures and technology.	3	2	3	3	2	3	-	1	1	1	1
BP502T.3	Examine the facilities and standards necessary for the industrial production of sterile dosage forms and ophthalmic preparations.	3	3	3	3	2	2	-	2	2	1	1
BP502T.4	Analyze appropriate packaging materials for various pharmaceutical dosage forms.	3	3	2	3	2	1	-	1	1	-	2
BP502T.5	Identify containers, closures, valves and propellants for different types of aerosol systems.	3	3	2	3	3	2	-	1	-	-	-

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutics I MID-SEMESTER (SEM–V) 2021-22						
Class: B. Pharm V Semester						
Subject Name: Industrial Pharmacy I– Theory		Time: 1 Hrs			Max. Marks: 30	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q. 1,3,5	Q. 2,4	Q. 7,8,9		Q. 10	

Student will be able to
CO1: Outline the assessment of physicochemical properties of drugs as a tool in the optimization of solid, liquid oral and parenteral dosage forms and its impact on stability of dosage forms.
CO2: Demonstrate tablets, capsules, liquid orals, cosmetics using established procedures and technology.

CO Map	Question No.	Question	Marks
CO1	Q.1	Define polymorphism with examples.	2
CO2	Q.2	What are dispersible tablet and effervescent tablet?	2
	Q.3	Define tablet excipients with examples.	2
CO2	Q.4	What is base adsorption?	2
CO2	Q.5	Define Bloom strength.	2
CO1	Q.6	Define the term preformulation and explain the physical properties of preformulations.	10
	Q.7	Explain in detail the production of hard gelatin capsule shells.	
CO1	Q.8	Explain the BCS classification of drugs & its significant	5
CO2	Q.9	Explain various advantages and disadvantages of pellets.	5
CO2	Q.10	Evaluate the final product quality control tests for capsules.	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

85.2 % Percentage of students secured more than 60% marks, so this course Industrial Pharmacy I– Theory (BP502T) attained Level 3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)
Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOLOGY

PROGRAMME OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge asscoited with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions

[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "-"

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
V SEM	BP 503T	3	3	3	3	2	2	3	1	1	3	1	-	-	-

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACOLOGY
Course Handout
Course : Pharmacology-II (Theory)
Course Code : BP503T, Credits : 04, Session : 2021-22 (Odd Sem.), Class : B. Pharm. 3rd Year
Faculty Name : Dr. Shvetank Bhatt

A. Introduction: This subject is intended to impart the fundamental knowledge on various aspects
(classification, mechanism of action, therapeutic effects, clinical uses, side effects and
contraindications) of drugs acting on different systems of body and in addition, emphasis
the basic concepts of bioassay.:

1. Know the classification of the drugs
2. Understand the mechanism of action, therapeutic uses, clinical uses and side effects of the dugs
3. Know the importance of bio-assays in preclinical drug discovery
4. Understand the pharmacology of drugs act on CVS, autacoids, coagulation, hormones etc.

B. Course Outcomes: At the end of the course, students will be able to:

BP503T.1. Discuss the Pharmacology of the drugs affecting the cardiovascular system.

BP503T.2. Explain the pharmacology of diuretics and anti-coagulants.

BP503T.3. Explain mechanism of actions and pharmacological actions of autacoids.

BP503T.4. Explain the pharmacology of the drugs acting on the endocrine system.

BP503T.5 Describe the various methods and applications of bioassay.

C. Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and

basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

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[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and

ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	A minimum of 80% attendance is required to be maintained by a student to be qualified for taking up the Odd Semester examination	A	4 %
	Quiz/ Assignment/Open book test/ Field work/Group discussion/ Seminar	Q/A/OBT/FW/GD/S	3%
	Student – Teacher interaction	STA	3%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

Q: Quiz, A: Assignment, OBT: Open book test, FW: Field work, GD: Group discussion, S: Seminar

E. Syllabus

Module I: **Pharmacology of drugs acting on cardio vascular system:**

a. Introduction to hemodynamic and electrophysiology of heart; b. Drugs used in congestive heart failure; c. Anti-hypertensive drugs; d. Anti-anginal drugs; e. Anti-arrhythmic drugs; f. Anti-hyperlipidemic drugs.

Module II: Pharmacology of drugs acting on cardio vascular and urinary system:

a. Drug used in the therapy of shock. b. Hematinics, coagulants and anticoagulants. c. Fibrinolytics and anti-platelet drugs d. Plasma volume expanders; a. Diuretics b. Anti-diuretics.

Module III Autocoids and related drugs:
Autocoids and related drugs a. Introduction to autacoids and classification b. Histamine, 5-HT and their antagonists. c. Prostaglandins, Thromboxanes and Leukotrienes. d. Angiotensin, Bradykinin and Substance P. e. Non-steroidal anti-inflammatory agents f. Anti-gout drugs g. Antirheumatic drugs

Module IV: Pharmacology of drugs acting on endocrine system:
Pharmacology of drugs acting on endocrine system a. Basic concepts in endocrine pharmacology. b. Anterior Pituitary hormones- analogues and their inhibitors. c. Thyroid hormones- analogues and their inhibitors.
d. Hormones regulating plasma calcium level- Parathormone, Calcitonin and Vitamin-D. d. Insulin, Oral Hypoglycemic agents and glucagon. e. ACTH and corticosteroids

Module V: Pharmacology of drugs acting on endocrine system and bioassay of drugs:
Pharmacology of drugs acting on endocrine system a. Androgens and Anabolic steroids. b. Estrogens, progesterone and oral contraceptives. c. Drugs acting on the uterus; Bioassay a. Principles and applications of bioassay. b.Types of bioassay c. Bioassay of insulin, oxytocin, vasopressin, ACTH,d-tubocurarine,digitalis, histamine and 5-HT.

F. Examination Scheme:

Components	CT	A	Q/A/OBT/FW/GD/S	STI	EE
Weightage (%)	15	4	3	3	75

Q: Quiz, A: Assignment, OBT: Open book test, FW: Field work, GD: Group discussion, S: Seminar, STI: Student – Teacher interaction

G. Suggested Text/Reference Books:

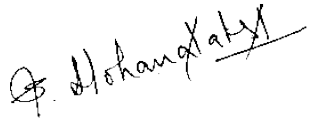
1. Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology, Churchil Livingstone Elsevier
2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill.
3. Goodman and Gilman's, The Pharmacological Basis of Therapeutics
4. Marry Anne K. K., Lloyd Yee Y., Brian K. A., Robbin L.C., Joseph G. B., Wayne A. K., Bradley R.W., Applied Therapeutics, The Clinical use of Drugs, The Point Lippincott Williams & Wilkins.
5. Mycek M.J, Gelnet S.B and Perper M.M. Lippincott's Illustrated Reviews-Pharmacology.
6. K.D.Tripathi. Essentials of Medical Pharmacology, , JAYPEE Brothers Medical Publishers (P) Ltd, New Delhi

H. Lecture Plan

Lecture	Topics	Mode	Correspon	Mode of

		of Delivery	ding CO	Assessing CO
1.	Introduction to hemodynamic and electrophysiology of heart	Lecture	BP503T.1	Mid Term-1, Quiz & End Sem Exam
2.	Drugs used in congestive heart failure	Lecture	BP503T.1	Mid Term-1, Quiz & End Sem Exam
3.	Drugs used in congestive heart failure	Lecture	BP503T.1	Mid Term-1, Quiz & End Sem Exam
4.	Tutorial 01	Tutorial 01		
5.	*Anti-hypertensive drugs*	Lecture	BP503T.1	Mid Term-1, Quiz & End Sem Exam
6.	Anti-anginal drugs	Lecture	BP503T.1	Mid Term-1, Quiz & End Sem Exam
7.	Anti-anginal drugs	Lecture	BP503T.1	Mid Term-1, Quiz & End Sem Exam
8.	Tutorial 02	Tutorial 02		
9.	Anti-arrhythmic drugs	Lecture	BP503T.1	Mid Term-1, Quiz & End Sem Exam
10.	Anti-hyperlipidemic drugs	Lecture	BP503T.1	Mid Term-1, Quiz & End Sem Exam
11.	Anti-hyperlipidemic drugs	Lecture	BP503T.1	Mid Term-1, Quiz & End Sem Exam
12.	Tutorial 03	Tutorial 04		
13.	Hematinics	Lecture	BP503T.2	Mid Term-1, Quiz & End Sem Exam
14.	Drug used in the therapy of shock	Lecture	BP503T.2	Mid Term-1, Quiz & End Sem Exam
15.	Coagulants	Lecture	BP503T.2	Mid Term-1, Quiz & End Sem Exam
16.	Tutorial 04	Tutorial 04		
17.	Anticoagulants	Lecture	BP503T.2	Mid Term-1, Quiz & End Sem Exam
18.	Fibrinolytics	Lecture	BP503T.2	Mid Term-1, Quiz & End Sem Exam
19.	Anti-platelet drugs	Lecture	BP503T.2	Mid Term-1, Quiz & End Sem Exam
20.	Tutorial 05	Tutorial 05		
21.	Plasma volume expanders	Lecture	BP503T.2	Mid Term-1, Quiz & End Sem Exam
22.	Pharmacology of drugs acting on urinary system	Lecture	BP503T.2	Mid Term-1, Quiz & End Sem Exam
23.	Diuretics	Lecture	BP503T.2	Mid Term-1, Quiz & End Sem Exam
24.	Tutorial 06	Tutorial 06		

25.	Anti-diuretic	Lecture	BP503T.2	Mid Term-1, Quiz & End Sem Exam
26.	Introduction to autacoids and classification	Lecture	BP503T.3	Mid Term-1, Quiz & End Sem Exam
27.	Histamine and their antagonists	Lecture	BP503T.3	Mid Term-1, Quiz & End Sem Exam
28.	Tutorial 07	Tutorial 07		
29.	Prostaglandins	Lecture	BP503T.3	Mid Term-1, Quiz & End Sem Exam
30.	Thromboxanes and Leukotrienes.	Lecture	BP503T.3	Mid Term-1, Quiz & End Sem Exam
31.	5-HT and their antagonists	Lecture	BP503T.3	Mid Term-1, Quiz & End Sem Exam
32.	Tutorial 08	Tutorial 08		
33.	Angiotensin, Bradykinin and Substance P	Lecture	BP503T.3	Mid Term-1, Quiz & End Sem Exam
34.	Non-steroidal anti-inflammatory agents	Lecture	BP503T.3	Mid Term-2, Quiz & End Sem Exam
35.	Anti-gout drugs	Lecture	BP503T.3	Mid Term-2, Quiz & End Sem Exam
36.	Tutorial 09	Tutorial 09		
37.	Antirheumatic drugs	Lecture	BP503T.3	Mid Term-2, Quiz & End Sem Exam
38.	Basic concepts in endocrine pharmacology	Lecture	BP503T.4	Mid Term-2, Quiz & End Sem Exam
39.	Anterior Pituitary hormones-analogues and their inhibitors	Lecture	BP503T.4	Mid Term-2, Quiz & End Sem Exam
40.	Tutorial 10	Tutorial 10		
41.	Thyroid hormones-analogues and their inhibitors	Lecture	BP503T.4	Mid Term-2, Quiz & End Sem Exam
42.	Hormones regulating plasma calcium level-Parathormone, Calcitonin and Vitamin-D	Lecture	BP503T.4	Mid Term-2, Quiz & End Sem Exam
43.	Insulin, Oral Hypoglycemic agents and glucagon	Lecture	BP503T.4	Mid Term-2, Quiz & End Sem Exam
44.	Tutorial 11	Tutorial 11		
45.	ACTH and corticosteroids	Lecture	BP503T.4	Mid Term-2, Quiz & End Sem Exam
46.	Pharmacology of drugs acting on endocrine system	Lecture	BP503T.4	Mid Term-2, Quiz & End Sem Exam
47.	Androgens and Anabolic	Lecture	BP503T.4	Mid Term-2, Quiz & End Sem Exam
48.	Tutorial 12	Tutorial 12		



49.	Estrogen and steroids	Lecture	BP503T.5	Mid Term-2, Quiz & End Sem Exam
50.	Estrogens and Progesterone	Lecture	BP503T.5	Mid Term-2, Quiz & End Sem Exam
51.	Oral contraceptives and Drugs acting on the uterus	Lecture	BP503T.5	Mid Term-2, Quiz & End Sem Exam
52.	Tutorial 13	Tutorial 13		
53.	Basic concepts in endocrine pharmacology	Lecture	BP503T.5	Mid Term-2, Quiz & End Sem Exam
54.	Anterior Pituitary hormones-analogues and their inhibitors	Lecture	BP503T.5	Mid Term-2, Quiz & End Sem Exam
55.	Principles and applications of Bioassay, Types of bioassay	Lecture	BP503T.5	Mid Term-2, Quiz & End Sem Exam
56.	Tutorial 14	Tutorial 14		
57.	Bioassay of insulin, oxytocin, vasopressin, ACTH	Lecture	BP503T.5	Mid Term-2, Quiz & End Sem Exam
58.	Bioassay of d-tubocurarine, digitalis,	Lecture	BP503T.5	Mid Term-2, Quiz & End Sem Exam
59.	Bioassay of histamine and 5-HT	Lecture	BP503T.5	Mid Term-2, Quiz & End Sem Exam
60.	Tutorial 15	Tutorial 15		Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP503T.1	Discuss the drugs acting on the various disorders of cardiovascular system	2	2	3	2	-	1	2	1	-	-	1
BP503T.2	Discuss the drugs acting on the various disorders of cardiovascular system including diuretics and drugs acts on coagulation and antiplatelet aggregatory drugs	2	2	2	3	-	1	1	1	-	-	1
BP503T.3	Describe the complete pharmacology of autacoids, NSAIDs and drugs act on inflammatory disorders like gout and rheumatoid arthritis	2	1	1	-	-	1	3	2	-	-	-

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BP503T.4	Explain the mechanism of action and Pharmacology of drugs acting on endocrine system	2	2	2	1	-	1	-	-	-	-	-
BP503T.5	Explain the mechanism of action and Pharmacology of drugs acting on endocrine system including male and female sex hormones & describe the importance of bioassays	2	1	-	-	-	2	1	1	-	-	1

Sample Question Paper

Amity School of Pharmacy Department of Pharmacology I MID-SEMESTER(SEM–V)2021-22						
Class: B.Pharm. V Semester						
Subject Name: Pharmacology-II Theory		Time:1 Hrs			Max.Marks:30	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,4	Q.2,3	Q.4	Q.2,5,6		

CO Map	Question No.	Question	Marks
CO1	Q.1	Write a note on Sex hormones	2
CO1	Q.2	List out any two functions of seratonin.	2
	Q.3	Write down any four applications of bioassays.	2
	Q.4	Write down the mechanism of action of paracetamol	
	Q.5	Write down the mechanism of action of biguanides	
CO1	Q.6	Explain the pharmacological actions of leukotrienes	6
CO2	Q.7	Discuss about anti-diabetic agents and mechanism of action of sulfonylureas and PPAR in diabetes	10

CO2	Q.8	Explain the pharmacological actions of prostaglandins	5
	Q.9	Explain the bioassays methods of Insulin.	5
CO2	Q.10	Classify the anti-thyroid drugs, anti-gout drugs and anti-rheumatic drugs	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

96.3 % Percentage of students secured more than 60% marks, so this course Pharmacology II – Theory (BP503T) attained Level 3.

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR

AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)

Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

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AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOGNOSY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
V SEM	-	3	1	1	1	3	2	2	2	2	3	2	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACONOSY
Course Handout
Course : Pharmacognosy and Phytochemistry–2nd THEORY
Course Code : BP504T Crédits : 04, Session :2021-22 (odd Sem.), Class : B.Pharm. 3rd Year
Faculty Name: Dr S. Mohana Lakshmi

A. Introduction: The course is designed to impart fundamental knowledge on the preparatory
pharmacy with arts and science of preparing the different conventional dosage forms.

B. Course Outcomes: At the end of the course, students will be able to:

BP504T.1. . To know the modern extraction techniques, characterization and identification of the
herbal drugs and phytoconstituents

BP504T.2. To understand the preparation and development of herbal formulation

BP504T.3. To understand the herbal drug interactions

BP504T.4. To carryout isolation and identification of phytoconstituents

BP504T.5. To impart the students the knowledge of how the
secondary metabolites are produced in the crude drugs, how to isolate and identify

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills.

Dr. Mohana Lakshmi

Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

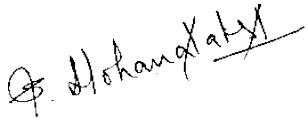
[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.



D. Assessment Plan:

Component of Evaluation	Description	Code	Weightage %
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

UNIT – I

Metabolic pathways in higher plants and their determination
a) Brief study of basic metabolic pathways and formation of different secondary metabolites
through these pathways- Shikimic acid pathway, Acetate pathways and Amino acid pathway. b) Study of utilization of radioactive isotopes in the investigation of biogenetic studies.

UNIT – II

General introduction, composition, chemistry & chemical classes, biosources, therapeutic
uses and commercial applications of following
secondary metabolites:
Alkaloids: Vinca, Rauwolfia, Belladonna, Opium,
Phenylpropanoids and Flavonoids: Lignans, Tea, Ruta
Steroids, Cardiac Glycosides & Triterpenoids: Liquorice, Dioscorea, Digitalis
Volatile oils: Mentha, Clove, Cinnamon, Fennel, Coriander,

Tannins: Catechu, Pterocarpus

Resins: Benzoin, Guggul, Ginger, Asafoetida, Myrrh, Colophony

Glycosides: Senna, Aloes, Bitter Almond

Iridoids, Other terpenoids & Naphthaquinones: Gentian, Artemisia, taxus, carotenoids

UNIT – III

Isolation, Identification and Analysis of Phytoconstituents

a) Terpenoids: Menthol, Citral, Artemisin

b) Glycosides: Glycyrhetinic acid & Rutin

c) Alkaloids: Atropine,Quinine,Reserpine,Caffeine

d) Resins: Podophyllotoxin, Curcumin

UNIT – IV Industrial production, estimation and utilization of the following phytoconstituents:

Forskolin, Sennoside, Artemisinin, Diosgenin, Digoxin, Atropine, Podophyllotoxin, Caffeine, Taxol, Vincristine and Vinblastine

UNIT – V Basics of Phytochemistry

Modern methods of extraction, application of latest techniques like Spectroscopy, chromatography and electrophoresis in the isolation, purification and identification of crude

drugs**.**

F. Examination Scheme:

Components	**A**	**CT**	**S/V/Q/HA**	**STI**	**EE**
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. W.C.Evans, Trease and Evans Pharmacognosy, 16th edition, W.B. Sounders & Co., London, 2009.

2. Mohammad Ali. Pharmacognosy and Phytochemistry, CBS Publishers & Distribution, New Delhi.

3. Text book of Pharmacognosy by C.K. Kokate, Purohit, Gokhlae (2007), 37th Edition,
Nirali Prakashan, New Delhi.

4. Herbal drug industry by R.D. Choudhary (1996), Ist Edn, Eastern Publisher, New Delhi.

5. Essentials of Pharmacognosy, Dr.SH.Ansari, IInd edition, Birla publications, New Delhi, 2007

6. Herbal Cosmetics by H.Pande, Asia Pacific Business press, Inc, New Delhi.

7. A.N. Kalia, Textbook of Industrial Pharmacognosy, CBS Publishers, New Delhi, 2005.

8. R Endress, Plant cell Biotechnology, Springer-Verlag, Berlin, 1994.

9. Pharmacognosy & Pharmacobiotechnology. James Bobbers, Marilyn KS, VE Tylor.

10. The formulation and preparation of cosmetic, fragrances and flavours. 11. Remington's Pharmaceutical sciences. 12. Text Book of Biotechnology by Vyas and Dixit.

13. Text Book of Biotechnology by R.C. Dubey.

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Brief study of basic metabolic pathways	Lecture	1,5	Mid Term-1, Quiz & End Sem Exam
2	formation of different secondary metabolites	Lecture	1,5	Mid Term-1, Quiz & End Sem Exam
3	Shikimic acid pathway	Lecture	1,5	Mid Term-1, Quiz & End Sem Exam
4	Quiz	Tutorial		Mid Term-1, Quiz & End Sem Exam
5	Acetate pathway	Lecture	1,5	Mid Term-1, Quiz & End Sem Exam
6	Amino acid pathway	Lecture	1,5	Mid Term-1, Quiz & End Sem Exam
7	Utilization of radioactive isotopes	Lecture	1,5	Mid Term-1, Quiz & End Sem Exam
8	Quiz	Tutorial		Mid Term-1, Quiz

				& End Sem Exam
9	Investigation of biogenetic studies	Lecture	1,5	Mid Term-1, Quiz & End Sem Exam
10	Alkaloids	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
11	Vinca, Rauwolfia	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
12	Seminar	Tutorial		Mid Term-1, Quiz & End Sem Exam
13	Belladonna, Opium	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
14	Phenylpropanoids and Flavonoids	Lecture	1,5	Mid Term-1, Quiz & End Sem Exam
15	Lignans, Tea, Rutin	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
16	Unit test	Tutorial		Mid Term-1, Quiz & End Sem Exam
17	Steroids, Cardiac Glycosides	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
18	Triterpenoids: Liquorice, Dioscorea	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
19	Digitalis	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
20	Group discussion on different topics	Tutorial		Mid Term-1, Quiz & End Sem Exam
21	Cinnamon, Fennel	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
22	Coriander and Tannins	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
23	Catechu, Pterocarpus	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
24	Quiz	Tutorial		Mid Term-1, Quiz & End Sem Exam
25	Resins: Benzoin	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
26	Guggul, Ginger	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
27	Asafoetida, Myrrh	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
28	Unit Test	Tutorial		Mid Term-1, Quiz & End Sem Exam
29	Colophony	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
30	Glycosides	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam

31	Senna,Aloe	Lecture	1,3	Mid Term-2, Quiz & End Sem Exam
32	Group discussion	Tutorial		Mid Term-2, Quiz & End Sem Exam
33	Bitter Almond	Lecture	1,3	Mid Term-2, Quiz & End Sem Exam
34	Iridoids, Other terpenoids	Lecture	1,,3	Mid Term-2, Quiz & End Sem Exam
35	Naphthaquinones	Lecture	3	Mid Term-2, Quiz & End Sem Exam
36	Seminar	Tutorial		Mid Term-2, Quiz & End Sem Exam
37	Gentian, Artemisia	Lecture	1,3	Mid Term-2, Quiz & End Sem Exam
38	Taxus, carotenoids	Lecture	1,3	Mid Term-2, Quiz & End Sem Exam
39	Terpenoids: Menthol	Lecture	1,3	Mid Term-2, Quiz & End Sem Exam
40	Unit test	Tutorial		Mid Term-2, Quiz & End Sem Exam
41	Glycosides: Glycyrhetinic acid	Lecture	1,5	Mid Term-2, Quiz & End Sem Exam
42	Alkaloids: Atropine,Quinine	Lecture	1,5	Mid Term-2, Quiz & End Sem Exam
43	Reserpine,Caffeine	Lecture	1,3	Mid Term-2, Quiz & End Sem Exam
44	Seminar	Tutorial		Mid Term-2, Quiz & End Sem Exam
45	Resins: Podophyllotoxin, Curcumin	Lecture	1,4	Mid Term-2, Quiz & End Sem Exam
46	Industrial production, estimation and utilization of the following phytoconstituents: Forskolin, Sennoside	Lecture	2,4	Mid Term-2, Quiz & End Sem Exam
47	Artemisinin, Diosgenin	Lecture	1,2,4	Quiz & End Sem Exam
48	Quiz	Tutorial		Quiz & End Sem Exam
49	Digoxin, Atropine	Lecture	1,2,4	Quiz & End Sem Exam
50	Podophyllotoxin, Caffeine	Lecture	1,2,4	Quiz & End Sem Exam
51	Taxol, Vincristine	Lecture	1,2,4	Quiz & End Sem Exam

52	Group discussion	Tutorial		Quiz & End Sem Exam
53	Modern methods of extraction	Lecture	2	Quiz & End Sem Exam
54	Spectroscopy techniques	Lecture	4,5	Quiz & End Sem Exam
55	Chromatography and electrophoresis	Lecture	4,5	Quiz & End Sem Exam
56	Unit test	Tutorial		Quiz & End Sem Exam
57	Isolation, purification and identification of crude drugs by spectroscopical , chromatography and electrophoresis	Lecture	2,4,5	Quiz & End Sem Exam
58	Basic principles of traditional system of medicine	Lecture	4,5	Quiz & End Sem Exam
59	Vinblastine,Rutin	Lecture	1,4,5	Quiz & End Sem Exam
60	Unit test	Tutorial		Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP504T.1	**BP504T.1**. To know the modern extraction	3	-	-	2	2	2	-	-	-	-	3				

	techniques, characterization and identification of the herbal drugs and phytoconstituents															
BP504T.2.	**BP504T.2**. To understand the preparation and development of herbal formulation	3	-	-	2	-	2	-	-	-	-	3				
BP504T.3.	**BP504T.3**. To understand the herbal drug interactions	3	2	-	2	-	2	-	-	-	-	3				
BP504T.4.	**BP504T.4**. To carryout isolation and identification of phytoconstituents	3	2	-	1	-	1	-	2	2	-	3				
BP504T.5.	**BP504T.5**. . To impart the students the knowledge of how the secondary metabolites are produced in the crude drugs, how to isolate and identify	3	-	-	2	-	-	-	-	-	-	3				

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacognosy I MID-SEMESTER (SEM –5th) 2021-22						
Class: B.Pharm, 6thSemester						
Subject Name: BP603T Herbal Drug Technology Theory		Time: 1 Hrs		Max. Marks: 30		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3,4,5	Q.6,8,9	Q.2	Q.7, 10		

The student will be able to

CO1. To know the modern extraction techniques, characterization and identification of the herbal drugs and phytoconstituents

CO2. To understand the preparation and development of herbal formulation

CO3. To impart the students the knowledge of how the secondary metabolites are produced in the crude drugs, how to isolate and identifyTo understand the herbal drug interactions

CO4. To carryout isolation and identification of phytoconstituents

CO5. To impart the students the knowledge of how the secondary metabolites are produced in the crude drugs, how to isolate and identify.

CO Map	Question No.	Question	Marks
CO4	Q.1	Give the source and chemical constituents of coriander?	2
CO5	Q.2	Give the applications of TLC?	2
CO1	Q.3	Explain Keller Killani test?	2
CO2	Q.4	Describe Bontrager test?	2

CO3	Q.5	Give biological source of Ginger and Rauwolfia?	2
CO1	Q.6	Explain industrial method of production and estimation of sennoside and atropine?	10
CO4	Q.7	Give detailed pharmacognostical study of digitalis?	10
CO3	Q.8	Discuss the industrial production and estimation of vincristine?	5
CO2	Q.9	Write a note on Acetate pathway and its significance?	5
CO4	Q.10	Write the method of isolation and estimation of curcumin?	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

96.3 % Percentage of students secured more than 60% marks, so this course Pharmacognosy And Phytochemistry II– Theory (BP504T) attained Level 3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)
Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICS

PROGRAMME OUTCOMES AND PROGRAMME-SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Program Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills, and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific inquiry, thinking analytically, clearly, and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership, and team-building when planning changes required for the fulfillment of practice, and professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication, and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

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Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
V SEM	BP505T	3	-	1	-	2	3	3	-	3	-	-				

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICS
Course Handout
Course: PHARMACEUTICAL JURISPRUDENCE THEORY
Course Code : BP505T, Crédits : 04, Session :2021-22 (Odd Sem.), Class : B.Pharm. 3rd Year
Faculty Name: Dr. Naveen Sharma, Ms. Ankita Kishore

A. Introduction: This course is designed to impart basic knowledge on important legislations related to the profession of pharmacy

B. Course Outcomes: At the end of the course, students will be able to:

BP505T.1. Interpret the Pharmaceutical legislations and their implications in the development, manufacturing, and marketing of pharmaceuticals.

BP505T.2 Relate Various Indian Pharmaceutical Acts and Laws with the Pharmacy profession

BP505T.3. Identify The regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals.

BP505T.4. Apply The code of ethics during the pharmaceutical practice.

BP505T.5. Make use of guidelines for using animals for experimentation

BP505T.6. Distinguish various types of Intellectual Property Rights.

C. Programme Outcomes:

[PO.1]. Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

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[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

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[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Programme Specific Outcomes:

PSO 1: Will be able to design, develop and implement efficient software for a given real life problem.

PSO 2: Will be able to apply knowledge of AI, Machine Learning and Data Mining in analyzing big data forextracting useful information from it and for performing predictive analysis.

PSO 3: Will be able to design, manage and secure wired/ wireless computer

networks for transfer and sharing ofinformation.

E. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

F. Syllabus

UNIT – I

Drugs and Cosmetics Act, 1940 and its rules 1945: Objectives, Definitions, Legal definitions of schedules to the Act and Rules Import of drugs – Classes of drugs and cosmetics prohibited from import, Import under license or permit. Offences and penalties. Manufacture of drugs – Prohibition of manufacture and sale of certain drugs, Conditions for grant of license and conditions of license for manufacture of drugs, Manufacture of drugs for test, examination and analysis, manufacture of new drug, loan license and repacking

UNIT – II

Detailed study of Schedule G, H, M, N, P,T,U, V, X, Y, Part XII B, Sch F & DMR (OA) Sale of Drugs – Wholesale, Retail sale and Restricted license. Offences and penalties Labeling & Packing of drugs- General labeling requirements and specimen labels for drugs and cosmetics, List of permitted colors. Offences and penalties. Administration of the Act and Rules – Drugs Technical Advisory Board, Central drugs Laboratory, Drugs Consultative Committee, Government drug analysts, Licensing authorities, controlling authorities, Drugs Inspectors

UNIT – III

Pharmacy Act –1948: Objectives, Definitions, Pharmacy Council of India; its constitution and functions, Education Regulations, State and Joint state pharmacy councils; constitution and functions, Registration of Pharmacists, Offences and Penalties

Medicinal and Toilet Preparation Act –1955: Objectives, Definitions, Licensing, Manufacture In bond and Outside bond, Export of alcoholic preparations, Manufacture of Ayurvedic, Homeopathic, Patent & Proprietary Preparations. Offences and Penalties.

Narcotic Drugs and Psychotropic substances Act-1985 and Rules: Objectives, Definitions, Authorities and Officers, Constitution and Functions of narcotic & Psychotropic Consultative Committee, National Fund for Controlling the Drug Abuse, Prohibition, Control and Regulation, opium poppy cultivation and production of poppy straw, manufacture, sale and export of opium, Offences and Penalties

UNIT – IV

Study of Salient Features of Drugs and Magic Remedies Act and its rules: Objectives, Definitions, Prohibition of certain advertisements, Classes of Exempted advertisements, Offences and Penalties

Prevention of Cruelty to animals Act-1960: Objectives, Definitions, Institutional Animal Ethics Committee, CPCSEA guidelines for Breeding and Stocking of Animals, Performance of Experiments, Transfer and acquisition of animals for experiment, Records, Power to suspend or revoke registration, Offences and Penalties

National Pharmaceutical Pricing Authority: Drugs Price Control Order (DPCO)- 2013. Objectives, Definitions, Sale prices of bulk drugs, Retail price of formulations, Retail price and ceiling price of scheduled formulations, National List of Essential Medicines (NLEM)

UNIV – V

Pharmaceutical Legislations – A brief review, Introduction, Study of drugs enquiry committee, Health survey and development committee, Hathi committee and Mudaliar committee

Code of Pharmaceutical ethics Definition, Pharmacist in relation to his job, trade, medical profession and his profession, Pharmacist's oath •

Medical Termination of Pregnancy Act

- Right to Information Act
- Introduction to Intellectual Property Rights (IPR)

G. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

H. Suggested Text/Reference Books:

1. Forensic Pharmacy by B. Sures
2. Text book of Forensic Pharmacy by B.M. Mithal .
3. Handbook of drug law-by M.L. Mehra
4. A textbook of Forensic Pharmacy by N.K. Jain

5. Drugs and Cosmetics Act/Rules by Govt. of India publications.
6. Medicinal and Toilet preparations act 1955 by Govt. of India publications.
7. Narcotic drugs and psychotropic substances act by Govt. of India publications
8. Drugs and Magic Remedies act by Govt. of India publication
9. Bare Acts of the said laws published by Government. Reference books (Theory)

I. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	**Drugs and Cosmetics Act, 1940 and its rules 1945:** Objectives, Definitions, Legal definitions of schedules to the Act and	Lecture	1,2	Mid Term-1, Quiz & End Sem Exam
2	Rules Import of drugs – Classes of drugs and cosmetics prohibited from import,	Lecture	1,2	Mid Term-1, Quiz & End Sem Exam
3	Import under license or permit. Offenses and penalties.	Lecture	1,2	Mid Term-1, Quiz & End Sem Exam
4	Discussion on basics of Drugs and Cosmetics Act, 1940 and its rules 1945	Tutorial	1,2	Mid Term-1, Quiz & End Sem Exam
5	Manufacture of drugs – Prohibition of manufacture and sale of certain drugs,	Lecture	1,2	Mid Term-1, Quiz & End Sem Exam
6	Conditions for grant of license and conditions of license for manufacture of drugs,	Lecture	1,2	Mid Term-1, Quiz & End Sem Exam
7	Manufacture of drugs for test, examination and analysis,	Lecture	1,2	Mid Term-1, Quiz & End Sem Exam
8	Doubt clearing session	Tutorial	1,2,3	Mid Term-1, Quiz & End Sem Exam
9	manufacture of new drug, loan license and repacking license.	Lecture	1,2	Mid Term-1, Quiz & End Sem Exam
10	**Drugs and Cosmetics Act, 1940 and its rules 1945.** Detailed study of Schedule	Lecture	1,2	Mid Term-1, Quiz & End Sem Exam

	G, H, M, N, P,T,U, V, X, Y, Part XII B, Sch F & DMR (OA)			
11	Detailed study of Schedule G, H, M, N, P,T,U, V, X, Y, Part XII B, Sch F & DMR (OA)	Lecture	1,2	Mid Term-1, Quiz & End Sem Exam
12	Revision of all schedules	Tutorial		Mid Term-1, Quiz & End Sem Exam
13	Sale of Drugs – Wholesale, Retail sale and Restricted license. Offences and penalties	Lecture	1,2	Mid Term-1, Quiz & End Sem Exam
14	Labeling & Packing of drugs- General labeling requirements and specimen labels for drugs and cosmetics	Lecture	1,2	Mid Term-1, Quiz & End Sem Exam
15	List of permitted colors. Offences and penalties. Administration of the Act and Rules – Drugs Technical Advisory Board	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
16	Class test	Tutorial	1,2,3	Mid Term-1, Quiz & End Sem Exam
17	Central drugs Laboratory, Drugs Consultative Committee	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
18	Government drug analysts, Licensing authorities, controlling authorities, Drugs Inspectors	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
19	**Pharmacy Act –1948:** Objectives, Definitions, Pharmacy Council of India; its constitution and functions	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
20	Group discussion on various authorities	Tutorial	1,3	Mid Term-1, Quiz & End Sem Exam
21	Education Regulations, State and Joint state pharmacy councils	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
22	constitution and functions of Education Regulations, State and Joint state pharmacy councils	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
23	Registration of Pharmacists, Offences & Penalties	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
24	Quiz	Tutorial	1,2,3	Mid Term-1, Quiz

				& End Sem Exam
25	**Medicinal and Toilet Preparation Act –1955:** Objectives, Definitions, Licensing	Lecture	1,2	Mid Term-1, Quiz & End Sem Exam
26	Manufacture In bond and Outside bond, Export of alcoholic preparations	Lecture	1,2	Mid Term-1, Quiz & End Sem Exam
27	Manufacture of Ayurvedic, Homeopathic, Patent & Proprietary Preparations. Offences and Penalties.	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
28	Revision	Tutorial	1,2,3	Mid Term-1, Quiz & End Sem Exam
29	**Narcotic Drugs and Psychotropic substances Act-1985 and Rules:** Objectives, Definitions, Authorities and Officers,	Lecture	1,2	Mid Term-1, Quiz & End Sem Exam
30	Constitution and Functions of narcotic & Psychotropic Consultative Committee, National Fund for Controlling the Drug Abuse	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
31	Prohibition, Control and Regulation, opium poppy cultivation and production of poppy straw	Lecture	1,2	Mid Term-2, Quiz & End Sem Exam
32	Seminar	Tutorial	1,2,3	Mid Term-2, Quiz & End Sem Exam
33	manufacture, sale and export of opium, Offences and Penalties	Lecture	1,2	Mid Term-2, Quiz & End Sem Exam
34	**Study of Salient Features of Drugs and Magic Remedies Act and its rules:** Objectives, Definitions, Prohibition of certain advertisements, Classes of Exempted advertisements, Offences and Penalties	Lecture	1,2	Mid Term-2, Quiz & End Sem Exam
35	**Prevention of Cruelty to animals Act-1960:** Objectives, Definitions, Institutional Animal Ethics Committee,	Lecture	1,2,3,5	Mid Term-2, Quiz & End Sem Exam
36	Group discussion on	Tutorial	1,2,3,4,5	Mid Term-2, Quiz

	various guidelines for utilizing in Prevention of Cruelty to animals Act			& End Sem Exam
37	CPCSEA guidelines for Breeding and Stocking of Animals,	Lecture	1,2,5	Mid Term-2, Quiz & End Sem Exam
38	Performance of Experiments, Transfer and acquisition of animals for experiment	Lecture	1,2,5	Mid Term-2, Quiz & End Sem Exam
39	Records, Power to suspend or revoke registration, Offences and Penalties	Lecture	1,2,5	Mid Term-2, Quiz & End Sem Exam
40	Seminar	Tutorial	1,2,3,4,5	Mid Term-2, Quiz & End Sem Exam
41	**National Pharmaceutical Pricing Authority:** Drugs Price Control Order (DPCO)- 2013. Objectives, Definitions, Sale prices of bulk drugs,	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
42	Retail price of formulations, Retail price and ceiling price of scheduled formulations, National List of Essential Medicines (NLEM)	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
43	**Pharmaceutical Legislations** – A brief review, Introduction, Study of drugs enquiry committee,	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
44	Revision class	Tutorial	1,2,3,4,5	Mid Term-2, Quiz & End Sem Exam
45	Health survey and development committee, Hathi committee and Mudaliar committee	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
46	**Code of Pharmaceutical ethics** Definition, Pharmacist in relation to his job,	Lecture	1,2,4	Mid Term-2, Quiz & End Sem Exam
47	trade, medical profession and his profession, Pharmacist's oath	Lecture	1,2,4	Quiz & End Sem Exam
48	Doubt clearing session	Tutorial	1,2,3	Quiz & End Sem

				Exam
49	Medical Termination of Pregnancy Act	Lecture	1,2	Quiz & End Sem Exam
50	Medical Termination of Pregnancy Act	Lecture	1,2	Quiz & End Sem Exam
51	Right to Information A	Lecture	1,2,4	Quiz & End Sem Exam
52	Quiz	Tutorial	1,2,3	Quiz & End Sem Exam
53	Right to Information A	Lecture	1,2,4	Quiz & End Sem Exam
54	Introduction to Intellectual Property Rights (IPR)	Lecture	1,2,5	Quiz & End Sem Exam
55	Introduction to Intellectual Property Rights (IPR)	Lecture	1,2,5	Quiz & End Sem Exam
56	General Discussion on IPR	Tutorial	1,2,3,4,5	Quiz & End Sem Exam
57	Introduction to Intellectual Property Rights (IPR)	Lecture	1,2,5	Quiz & End Sem Exam
58	Introduction to Intellectual Property Rights (IPR)	Lecture	1,2,5	Quiz & End Sem Exam
59	Introduction to Intellectual Property Rights (IPR)	Lecture	1,2,5	Quiz & End Sem Exam
60	Class test	Tutorial	1,2,3,4,5,6	Quiz & End Sem Exam

J. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP505T.1	**Interpret** the Pharmaceutical legislations and their implications in the development, manufacturing, and	3	-	1	-	2	1	2	-	1	-	-				

	marketing of pharmaceuticals.															
BP505T.2.	**Relate** Various Indian Pharmaceutical Acts and Laws with Pharmacy profession	3	-	3	-	2	1	3	-	1	-	2				
BP505T.3.	**Identify** The regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals.	3	-	-	-	1	2	-	-	-	-	-				
BP505T.4.	**Apply** the code of ethics during the pharmaceutical practice.	3	-	3	-	3	3	3	-	3	-	-				
BP505T.5.	**Make use of** guidelines for using animals for experimentation	3	-	2	-	-	2	3	-	1	-	-				
BP505T.6.	**Distinguish** various types of Intellectual Property Rights.	3	-	3	-	-	3	3	-	2	-	-				

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutics I MID-SEMESTER (SEM –Vth) 2022-23
Class: B.Pharm, Vth Semester

Subject Name: BP505T Pharmaceutical Jurisprudence Theory		Time: 1 Hr			Max. Marks: 30	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1, 4, 7, 10	Q.2 ,5, 6, 9	Q. 8	Q. 3		

Student will be able to
CO1: List the broad perceptive of cloud architecture and model.
CO2: Apply different cloud programming models as per need.

CO Map	Question No.	Question	Marks
CO1	Q.1	**Define** the terms cosmetic and spurious cosmetics.	2
CO3	Q.2	**List** the functions of education regulation.	2
CO1	Q.3	**Distinguish** between wholesale & retail sales.	2
CO2	Q.4	**Write** the importance of Government drug analysts.	2
CO1 CO3	Q.5	**Explain** Wholesale & Retail sales.	2
	Q.6	**Explain** the constitution and functions of the Drugs Technical Advisory Board.	10
CO4	Q.7	**Outline** in brief about SCHEDULE M.	10
CO3	Q.8	**Compare** the manufacturing inside the bond & outside the bond.	5
CO3	Q.9	**Build** a relationship between the role of the pharmacist and society.	5
CO1	Q.10	**Tell** about the duties of Drug inspector.	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1

Dr. Dhananjay

Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

98.1 % Percentage of students secured more than 60% marks, so this course Pharmaceutical Jurisprudence – Theory (BP505T) attained Level 3.

AMITY UNIVERSITY
MADHYA PRADESH
Established vide Government of Madhya Pradesh Act No. 27 of 2010

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Programme Educational Objectives (PEOs)
Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICS

PROGRAMME OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions

[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "-"

PROGRAMME ARTICULATION MATRIX												
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
V SEM	BP 506P	3	3	3	3	1	3	2	1	3	1	2

DEPARTMENT OF PHARMACEUTICS
Course Handout
Course : INDUSTRIAL PHARMACY-I (Practical)
Course Code : BP506P, Crédits : 02, Session : 2021-22 (Odd Sem.), Class : B. Pharm. 3rd Year
Faculty Name : Dr. Ankit Yadav

A. Introduction: This subject is designed to impart fundamental and practical knowledge of pharmaceutical additives and various pharmaceutical dosage forms on the performance of the drug product.

B. Course Outcomes: At the end of the course, students will be able to:

BP506P.1. Understand the various pharmaceutical dosage forms and their manufacturing techniques.

BP506P.2. Recall various considerations required in formulation of pharmaceutical dosage forms

BP506P.3. Formulate solid, liquid and semisolid dosage by using established procedures and technology.

BP506P.4. Conclude the facilities and standards necessary for the industrial production of sterile dosage forms and ophthalmic preparations.

BP506P.5 Select the glass containers required for the storage of the finished products.

C. Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

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[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

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[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

PR: Practical Records, RV: Regular viva, As: Assignment

E. Syllabus

Module I: **Preformulation Studies:**

1. Preformulation studies on paracetamol/ any other drug
2. Preformulation studies on asp*i*rin/ any other drug

Module II: Tablets, granules and capsules:

3. Preparation and evaluation of Paracetamol tablets
4. Preparation and evaluation of Aspirin tablets
5. Coating of tablets- film coating of tables/granules
6. Quality control test of (as per IP) marketed tablets
7. Quality control test of (as per IP) marketed capsules

Module III: Injection:

8. Preparation of Calcium Gluconate injection
9. Preparation of Ascorbic Acid injection

Module IV: Ophthalmic Preparations:

10. Preparation of Eye drops
11. Preparation of Eye ointments

Module V: Creams & containers:

12. Preparation of cold cream
13. Preparation of vanishing cream
14. Evaluation of Glass containers (as per IP)

F. Examination Scheme:

Components	**A**	**CT**	**LR**	**V**	**EE**
Weightage (%)	2	10	1	2	35

PR: Practical Records, RV: Regular viva, As: Assignment

G. Suggested Text/Reference Books:

1. Pharmaceutical dosage forms - Tablets, volume 1 -3 by H.A. Liberman, Leon Lachman & J. B. Schwartz
2. Pharmaceutical dosage form - Parenteral medication vol- 1&2 by Liberman & Lachman
3. Pharmaceutical dosage form disperse system VOL-1 by Liberman & Lachman
4. Modern Pharmaceutics by Gilbert S. Banker & C.T. Rhodes, 3rd Edition
5. Remington: The Science and Practice of Pharmacy, 20th edition Pharmaceutical Science (RPS)
6. Theory and Practice of Industrial Pharmacy by Liberman & Lachman
7. Pharmaceutics- The science of dosage form design by M. E. Aulton, Churchill livingstone, Latest edition
8. Introduction to Pharmaceutical Dosage Forms by H. C. Ansel, Lea & Febiger, Philadelphia, 5thedition, 2005
9. Drug stability - Principles and practice by Cartensen & C.J. Rhodes, 3rd Edition, Marcel Dekker Series, Vol 107.

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1.	Preformulation studies on paracetamol/ any other drug	Practical	BP506P	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
2.	Preformulation studies on aspirin/ any other drug	Practical	BP506P	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
3.	Preparation and evaluation of Paracetamol tablets	Practical	BP506P	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
4.	Preparation and evaluation of Aspirin tablets	Practical	BP506P	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
5.	Coating of tablets- film coating of tables/granules	Practical	BP506P	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
6.	Quality control test of (as per IP) marketed tablets	Practical	BP506P	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
7.	Quality control test of (as per IP) marketed capsules	Practical	BP506P	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
8.	Preparation of Calcium Gluconate injection	Practical	BP506P	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
9.	Preparation of Ascorbic Acid injection	Practical	BP506P	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
10.	Preparation of Eye drops	Practical	BP506P	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
11.	Preparation of Eye ointments	Practical	BP506P	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both

12.	Preparation of cold cream	Practical	BP506P	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
13.	Preparation of vanishing cream	Practical	BP506P	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
14.	Evaluation of Glass containers (as per IP)	Practical	BP506P	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
15.	Evaluation of Glass containers (as per IP)	Practical	BP506P	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP506P.1	Understand the various pharmaceutical dosage forms and their manufacturing techniques.	3	1	3	2	1	-	-	-	3	1	3
BP506P.2	Recall various considerations required in formulation of pharmaceutical dosage forms	3	2	2	2	-	-	-	-	1	-	2
BP506P.3	Formulate solid, liquid and semisolid dosage by using established procedures and technology.	3	1	2	2	-	1	-	-	2	-	1
BP506P.4	Conclude the facilities and standards necessary for the industrial production of sterile dosage forms and ophthalmic preparations.	3	1	2	2	-	1	-	1	-	-	1
BP506P.5	Select the glass containers required for the storage of the finished products.	2	2	2	1	1	1	-	-	-	-	1

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

100 % Percentage of students secured more than 60% marks, so this course Industrial Pharmacy I – Practical (BP506P) attained Level 3.

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacy I MID-SEMESTER (SEM–V) 2021-22						
Class: B. Pharm V Semester						
Subject Name: BP 506 P. Industrial Pharmacy-I (Practical)		Time: 4 Hrs			Max. Marks: 40	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3	Q.2	Q.3	Q.2	Q.2	

Student will be able to
CO1: Understand the various pharmaceutical dosage forms and their manufacturing techniques.
CO2: Recall various considerations required in formulation of pharmaceutical dosage forms.

CO Map	Question No.	Question	Marks
CO1 and CO2	Qs.1	Synopsis	10
CO1	Q.2 a	Perform the preformulation studies on paracetamol	15
CO2	Q.2 b	Carry out the quality control test of (as per IP) marketed tablets	6
CO1 and CO2	Q.3	Viva voce	3

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
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[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

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[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess

societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "-"

PROGRAMME ARTICULATION MATRIX												
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
V SEM	BP 507 P	3	3	3	3	1	3	2	1	3	1	2

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACY
Course Handout
Course : Pharmacology-II (Practical)
Course Code : BP507P, Crédits : 02, Session : 2021-22 (Odd Sem.), Class : B. Pharm. 3rd Year
Faculty Name : Dr. Shvetank Bhatt

A. Introduction: This subject is designed to impart fundamental and practical knowledge of pharmaceutical additives and various pharmaceutical dosage forms on the performance of the drug product.

B. Course Outcomes: At the end of the course, students will be able to:

BP507P.1. Understand the various instruments and equipments used in the Pharmacology experiments and in vitro techniques of pharmacology.

BP507P.2. Dose response curve of various drugs such as acetylcholine and histamine

BP507P.3. PA2 and PD2 value determination.

BP507P.4. Bioassay of various drug using ex-pharm software.

BP507P.5 Evaluation of various drugs for their analgesic, anti-inflammatory and diuretic activity.

C. Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills.

Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component	Description	Code	Weightage

of Evaluation			**%**
Continuous Internal Evaluation	Mid Term 1	CT	20%
	Mid Term 2		
	A minimum of 80% attendance is required to be maintained by a student to be qualified for taking up the Odd Semester examination	A	4 %
	Practical Records/Regular viva/ Assignment	PR/RV/As	6%
End Semester Examination	End Semester Examination	EE	70%
Total			**100%**

PR: Practical Records, RV: Regular viva, As: Assignment

E. Syllabus

Module I: **Introduction:**

1. Introduction to in-vitro pharmacology and physiological salt solutions.

Module II: Effect of drugs:

2. Effect of drugs on isolated frog heart.
3. Effect of drugs on blood pressure and heart rate of dog.
4. Effect of spasmogens and spasmolytics using rabbit jejunum.
5. Anti-inflammatory activity of drugs using carrageenan induced paw-edema model.
6. Analgesic activity of drug using central and peripheral methods

Module III: DRC:

7. Study of diuretic activity of drugs using rats/mice.
8. DRC of acetylcholine using frog rectus abdominis muscle.
9. Effect of physostigmine and atropine on DRC of acetylcholine using frog rectus abdominis muscle and rat ileum respectively.

Module IV: Bioassays:

10. Bioassay of histamine using guinea pig ileum by matching method.
11. Bioassay of oxytocin using rat uterine horn by interpolation method.
12. Bioassay of serotonin using rat fundus strip by three point bioassay.
13. Bioassay of acetylcholine using rat ileum/colon by four point bioassay.

Module V: Determination of PA2 & PD2 value:

14. Determination of PA2 value of prazosin using rat anococcygeus muscle (by Schilds plot method).
15. Determination of PD2 value using guinea pig ileum.

F. Examination Scheme:

Components	CT	A	PR/RV/As	EE
Weightage (%)	10	4	6	70

PR: Practical Records, RV: Regular viva, As: Assignment

G. Suggested Text/Reference Books:

1. Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology, Churchil Livingstone Elsevier
2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill.
3. Goodman and Gilman's, The Pharmacological Basis of Therapeutics
4. Marry Anne K. K., Lloyd Yee Y., Brian K. A., Robbin L.C., Joseph G. B., Wayne A. K., Bradley R.W., Applied Therapeutics, The Clinical use of Drugs, The Point Lippincott Williams & Wilkins.
5. Mycek M.J, Gelnet S.B and Perper M.M. Lippincott's Illustrated Reviews-Pharmacology.
6. K.D.Tripathi. Essentials of Medical Pharmacology, , JAYPEE Brothers Medical Publishers (P) Ltd, New Delhi.
7. Sharma H. L., Sharma K. K., Principles of Pharmacology, Paras medical publisher
8. Modern Pharmacology with clinical Applications, by Charles R.Craig& Robert.
9. Ghosh MN. Fundamentals of Experimental Pharmacology. Hilton & Company, Kolkata.
10. Kulkarni SK. Handbook of experimental pharmacology. Vallabh Prakashan.

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1.	Introduction to in-vitro pharmacology and physiological salt solutions.	Practical	BP507P	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
2.	Effect of drugs on isolated frog heart.	Practical	BP507P	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
3.	Effect of drugs on blood pressure and heart rate of dog.	Practical	BP507P	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
4.	Study of diuretic activity of drugs using rats/mice.	Practical	BP507P	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
5.	DRC of acetylcholine using frog rectus abdominis muscle.	Practical	BP507P	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
6.	Effect of physostigmine and atropine on DRC of acetylcholine using frog rectus abdominis muscle and rat ileum respectively.	Practical	BP507P	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
7.	Bioassay of histamine using guinea pig ileum by matching method.	Practical	BP507P	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
8.	Bioassay of oxytocin using rat uterine horn by interpolation method.	Practical	BP507P	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
9.	Bioassay of serotonin using rat fundus strip by three point bioassay.	Practical	BP507P	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
10.	Bioassay of acetylcholine using rat ileum/colon by four point bioassay.	Practical	BP507P	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
11.	Determination of PA2 value	Practical	BP507P	Mid Term-2 & End Sem

	of prazosin using rat anococcygeus muscle (by Schilds plot method).			Exam as Synopsis/ Experiments/ Viva voce for both
12.	Determination of PD2 value using guinea pig ileum.	Practical	BP507P	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
13.	Effect of spasmogens and spasmolytics using rabbit jejunum.	Practical	BP507P	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
14.	Anti-inflammatory activity of drugs using carrageenan induced paw-edema model.	Practical	BP507P	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
15.	Analgesic activity of drug using central and peripheral methods	Practical	BP507P	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP506P.1	Understand the various pharmaceutical dosage forms and their manufacturing techniques.	3	1	3	2	1	-	-	-	3	1	3
BP506P.2	Recall various considerations required in formulation of pharmaceutical dosage forms	3	2	2	2	-	-	-	-	1	-	2
BP506P.3	Formulate solid, liquid and semisolid dosage by using established procedures and technology.	3	1	2	2	-	1	-	-	2	-	1
BP506P.4	Conclude the facilities and standards necessary for the industrial production of sterile dosage forms and ophthalmic preparations.	3	1	2	2	-	1	-	1	-	-	1

BP506P.5	Select the glass containers required for the storage of the finished products.	2	2	2	1	1	1	-	-	-	-	1

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacy I MID-SEMESTER (SEM–V) 2021-22						
Class: B. Pharm V Semester						
Subject Name: BP 507 P. Pharmacology-II (Practical)		Time: 4 Hrs			Max. Marks: 40	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3	Q.2	Q.3	Q.2	Q.2	
Student will be able to CO1: Understand the various pharmaceutical Bioassay techniques. CO2: Recall various considerations required in Experimental Pharmacology						

CO Map	**Question No.**	**Question**	**Marks**
CO1 and CO2	Q.1	Synopsis	10
CO1	Q.2	Perform the Bioassay of Histamine by using Three point	25
CO1 and CO2	Q.3	Viva voce	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

100 % Percentage of students secured more than 60% marks, so this course Pharmacology II – Practical (BP507P) attained Level 3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)
Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUE OF PHARMACY
DEPARTMENT OF PHARMACOGNOSY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharmacy), Academic Year – 2021-22

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

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1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11				
V SEM	BP508 P	3	2	2	1	-	-	2	-	2	2	1		-	-	-

Dr. Mohanty

AMITY UNIVERSITY
MADHYA PRADESH
Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACOGNOSY
Course Handout
Course : PHARMACOGNOSY & PHYTOCHEMISTRY II (Practical)
Course Code : BP 508 P, Crédits : 02, Session : 2021-22 (Odd Sem.), Class : B.Pharm. III Year
Faculty Name : Dr. S. Mohana Lakshmi

A. Introduction: This course deals with the fundamentals of analytical chemistry and principles of electrochemical analysis of drugs. It aims to understand the principles of volumetric and electro chemical analysis and carryout various volumetric and electrochemical titrations.

B. Course Outcomes: At the end of the course, students will be:

BP508P .1	Identify crude drugs by morphological and microscopical characteristics
BP508P .2	Isolate phytoconstituents from crude drugs, Perform Paper and Thin Layer Chromatography
BP508P .3	Isolate and analyse volatile oils
BP508P .4	Carryout chemical tests for the identification of unorganized crude drugs

S. Mohana Lakshmi

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

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[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

E. Syllabus

1. Morphology, histology and powder characteristics & extraction & detection of: Cinchona, Cinnamon, Senna, Clove, Ephedra, Fennel and Coriander
2. Exercise involving isolation & detection of active principles
   a. Caffeine - from tea dust.
   b. Diosgenin from Dioscorea
   c. Atropine from Belladonna
   d. Sennosides from Senna
3. Separation of sugars by Paper chromatography
4. TLC of herbal extract
5. Distillation of volatile oils and detection of phytoconstitutents by TLC
6. Analysis of crude drugs by chemical tests: **(**i) Asafoetida (ii) Benzoin (iii) Colophony (iv) Aloes (v) Myrrh

F. Suggested Book

1. W.C.Evans, Trease and Evans Pharmacognosy, 16th edition, W.B. Sounders & Co., London, 2009.

2. Mohammad Ali. Pharmacognosy and Phytochemistry, CBS Publishers & Distribution, New Delhi.
3. Text book of Pharmacognosy by C.K. Kokate, Purohit, Gokhlae (2007), 37th Edition, Nirali Prakashan, New Delhi.
4. Herbal drug industry by R.D. Choudhary (1996), Ist Edn, Eastern Publisher, New Delhi.
5. Essentials of Pharmacognosy, Dr.SH.Ansari, IInd edition, Birla publications, New Delhi, 2007
6. Herbal Cosmetics by H.Pande, Asia Pacific Business press, Inc, New Delhi.
7. A.N. Kalia, Textbook of Industrial Pharmacognosy, CBS Publishers, New Delhi, 2005.
8. R Endress, Plant cell Biotechnology, Springer-Verlag, Berlin, 1994.
9. Pharmacognosy & Pharmacobiotechnology. James Bobbers, Marilyn KS, VE Tylor.
10. The formulation and preparation of cosmetic, fragrances and flavours.
11. Remington's Pharmaceutical sciences.
12. Text Book of Biotechnology by Vyas and Dixit.
13. Text Book of Biotechnology by R.C. Dubey.

A. Examination Scheme:

Components	A	CT	LR	V	EE
Weightage (%)	2	10	1	2	35

LT: Lab Test,PR/RVV: Practical Records/ Regular viva voce, EE: End Semester Examination; A: Attendance

B. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Morphology, histology and powder characteristics & extraction & detection of: Cinchona,	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
2	Cinnamon	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
3	Senna	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
4	*Clove & Ephedra*	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
5	. Fennel and Coriander	Practical	CO1	Mid Term-2, Quiz & End Sem Exam
6	Exercise involving isolation & detection of active principles Caffeine - from tea dust.	Practical	CO1,2	Mid Term-2, Quiz & End Sem Exam
7	Diosgenin from Dioscorea	Practical	CO1, 2	Mid Term-2,

				Quiz & End Sem Exam
8	Atropine from Belladonna	Practical	CO1, 2	Mid Term-2, Quiz & End Sem Exam
9	Sennosides from Senna	Practical	CO1, 2	Mid Term-2, Quiz & End Sem Exam
10	Separation of sugars by Paper chromatography	Practical	CO2	Mid Term-2, Quiz & End Sem Exam
11	TLC of herbal extract	Practical	CO2	Mid Term-2, Quiz & End Sem Exam
12	Distillation of volatile oils and detection of phytoconstitutents by TLC	Practical	CO3	Mid Term-2, Quiz & End Sem Exam
13	Analysis of crude drugs by chemical tests: (i) Asafoetida (ii) Benzoin (iii)	Practical	CO4	Mid Term-2, Quiz & End Sem Exam
14	Colophony (iv) Aloes (v) Myrrh	Practical	CO4	Mid Term-2, Quiz & End Sem Exam

A. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	
BP508P.1	Identify crude drugs by morphological and microscopical characteristics	3		2	1	2	1	-	2	1	2	1	
BP508P.2	Isolate phytoconstituents from crude drugs, Perform Paper and Thin Layer Chromatography	2	-	-	1	-	1	-	-	-	-	3	

BP508P .3	Isolate and analyse volatile oils	3	2	2	1	-	2	-	2	-	-	3	
BP508P .4	Carryout chemical tests for the identification of unorganized crude drugs	2	2	2	1	-	2	-	2	-	-	3	

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacognosy I MID-SEMESTER (SEM –V) 2021-22						
Class: B.Pharm, V Semester						
Subject Name: BP508 P Pharmacognosy & Phytochemistry II Practical		Time: 4 Hrs		Max. Marks: 40		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,4	Q.2,3	Q.4	Q.2,5,6		

Student will be able to

CO.1.
Identify crude drugs by morphological and microscopical characteristics

CO.2.
Isolate phytoconstituents from crude drugs, Perform Paper and Thin Layer Chromatography

CO.3.
Isolate and analyse volatile oils

CO.4.
Carryout chemical tests for the identification of unorganized crude drugs

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

100 % Percentage of students secured more than 60% marks, so this course Pharmacognosy And Phytochemistry II – Practical (BP508P) attained Level 3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)
Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

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AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

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Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I SEM																

II SEM																
III SEM																
IV SEM	-															
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V SEM									-	-	-	-	-	-	-	-
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VI SEM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BP601T	3	-	2	-	1	3	2	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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VII SEM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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Dr. Mohanty

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICAL CHEMISTRY
Course Handout
Course : MEDICINAL CHEMISTRY – III THEORY
Course Code : BP601T, Crédits : 04, Session : 2021-22 (Even Sem.), Class : B.Pharm. IV Year
Faculty Name: Dr. V. Murugesan

A. Introduction: The course is designed to impart fundamental knowledge on the preparatory
pharmacy with arts and science of preparing the different conventional dosage forms.

B. Course Outcomes: At the end of the course, students will be able to:

BP501T.1. Understand the chemistry of drugs with respect to their pharmacological activity

BP501T.2. Understand the drug metabolic pathways, adverse effect and therapeutic value of
drugs

BP501T.3. Understand the mechanism of action.

BP501T.4. Know the Structural Activity Relationship of different class of drugs.

BP501T.5. Study the chemical synthesis of selected drugs.

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to

identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	Description	Code	Weightage %
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

UNIT – I

Antibiotics

Historical background, Nomenclature, Stereochemistry, Structure activity relationship, Chemical degradation classification and important products of the following classes.

β-Lactam antibiotics: Penicillin, Cepholosporins, β- Lactamase inhibitors, Monobactams

Aminoglycosides: Streptomycin, Neomycin, Kanamycin

Tetracyclines: Tetracycline,Oxytetracycline, Chlortetracycline, Minocycline, Doxycycline

UNIT – II

Antibiotics

Historical background, Nomenclature, Stereochemistry, Structure activity relationship, Chemical degradation classification and important products of the following classes.

Macrolide: Erythromycin Clarithromycin, Azithromycin.

Miscellaneous: Chloramphenicol*, Clindamycin.

Prodrugs: Basic concepts and application of prodrugs design.

Antimalarials: Etiology of malaria.

Quinolines: SAR, Quinine sulphate, Chloroquine*, Amodiaquine, Primaquine phosphate, Pamaquine*, Quinacrine hydrochloride, Mefloquine.

Biguanides and dihydro triazines: Cycloguanil pamoate, Proguanil.
Miscellaneous: Pyrimethamine, Artesunete, Artemether, Atovoquone

UNIT – III

Anti-tubercular Agents

Synthetic anti tubercular agents: Isoniozid*, Ethionamide, Ethambutol, Pyrazinamide, Para amino salicylic acid.* Anti tubercular antibiotics: Rifampicin, Rifabutin, Cycloserine, Streptomycine, Capreomycin sulphate.

Urinary tract anti-infective agents

Quinolones: SAR of quinolones, Nalidixic Acid,Norfloxacin, Enoxacin, Ciprofloxacin*, Ofloxacin, Lomefloxacin, Sparfloxacin, Gatifloxacin,

Moxifloxacin

Miscellaneous: Furazolidine, Nitrofurantoin*, Methanamine.

Antiviral agents:

Amantadine hydrochloride, Rimantadine hydrochloride, Idoxuridine trifluoride, Acyclovir*, Gancyclovir, Zidovudine, Didanosine, Zalcitabine, Lamivudine, Loviride, Delavirding, Ribavirin, Saquinavir, Indinavir, Ritonavir.

UNIT – IV

Antifungal agents:

Antifungal antibiotics: Amphotericin-B, Nystatin, Natamycin, Griseofulvin.
Synthetic Antifungal agents: Clotrimazole, Econazole, Butoconazole, Oxiconazole Tioconozole, Miconazole*, Ketoconazole, Terconazole, Itraconazole, Fluconazole, Naftifine hydrochloride, Tolnaftate*.
Anti-protozoal Agents: Metronidazole*, Tinidazole, Ornidazole, Diloxanide, Iodoquinol, Pentamidine Isethionate, Atovaquone, Eflornithine.
Anthelmintics: Diethylcarbamazine citrate*, Thiabendazole, Mebendazole*, Albendazole, Niclosamide, Oxamniquine, Praziquantal, Ivermectin.

UNIV – V

Introduction to Drug Design

Various approaches used in drug design.

Physicochemical parameters used in quantitative structure activity relationship (QSAR) such as partition coefficient, Hammet's electronic parameter, Tafts steric parameter and Hansch analysis.

Pharmacophore modeling and docking techniques.

Combinatorial Chemistry: Concept and applications chemistry: solid phase and solution phase synthesis of combinatoria

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. Wilson and Giswold's Organic medicinal and Pharmaceutical Chemistry.
2. Foye's Principles of Medicinal Chemistry.
3. Burger's Medicinal Chemistry, Vol I to IV.
4. Introduction to principles of drug design- Smith and Williams.

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	**β-Lactam antibiotics:** Penicillin	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
2	Cepholosporins,	Lecture	4,5	Mid Term-1, Quiz & End Sem Exam
3	β- Lactamase inhibitors	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
4	Monobactams	Tutorial	1,2,3	Mid Term-1, Quiz & End Sem Exam
5	Aminoglycosides	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
6	Streptomycin,	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
7	Neomycin	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
8	Kanamycin	Tutorial	1,2,3,4	Mid Term-1, Quiz & End Sem Exam
9	Tetracyclines	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
10	Tetracycline	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
11	Oxytetracycline,	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
12	Chlortetracycline,	Tutorial	4, 1,2,3	Mid Term-1, Quiz & End Sem Exam
13	Minocycline, Doxycycline dinitrite	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
14	**Macrolide:** Erythromycin	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
15	Clarithromycin, Azithromycin.	Lecture	5,1,2,3	Mid Term-1, Quiz & End Sem Exam
16	**Prodrugs:** Basic concepts	Tutorial	1,2,3	Mid Term-1, Quiz & End Sem Exam
17	Application of	Lecture	1,2,3	Mid Term-1,

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	prodrugs design.			Quiz & End Sem Exam
18	**Antimalarials:** Etiology of malaria.	Lecture	5, 1,2,3	Mid Term-2, Quiz & End Sem Exam
19	**Quinolines:** SAR,	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
20	Quinine sulphate, Chloroquine*	Tutorial	1,2,3	Mid Term-2, Quiz & End Sem Exam
21	Amodiaquine, Primaquine phosphate, Pamaquine*	Lecture	5, 1,2,3	Mid Term-2, Quiz & End Sem Exam
22	Quinacrine hydrochloride, Mefloquine	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
23	Digoxin, Digitoxin,	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
24	Biguanides and dihydro triazines: Cycloguanil pamoate, Proguanil.	Tutorial	1,2,3	Mid Term-2, Quiz & End Sem Exam
25	**Miscellaneous:** Pyrimethamine, Artesunete, Artemether, Atovoquone	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
26	**Anti-tubercular Agents Synthetic anti tubercular agents:**	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
27	Isoniozid*, Ethionamide, Ethambutol, Pyrazinamide,	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
28	Para amino salicylic acid.*	Tutorial	1,2,3	Mid Term-2, Quiz & End Sem Exam
29	**Anti tubercular antibiotics:** Rifampicin, Rifabutin,	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam

30	Cycloserine Streptomycine , Capreomycin sulphate	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
31	**Urinary tract anti-infective agents**	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
32	**Quinolones:** SAR of quinolones,	Tutorial	1,2,3	Mid Term-2, Quiz & End Sem Exam
33	Nalidixic Acid,Norfloxacin, Enoxacin, Ciprofloxacin*	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
34	Ofloxacin, Lomefloxacin, Sparfloxacin,	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
35	Gatifloxacin, Moxifloxacin	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
36	**Miscellaneous:** Furazolidine, Nitrofurantoin *, Methanamine	Tutorial	1,2,3	Mid Term-2, Quiz & End Sem Exam
37	**Antiviral agents:** Amantadine hydrochloride,	Lecture	5, 1,2,3	Mid Term-2, Quiz & End Sem Exam
38	Idoxuridine trifluoride, Acyclovir*, Gancyclovir,	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
39	Rimantadine hydrochloride, Zidovudine, Didanosine, Zalcitabine.	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
40	Lamivudine, Loviride, Delavirding	Tutorial	1,2,3	Mid Term-2, Quiz & End Sem Exam
41	Ribavirin, Saquinavir, Indinavir, Ritonavir.	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
42	**Antifungal**	Lecture	1,2,3	Mid Term-2,

P. Mohanty

	agents:			Quiz & End Sem Exam
43	**Antifungal antibiotics:** Amphotericin-B, Nystatin, Natamycin, Griseofulvin.	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
44	**Sulphonamides and Sulfones**	Tutorial	5	Mid Term-2, Quiz & End Sem Exam
45	**Synthetic Antifungal agents:** Clotrimazole, Econazole, Butoconazole, Oxiconazole Tioconozole,	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
46	Miconazole*, Ketoconazole, Terconazole, Itraconazole	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
47	Fluconazole, Naftifine hydrochloride, Tolnaftate*.	Lecture	1,2,3	Quiz & End Sem Exam
48	**Anti-protozoal Agents:** Metronidazole*, Tinidazole, Ornidazole, Diloxanide, Iodoquinol,	Tutorial	1,2,3	Quiz & End Sem Exam
49	Pentamidine Isethionate, Atovaquone, Eflornithine.	Lecture	1,2,3	Quiz & End Sem Exam
50	**Anthelmintics:** Diethylcarbamazine citrate*, Thiabendazole, Mebendazole*,	Lecture	5	Quiz & End Sem Exam
51	Albendazole, Niclosamide, Oxamniquine, Praziquantal, Ivermectin.	Lecture	5	Quiz & End Sem Exam
52	Historical	Tutorial	1,2,3	Quiz & End

	development, chemistry, Sulfasalazine.			Sem Exam
53	classification and SAR of Sulfonamides:	Lecture	1,2,3	Quiz & End Sem Exam
54	**Folate reductase inhibitors:** Trimethoprim*, Cotrimoxazole. **Sulfones:** Dapsone*., Sulfisoxazole, Sulphamethizine, Sulfacetamide*,	Lecture	1,2,3	Quiz & End Sem Exam
55	Sulphapyridine, Sulfamethoxaole*, Sulphadiazine, Mefenide acetate,	Lecture	1,2,3	Quiz & End Sem Exam
56	**Introduction to Drug Design** Various approaches used in drug design.	Tutorial	1,2,3	Quiz & End Sem Exam
57	Physicochemical parameters used in quantitative structure activity relationship (QSAR) such as partition coefficient, Hammet's electronic *parameter,*	Lecture	1,2,3	Quiz & End Sem Exam
58	Tafts steric parameter and Hansch analysis.	Lecture	1,2,3	Quiz & End Sem Exam
59	Pharmacophore modeling and docking techniques.	Lecture	5	Quiz & End Sem Exam
60	*Combinatorial Chemistry: Concept and applications chemistry: solid phase and solution*	Tutorial	5	Quiz & End Sem Exam

	phase synthesis.			

5. Remington's Pharmaceutical Sciences.
6. Martindale's extra pharmacopoeia.
7. Organic Chemistry by I.L. Finar, Vol. II.
8. The Organic Chemistry of Drug Synthesis by Lednicer, Vol. 1to 5.
9. Indian Pharmacopoeia.
10. Text book of practical organic chemistry- A.I.Vogel.

H. Lecture Plan

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP501T.1	***BP501T.1.*** Understand the chemistry of drugs with respect to their pharmacological activity	3	-	-	-	2	2	1	-	1	-	-				
BP501T.2.	**BP501T.2.** Understand the drug metabolic pathways, adverse effect and therapeutic value of drugs	3	-	-	1	-	2	-	-	-	-	3				
BP501T.3.	***BP501T.3.*** Understand the mechanism of action.	3	2	-	3	-	2	-	-	-	-	3				

BP501T.4.	**BP501T.4**. Know the Structural Activity Relationship of different class of drugs.	2	2	3	3	-	1	-	-	-	-	3				
BP501T.5.	***BP501T.5***. Study the chemical synthesis of selected drugs.	1	-	3	-	-	-	-	-	-	-	3				

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutical Chemistry I MID-SEMESTER (SEM –VI) 2021-22						
Class: B.Pharm, VI Semester						
Subject Name: BP501T. MEDICINAL CHEMISTRY – II (Theory)		Time: 1 Hrs		Max. Marks: 30		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3,4,5	Q.6,8,9	Q.2	Q.7, 10		

The student will be able to

CO1. Understand the chemistry of drugs with respect to their pharmacological activity

CO2. Understand the drug metabolic pathways, adverse effect and therapeutic value of drugs

CO3. Understand the mechanism of action.

CO.4. Know the Structural Activity Relationship of different class of drugs.

CO.5. Study the chemical synthesis of selected drugs.

CO Map	Question No.	Question	Marks
CO4	Q.1	How do β-Lactam protect against infections?	2
CO5	Q.2	Draw the chemical structures of Tetracycline, Oxytetracycline along with medicinal uses.	2
CO1	Q.3	Define Tetracycline's with two suitable drug structural examples.	2
CO2	Q.4	Write the synthetic route chemical reaction of Chloroquine	2

CO2	Q.5	Write the chemical structural difference between artesunete and artemether.	2
CO1	Q.6	Write the mechanism and synthetic route of chloroquine drug along with structure activity relationship of quinolines	10
CO4	Q.7	Discuss about the classification and mechanism of synthetic anti tubercular agents along with suitable chemical structural examples.	10
CO3	Q.8	Write short notes on nitrofurantoin and methanamine	5
CO2	Q.9	Discuss about the mechanism and ADR of gancyclovir and zidovudine with suitable chemical structural examples.	5
CO4	Q.10	Write short notes on anthelmintics Agents.	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 1:

64.8 % Percentage of students secured more than 60% marks, so this course Medicinal Chemistry III – Theory (BP601T) attained Level 1.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)
Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
AMITY INSTITUTE OF PHARMACY

PROGRAMME OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge asscoited with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions

[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "-"

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
VI SEM	BP 602T	3	3	3	3	2	2	3	1	1	3	1	-	-	-

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACY
Course Handout
Course : Pharmacology-III (Theory)
Course Code : BP602T, Credits : 04, Session : 2021-22 (Even Sem.), Class : B. Pharm. 3rd Year
Faculty Name : Dr. K.Anitha, Mrs. Monika Kaushik

A. Introduction: This subject is intended to impart the fundamental knowledge on various aspects
(classification, mechanism of action, therapeutic effects, clinical uses, side effects and
contraindications) of drugs acting on different systems of body and in addition, emphasis
the basic concepts of bioassay.:

1. Know the classification of the drugs
2. Understand the mechanism of action, therapeutic uses, clinical uses and side effects of the dugs
3. Know the importance of bio-assays in preclinical drug discovery
4. Understand the pharmacology of drugs act on CVS, autacoids, coagulation, hormones etc.

B. Course Outcomes: At the end of the course, students will be able to:

BP602T.1. Discuss the Pharmacology of the drugs affecting the Respiratory and GIT system.

BP602T.2. Explain the pharmacology of chemotherapeutic agents

BP602T.3. Explain the pharmacology of mechanism of chemotherapeutic agents.

BP602T.4. Explain the pharmacology of immunopharmacological agents.

BP602T.5 Describe the various methods and applications of bioassay.

C. Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

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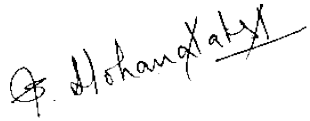
[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.



D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	A minimum of 80% attendance is required to be maintained by a student to be qualified for taking up the Odd Semester examination	A	4 %
	Quiz/ Assignment/Open book test/ Field work/Group discussion/ Seminar	Q/A/OBT/FW/GD/S	3%
	Student – Teacher interaction	STA	3%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

Q: Quiz, A: Assignment, OBT: Open book test, FW: Field work, GD: Group discussion, S: Seminar

E. Syllabus

UNIT-I 10hours 1. Pharmacology of drugs acting on Respiratory system a. Anti -asthmatic drugs b. Drugs used in the management of COPD c. Expectorants and antitussives d. Nasal decongestants e. Respiratory stimulants 2. Pharmacology of drugs acting on the Gastrointestinal Tract a. Antiulcer agents. b. Drugs for constipation and diarrhoea. c. Appetite stimulants and suppressants. d. Digestants and carminatives. e. Emetics and anti-emetics.

UNIT-II 10hours 3. Chemotherapy a. General principles of chemotherapy. b. Sulfonamides and cotrimoxazole. c. Antibiotics- Penicillins, cephalosporins, chloramphenicol, macrolides, quinolones and fluoroquinolins, tetracycline and aminoglycosides

UNIT-III 10hours 3. Chemotherapy a. Antitubercular agents b. Antileprotic agents 131 c. Antifungal agents d. Antiviral drugs e.Anthelmintics f. Antimalarial drugs g. Antiamoebic agents

UNIT-IV 08hours 3. Chemotherapy l. Urinary tract infections and sexually transmitted diseases. m. Chemotherapy of malignancy. 4. Immunopharmacology a. Immunostimulants b. Immunosuppressant Protein drugs, monoclonal antibodies, target drugs to antigen, biosimilars

UNIT-V 07hours 5. Principles of toxicology a. Definition and basic knowledge of acute, subacute and chronic toxicity. b. Definition and basic knowledge of genotoxicity, carcinogenicity, teratogenicity and mutagenicity c. General principles of treatment of poisoning d. Clinical symptoms and management of barbiturates, morphine, organophosphosphorus compound and lead, mercury and arsenic poisoning. 6. Chronopharmacology a. Definition of rhythm and cycles. b. Biological clock and their significance leading to chronotherapy

F. Examination Scheme:

Components	CT	A	Q/A/OBT/FW/GD/S	STI	EE
Weightage (%)	15	4	3	3	75

Q: Quiz, A: Assignment, OBT: Open book test, FW: Field work, GD: Group discussion, S: Seminar, STI: Student – Teacher interaction

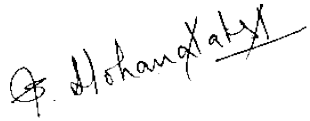
G. Suggested Text/Reference Books:

1. Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology, Churchil Livingstone Elsevier
2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill.
3. Goodman and Gilman's, The Pharmacological Basis of Therapeutics
4. Marry Anne K. K., Lloyd Yee Y., Brian K. A., Robbin L.C., Joseph G. B., Wayne A. K., Bradley R.W., Applied Therapeutics, The Clinical use of Drugs, The Point Lippincott Williams & Wilkins.
5. Mycek M.J, Gelnet S.B and Perper M.M. Lippincott's Illustrated Reviews-Pharmacology.
6. K.D.Tripathi. Essentials of Medical Pharmacology, , JAYPEE Brothers Medical Publishers (P) Ltd, New Delhi

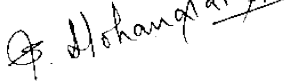
H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1.	Pharmacology of drugs acting on Respiratory system	Lecture	BP602T.1	Mid Term-1, Quiz & End Sem Exam
2.	Anti -asthmatic drugs	Lecture	BP602T.1	Mid Term-1, Quiz & End Sem Exam
3.	Drugs used in the management of COPD	Lecture	BP602T.1	Mid Term-1, Quiz & End Sem Exam
4.	Tutorial 01	Tutorial 01		
5.	*Expectorants and antitussives*	Lecture	BP602T.1	Mid Term-1, Quiz & End Sem Exam
6.	Nasal decongestants	Lecture	BP602T.1	Mid Term-1, Quiz

				& End Sem Exam
7.	Drugs for constipation and diarrhoea	Lecture	BP602T.1	Mid Term-1, Quiz & End Sem Exam
8.	Tutorial 02	Tutorial 02		
9.	Respiratory stimulants, Emetics and anti-emetics.	Lecture	BP602T.1	Mid Term-1, Quiz & End Sem Exam
10.	Appetite stimulants and suppressants	Lecture	BP602T.1	Mid Term-1, Quiz & End Sem Exam
11.	Antiulcer agents, Appetite stimulants and suppressants	Lecture	BP602T.1	Mid Term-1, Quiz & End Sem Exam
12.	Tutorial 03	Tutorial 04		
13.	General principles of chemotherapy	Lecture	BP602T.2	Mid Term-1, Quiz & End Sem Exam
14.	Sulfonamides	Lecture	BP602T.2	Mid Term-1, Quiz & End Sem Exam
15.	cotrimoxazole	Lecture	BP602T.2	Mid Term-1, Quiz & End Sem Exam
16.	Tutorial 04	Tutorial 04		
17.	Antibiotics- Penicillins	Lecture	BP602T.2	Mid Term-1, Quiz & End Sem Exam
18.	cephalosporins	Lecture	BP602T.2	Mid Term-1, Quiz & End Sem Exam
19.	chloramphenicol	Lecture	BP602T.2	Mid Term-1, Quiz & End Sem Exam
20.	Tutorial 05	Tutorial 05		
21.	macrolides	Lecture	BP602T.2	Mid Term-1, Quiz & End Sem Exam
22.	quinolones	Lecture	BP602T.2	Mid Term-1, Quiz & End Sem Exam
23.	fluoroquinolins	Lecture	BP602T.2	Mid Term-1, Quiz & End Sem Exam
24.	Tutorial 06	Tutorial 06		
25.	tetracycline	Lecture	BP602T.2	Mid Term-1, Quiz & End Sem Exam
26.	aminoglycosides	Lecture	BP602T.3	Mid Term-1, Quiz & End Sem Exam
27.	Chemotherapy a. Antitubercular agents	Lecture	BP602T.3	Mid Term-1, Quiz & End Sem Exam
28.	Tutorial 07	Tutorial 07		
29.	Antifungal agents	Lecture	BP602T.3	Mid Term-1, Quiz & End Sem Exam
30.	Antiviral drugs	Lecture	BP602T.3	Mid Term-1, Quiz & End Sem Exam
31.	Anthelmintics	Lecture	BP602T.3	Mid Term-1, Quiz



				& End Sem Exam
32.	Tutorial 08	Tutorial 08		
33.	Antimalarial drugs	Lecture	BP602T.3	Mid Term-1, Quiz & End Sem Exam
34.	Antiamoebic agents	Lecture	BP602T.3	Mid Term-2, Quiz & End Sem Exam
35.	Antiamoebic agents	Lecture	BP602T.3	Mid Term-2, Quiz & End Sem Exam
36.	Tutorial 09	Tutorial 09		
37.	Chemotherapy	Lecture	BP602T.4	Mid Term-2, Quiz & End Sem Exam
38.	Urinary tract infections	Lecture	BP602T.4	Mid Term-2, Quiz & End Sem Exam
39.	sexually transmitted diseases	Lecture	BP602T.4	Mid Term-2, Quiz & End Sem Exam
40.	Tutorial 10	Tutorial 10		
41.	Chemotherapy of malignancy	Lecture	BP602T.4	Mid Term-2, Quiz & End Sem Exam
42.	Immunopharmacology	Lecture	BP602T.4	Mid Term-2, Quiz & End Sem Exam
43.	Immunostimulants	Lecture	BP602T.4	Mid Term-2, Quiz & End Sem Exam
44.	Tutorial 11	Tutorial 11		
45.	Immunosuppressant	Lecture	BP602T.4	Mid Term-2, Quiz & End Sem Exam
46.	Protein drugs, monoclonal antibodies	Lecture	BP602T.4	Mid Term-2, Quiz & End Sem Exam
47.	target drugs to antigen, biosimilars	Lecture	BP602T.4	Mid Term-2, Quiz & End Sem Exam
48.	Tutorial 12	Tutorial 12		
49.	Principles of toxicology	Lecture	BP602T.5	Mid Term-2, Quiz & End Sem Exam
50.	Definition and basic knowledge of acute, subacute and chronic toxicity	Lecture	BP602T.5	Mid Term-2, Quiz & End Sem Exam
51.	Definition and basic knowledge of genotoxicity, carcinogenicity, teratogenicity and mutagenicity	Lecture	BP602T.5	Mid Term-2, Quiz & End Sem Exam
52.	Tutorial 13	Tutorial 13		
53.	General principles of treatment of poisoning	Lecture	BP602T.5	Mid Term-2, Quiz & End Sem Exam
54.	Clinical symptoms and management of barbiturates	Lecture	BP602T.5	Mid Term-2, Quiz & End Sem Exam



55.	Principles and applications of Bioassay, Types of bioassay	Lecture	BP602T.5	Mid Term-2, Quiz & End Sem Exam
56.	Tutorial 14	Tutorial 14		
57.	organophosphosphorus compound and lead, mercury and arsenic poisoning	Lecture	BP602T.5	Mid Term-2, Quiz & End Sem Exam
58.	Chronopharmacology a. Definition of rhythm and cycles	Lecture	BP602T.5	Mid Term-2, Quiz & End Sem Exam
59.	Definition of rhythm and cycles. b. Biological clock and their significance leading to chronotherapy	Lecture	BP602T.5	Mid Term-2, Quiz & End Sem Exam
60.	Tutorial 15	Tutorial 15		Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP602T.1	Discuss the drugs acting on the various disorders of Respiratory and GIT system	2	2	3	2	-	1	2	1	-	-	1
BP602T.2	Explain the pharmacology of chemotherapeutic agents	2	2	2	3	-	1	1	1	-	-	1
BP602T.3	Explain the pharmacology of mechanism of chemotherapeutic agents	2	1	1	-	-	1	3	2	-	-	-
BP602T.4	Explain the pharmacology of immunopharmacological agents.	2	2	2	1	-	1	-	-	-	-	-
BP602T.5	*Explain the mechanism of action and Pharmacology of Toxicological drugs acting on system*	2	1	-	-	-	2	1	1	-	-	1

Sample Question Paper

Amity School of Pharmacy Department of Pharmacology I MID-SEMESTER(SEM–VI)2021-22						
Class: B.Pharm. VI Semester						
Subject Name: BP602T Pharmacology-III		Time:1 Hrs		Max.Marks:30		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,4	Q.2,3	Q.4	Q.2,5,6		

CO Map	Question No.	Question	Marks
CO1	Q.1	Write a note on GIT enzymes	2
CO1	Q.2	List out any two functions of Toxicological branch.	2
	Q.3	Write down any four applications of microbial agents.	2
	Q.4	Write down the mechanism of action of H2 anti histaminics	2
	Q.5	Write down the mechanism of action of Gresiofulvin	2
CO1	Q.6	Classify the antiviral Drugs	10
CO2	Q.7	Discuss about anti-ulcer agents and mechanism of action of ulcer agents	10
CO2	Q.8	Write the Clinical symptoms and management of barbiturates, morphine, organophosphosphorus compound and lead, mercury and arsenic poisoning.	5
	Q.9	Explain the antifungal Drugs.	5
CO2	Q.10	Classify the antimalarial Drugs	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 1:

64.8 % Percentage of students secured more than 60% marks, so this course Pharmacology III Theory (BP602T) attained Level 1.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)
Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOGNOSY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
VI SEM	-	3	1	1	1	3	2	2	2	2	3	2	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACONOSY
Course Handout
Course : HERBAL DRUG TECHNOLOGY – THEORY
Course Code : BP603T Crédits : 04, Session :2021-22 (Even Sem.), Class : B.Pharm. 3rd Year
Faculty Name: Dr.S.Mohana Lakshmi,Dr M. Sathish,Mr Deepak Singh Janoti

A. Introduction: The course is designed to impart fundamental knowledge on the preparatory
pharmacy with arts and science of preparing the different conventional dosage forms.

B. Course Outcomes: At the end of the course, students will be able to:

BP603T.1. Understand raw material as source of herbal drugs from cultivation to herbal drug product.

BP603T.2. Know the WHO and ICH guidelines for evaluation of Herbal drugs

BP603T.3. Know the herbal cosmetics,natural sweeteners,nutraceuticals.

BP603T.4. Appreciate patenting of herbal drugs,GMP.

BP603T.5. The knowledge of basic understanding of herbal drug industry

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	Description	Code	Weightage %
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

UNIT – I

Herbs as raw materials

Definition of herb, herbal medicine, herbal medicinal product, herbal drug preparation
Source of Herbs
Selection, identification and authentication of herbal materials
Processing of herbal raw material
Biodynamic Agriculture
Good agricultural practices in cultivation of medicinal plants including Organic farming.
Pest and Pest management in medicinal plants: Biopesticides/Bioinsecticides.
Indian Systems of Medicine
a) Basic principles involved in Ayurveda, Siddha, Unani and Homeopathy
b) Preparation and standardization of Ayurvedic formulations viz Aristas and Asawas, Ghutika,Churna, Lehya and Bhasma.

UNIT – II Nutraceuticals

General aspects, Market, growth, scope and types of products available in the market. Health
benefits and role of Nutraceuticals in ailments like Diabetes, CVS diseases, Cancer, Irritable

bowel syndrome and various Gastro intestinal diseases. Study of following herbs as health food: Alfaalfa, Chicory, Ginger, Fenugreek, Garlic, Honey, Amla, Ginseng, Ashwagandha, Spirulina

Herbal-Drug and Herb-Food Interactions: General introduction to interaction and classification. Study of following drugs and their possible side effects and interactions: Hypercium, kava-kava, Ginkobiloba, Ginseng, Garlic, Pepper & Ephedra

UNIT – III Herbal Cosmetics

Sources and description of raw materials of herbal origin used via, fixed oils, waxes, gums agents colours, perfumes, protective, bleaching agents, antioxidants in products such as skin care, hair care and oral hygiene products. Herbal excipients:

Herbal Excipients – Significance of substances of natural origin as excipients – colorants, sweeteners, binders, diluents, viscosity builders, disintegrants, flavors & perfumes. Herbal formulations :

Conventional herbal formulations like syrups, mixtures and tablets and Novel dosage forms like phytosomes

UNIT – IV Evaluation of Drugs

WHO & ICH guidelines for the assessment of herbal drugs

Stability testing of herbal drugs. Patenting and Regulatory requirements of natural products:

a) Definition of the terms: Patent, IPR, Farmers right, Breeder's right, Bioprospecting and Biopiracy

b) Patenting aspects of Traditional Knowledge and Natural Products. Case study of Curcuma & Neem.

Regulatory Issues - Regulations in India (ASU DTAB, ASU DCC), Regulation of manufacture of ASU drugs - Schedule Z of Drugs & Cosmetics Act for ASU drugs.

UNIT – V General Introduction to Herbal Industry

Herbal drugs industry: Present scope and future prospects. A brief account of plant based industries and institutions involved in work on medicinal and aromatic plants in India. Schedule T – Good Manufacturing Practice of Indian systems of medicine

Components of GMP (Schedule – T) and its objectives

Infrastructural requirements, working space, storage area, machinery and equipments,

F. standard operating procedures, health and hygiene, documentation and records

G. Examination Scheme:

Components	**A**	**CT**	**S/V/Q/HA**	**STI**	**EE**
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

H. Suggested Text/Reference Books:

1 Textbook of Pharmacognosy by Trease & Evans.

2. Textbook of Pharmacognosy by Tyler, Brady & Robber.

3. Pharmacognosy by Kokate, Purohit and Gokhale

4. Essential of Pharmacognosy by Dr.S.H.Ansari

5. Pharmacognosy & Phytochemistry by V.D.Rangari

6. Pharmacopoeal standards for Ayurvedic Formulation (Council of Research in Indian Medicine & Homeopathy)

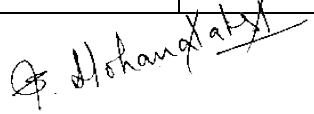
7. Mukherjee, P.W. Quality Control of Herbal Drugs: An Approach to Evaluation of Botanicals. Business Horizons Publishers, New Delhi, India, 2002.

I. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Definition of herb, herbal medicine	Lecture	1	Mid Term-1, Quiz & End Sem Exam
2	Herbal medicinal product, herbal drug preparation	Lecture	1	Mid Term-1, Quiz & End Sem Exam
3	Identification and authentication of herbal materials ,Source of Herbs	Lecture	1,5	Mid Term-1, Quiz & End Sem Exam
4	Quiz	Tutorial		Mid Term-1, Quiz & End Sem Exam
5	Processing of herbal raw material	Lecture	1	Mid Term-1, Quiz & End Sem Exam
6	Biodynamic Agriculture	Lecture	1	Mid Term-1, Quiz & End Sem Exam
7	Good agricultural practices in cultivation of medicinal plants including Organic farming.	Lecture	1	Mid Term-1, Quiz & End Sem Exam
8	Quiz	Tutorial		Mid Term-1, Quiz & End Sem Exam
9	Pest and Pest management in medicinal plants: Biopesticides/Bioinsecticides.	Lecture	1	Mid Term-1, Quiz & End Sem Exam
10	Indian Systems of Medicine Basic principles involved in Ayurveda, Siddha, Unani and Homeopathy	Lecture	1	Mid Term-1, Quiz & End Sem Exam

11	Preparation and standardization of Ayurvedic formulations viz Aristas and Asawas, Ghutika,Churna, Lehya and Bhasma	Lecture	1	Mid Term-1, Quiz & End Sem Exam
12	Seminar	Tutorial		Mid Term-1, Quiz & End Sem Exam
13	Nutraceuticals General aspects	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
14	Market, growth, scope and types of products available in the market.	Lecture	1,5	Mid Term-1, Quiz & End Sem Exam
15	Health benefits and role of Nutraceuticals in ailments like Diabetes, CVS diseases, Cancer	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
16	Unit test	Tutorial		Mid Term-1, Quiz & End Sem Exam
17	Role of Nutraceuticals in Irritable bowel syndrome and various Gastro intestinal diseases	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
18	Alfaalfa, Chicory	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
19	Fenugreek, Garlic	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
20	Group discussion on different topics	Tutorial		Mid Term-1, Quiz & End Sem Exam
21	Ginger ,Honey	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
22	Amla, Ginseng	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
23	Ashwagandha, Spirulina	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
24	Quiz	Tutorial		Mid Term-1, Quiz & End Sem Exam
25	Herbal-Drug and Herb-Food Interactions: General introduction to interaction and classification	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
26	Hypercium, kava-kava	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
27	Ginkobiloba, Ginseng	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
28	Unit Test	Tutorial		Mid Term-1, Quiz & End Sem Exam

29	Pepper & Ephedra	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
30	Ginseng, Garlic	Lecture	1,3	Mid Term-1, Quiz & End Sem Exam
31	Sources and description of raw materials of herbal origin used via, fixed oils, waxes	Lecture	1,3	Mid Term-2, Quiz & End Sem Exam
32	Group discussion on herbal drug interactions	Tutorial		Mid Term-2, Quiz & End Sem Exam
33	Gums agents, colours, perfumes	Lecture	1,3	Mid Term-2, Quiz & End Sem Exam
34	Protective, bleaching agents, antioxidants	Lecture	1,,3	Mid Term-2, Quiz & End Sem Exam
35	Herbal Excipients – Significance of substances of natural origin as excipients	Lecture	3	Mid Term-2, Quiz & End Sem Exam
36	Seminar	Tutorial		Mid Term-2, Quiz & End Sem Exam
37	Colorants, sweeteners, binders	Lecture	3	Mid Term-2, Quiz & End Sem Exam
38	Diluents, viscosity builders, disintegrants	Lecture	3	Mid Term-2, Quiz & End Sem Exam
39	Flavours & perfumes.	Lecture	3	Mid Term-2, Quiz & End Sem Exam
40	Unit test	Tutorial		Mid Term-2, Quiz & End Sem Exam
41	Herbal formulations : Conventional herbal formulations like syrups, mixtures and tablets	Lecture	5	Mid Term-2, Quiz & End Sem Exam
42	Novel dosage forms like phytosomes	Lecture	5	Mid Term-2, Quiz & End Sem Exam
43	Evaluation of Drugs WHO & ICH guidelines for the assessment of herbal drugs	Lecture	2	Mid Term-2, Quiz & End Sem Exam
44	Seminar	Tutorial		Mid Term-2, Quiz & End Sem Exam
45	Stability testing of herbal drugs. Patenting and Regulatory requirements of natural products	Lecture	2,4	Mid Term-2, Quiz & End Sem Exam



46	Definition of the terms: Patent, IPR, Farmers right, Breeder's right, Bioprospecting and Biopiracy	Lecture	4	Mid Term-2, Quiz & End Sem Exam
47	Patenting aspects of Traditional Knowledge and Natural Products. Case study of Curcuma & Neem.	Lecture	4	Quiz & End Sem Exam
48	Quiz	Tutorial		Quiz & End Sem Exam
49	Regulatory Issues - Regulations in India (ASU DTAB, ASU DCC), Regulation of manufacture of ASU drugs - Schedule Z of Drugs & Cosmetics Act for ASU drugs.	Lecture	2,3	Quiz & End Sem Exam
50	General Introduction to Herbal Industry	Lecture	5	Quiz & End Sem Exam
51	A brief account of plant based industries and institutions	Lecture	5	Quiz & End Sem Exam
52	Group discussion on Regulatory issues	Tutorial	4,5	Quiz & End Sem Exam
53	Schedule T – Good Manufacturing Practice of Indian systems of medicine	Lecture	4	Quiz & End Sem Exam
54	Components of GMP (Schedule – T) and its objectives	Lecture	4,5	Quiz & End Sem Exam
55	Infrastructural requirements	Lecture	4,5	Quiz & End Sem Exam
56	Unit test	Tutorial		Quiz & End Sem Exam
57	Working space, storage area	Lecture	4,5	Quiz & End Sem Exam
58	Machinery and equipments	Lecture	4,5	Quiz & End Sem Exam
59	Herbal drugs industry: Present scope and future prospects	Lecture	4,5	Quiz & End Sem Exam

60	Unit test	Tutorial		Quiz & End Sem Exam

J. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP603T.1	**BP603T.1**. Understand raw material as source of herbal drugs from cultivation to herbal drug product.	3	-	-	-	2	2	-	-	3	-	3				
BP603T.2.	**BP603T.2**. Know the WHO and ICH guidelines for evaluation of Herbal drugs	3	-	-	1	-	2	-	-	3	-	3				
BP603T.3.	**BP603T.3**. Know the herbal cosmetics,natural sweeteners,nutraceuticals	3	2	-	3	-	2	-	-	2	-	3				
BP603T.4.	**BP603T.4**. Appreciate patenting of herbal drugs,GMP.	2	2	3	3	-	1	-	2	2	-	3				
BP603T.5.	**BP603T.5**. The knowledge of basic understanding of herbal drug	1	-	3	-	-	-	-	-	-	-	3				

	industry														

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacognosy I MID-SEMESTER (SEM –6th) 2021-22						
Class: B.Pharm, 6thSemester						
Subject Name: BP603T Herbal Drug Technology Theory		Time: 1 Hrs		Max. Marks: 30		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3,4,5	Q.6,8,9	Q.2	Q.7, 10		
The student will be able to **CO1**. Understand raw material as source of herbal drugs from cultivation to herbal drug product. **CO2**. Know the WHO and ICH guidelines for evaluation of Herbal drugs. **CO3**. Know the herbal cosmetics,natural sweeteners,nutraceuticals. **CO4**. Appreciate patenting of herbal drugs,GMP.						

CO5. The knowledge of basic understanding of herbal drug industry.			
CO Map	Question No.	Question	Marks
CO4	Q.1	Define biopesticides?	2
CO5	Q.2	Differenciate between ayurvedic and homeopathic system of medicines?	2
CO1	Q.3	Define herbal medicine with examples?	2
CO2	Q.4	Define shelf life of herbal product?	2
CO3	Q.5	Name any two natural sweeteners and give their biological source?	2
CO1	Q.6	What are herbal excipients? write significance and properties of colorant,sweeterners,binders with suitable examples?	10
CO4	Q.7	Write a detailed note patenting of traditional knowledge and natural products with examples?	10
CO3	Q.8	What is nutraceuticals ?Classify them.Write health benefit and role of nutraceuticals in ailments of various disease?	5
CO2	Q.9	Write a note on stability testing of herbal drugs?	5
CO4	Q.10	Write in detail about good agriculture practices in cultivation of medicinal plants?	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 1:

63 % Percentage of students secured more than 60% marks, so this course Herbal Drug Technology – Theory (BP603T) attained Level 1

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR

AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)

Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

AMITY UNIVERSITY
MADHYA PRADESH
Established vide Government of Madhya Pradesh Act No. 27 of 2010

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICS

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
VI SEM	-	3	1	1	1	3	2	2	2	2	3	2	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICS
Course Handout
Course : BIOPHARMACEUTICS AND PHARMACOKINETICS-THEORY
Course Code : BP604T, Programme : B. Pharmacy VI-Semester **Crédits : 04, Session :2021-22 (Even Sem.)**
Faculty Name : Dr. M.Prathap

A. Scope: This subject is designed to impart knowledge and skills of Biopharmaceutics and pharmacokinetics and their applications in pharmaceutical development, design of dose and dosage regimen and in solving the problems raised their in

B. Course Outcome: ***At the end of each course, the student will be able to:***

BP604.1	Know [Applying] and understand the processes and terms related to the fate of drug in human body also explain and describe [Remembering] the physicochemical, dosage form and patient related factors affecting absorption, distribution, metabolism and excretion of drugs, Describe [L2: Understanding] the basic concept in Biopharmaceutics and its importance in dosage form design
BP604.2	To analyses the bioavailability of a drug and compare the bioequivalence between formulations, Describe [L1: Remembering] and evaluate [L5: Evaluating] bioavailability, bioequivalence and its regulatory requirements for conducting bioequivalence study
BP604.3	Apply **[L3: Application]** the concept of compartment modelling and estimate [**L5: Evaluating]** the quantity/concentration of drug in body at any point of time.
BP604.4	To evaluate various pharmacokinetic parameters for the drugs exhibiting saturation kinetics.
BP604.5	Apply [L3: Application] Pharmacokinetics in Clinical Situations

C. 1.Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices**.**
2. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

3. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice.
Find, analyze, evaluate and apply information systematically and shall make defensible decisions.
4. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.
5. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well-being.
6. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).
7. Pharmaceutical Ethics: Honor personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.
8. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.
9. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional Pharmacy Practice
10. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
11. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively

D.Programme specific outcomes:

1. Scientific Thinking: Enable student's knowledge in scientific perception to understand the concepts and to solve the problems positively while making pharmaceutical formulations.
2. Analytical Skills: Assimilate and develop analytical skills using advanced equipment to design and evaluate pharmaceutical products, also to assess their quality.
3. Resource Management: Utilize and manage resources from natural, semi synthetic and synthetic origin to develop real time products with utmost benefit and safety.
4.Public Health Care: Promote and empower the healthy living in the community by various means of awareness and health strategies.
5. Entrepreneurship: Acquire and develop entrepreneurship and administration skills to establish community pharmacy, learning and training centers for the long term wellbeing of society.

E. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**

Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2 quiz, assignment, open book test, field work, group discussion and seminar)		
	Seminar/ Assignment/Quiz/ Open book test	S/As/Q/OBT	3%
Interaction	Student-Teacher interaction	ST	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

F. Syllabus

UNIT-I

Introduction Biopharmaceutics to Absorption; Mechanisms of drug absorption through GIT, factors influencing drug absorption though GIT, absorption of drug from Non per oral extra-vascular routes, Distribution Tissue permeability of drugs, binding of drugs, apparent, volume of drug distribution, plasma and tissue protein binding of drugs, factors affecting protein-drug binding. Kinetics of protein binding, Clinical significance of protein binding of drugs

UNIT- II

Elimination: Drug metabolism and basic understanding metabolic pathways renal excretion of drugs, factors affecting renal excretion of drugs, renal clearance, Non renal routes of drug excretion of drugs Bioavailability and Bioequivalence: Definition and Objectives of bioavailability, obsolete and relative bioavailability, measurement of bioavailability, in-vitro drug dissolution models, in-vitro-in-vivo correlations, bioequivalence studies, methods to enhance the dissolution rates and bioavailability of poorly soluble drugs.

UNIT- III

Pharmacokinetics: Definition and introduction to Pharmacokinetics, Compartment models, Non compartment models, physiological models, One compartment open model. (a). Intravenous Injection (Bolus) (b). Intravenous infusion and (c) Extra vascular administrations. Pharmacokinetics parameters - KE ,t1/2,Vd,AUC,Ka, Clt and CLR- definitions methods of eliminations, understanding of their significance and application

UNIT- IV

Multi compartment models: Two compartment open model. IV bolus Kinetics of multiple dosing, steady state drug levels, calculation of loading and maintenance doses and their significance in clinical settings.

UNIT- V

Nonlinear Pharmacokinetics: a. Introduction, b. Factors causing Non-linearity. c. Michaelis-menton method of estimating parameters, Explanation with example of drugs.

G. Examination Scheme:

Components	A	ST	CT	S/As/Q/OBT	EE
Weightage (%)	4	3	15	3	75

CT: Class Test, As: Assignment, ST: Student teacher interaction,
S/A/Q/OBT: Seminar/ Assignment/Quiz/ Open book test, EE: End Semester Examination; A: Attendance

H. Suggested Text/Reference Books:

1. Biopharmaceutics and Clinical Pharmacokinetics by, Milo Gibaldi.

2. Biopharmaceutics and Pharmacokinetics; By Robert F Notari

3. Applied biopharmaceutics and pharmacokinetics, Leon Shargel and Andrew

B.C.YU 4th edition,Prentice-Hall Inernational edition.USA

4. Bio pharmaceutics and Pharmacokinetics-A Treatise, By D. M. Brahmankar and

Sunil B.Jaiswal,Vallabh Prakashan Pitampura, Delhi

5. Pharmacokinetics: By Milo Glbaldi Donald, R. Mercel Dekker Inc.

6. Hand Book of Clinical Pharmacokinetics, By Milo Gibaldi and Laurie Prescott by

ADIS Health Science Press.

7. Biopharmaceutics; By Swarbrick

8. Clinical Pharmacokinetics, Concepts and Applications: ByMalcolm Rowland and

9. Thomas, N. Tozen, Lea and Febrger, Philadelphia, 1995.

10. Dissolution, Bioavailability and Bioequivalence, By Abdou H.M, Mack,

Publishing Company,Pennsylvania 1989.

11. Biopharmaceutics and Clinical Pharmacokinetics-An introduction 4th edition Revised and

expanded by Rebort F Notari Marcel Dekker Inn, New York and Basel, 1987.

12. Remington's Pharmaceutical Sciences, ByMack Publishing Company, Pennsylvnia

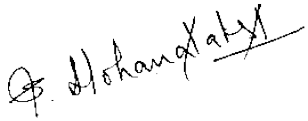
I. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Mechanisms of drug absorption through GIT	Lecture	BP604T.1	Mid Term-1, Quiz & End Sem Exam
2	Mechanisms of drug absorption through GIT	Lecture	BP604T.1	Mid Term-1, Quiz & End Sem Exam
3	factors influencing drug absorption though GIT,	Lecture	BP604T.1	Mid Term-1, Quiz & End Sem Exam
4	factors influencing drug absorption though GIT,	Lecture	BP604T.1	Mid Term-1, Quiz & End Sem Exam

5	Tissue permeability of drugs	Lecture	BP604T.1	Mid Term-1, Quiz & End Sem Exam
6	Tissue permeability of drugs	Lecture	BP604T.1	Mid Term-1, Quiz & End Sem Exam
7	binding of drugs	Lecture	BP604T.1	Mid Term-1, Quiz & End Sem Exam
8	binding of drugs	Lecture	BP604T.1	Mid Term-1, Quiz & End Sem Exam
9	apparent, volume of drug distribution,	Lecture	BP604T.1	Mid Term-1, Quiz & End Sem Exam
10	factors affecting protein-drug binding.	Lecture	BP604T.1	Mid Term-1, Quiz & End Sem Exam
11	Kinetics of protein binding, Clinical significance of protein binding of drugs,	Lecture	BP604T.2	Mid Term-1, Quiz & End Sem Exam
12	Drug metabolism and basic understanding metabolic pathways,	Lecture	BP604T.2	Mid Term-1, Quiz & End Sem Exam
13	Drug metabolism and basic understanding metabolic pathways,	Lecture	BP604T.2	Mid Term-1, Quiz & End Sem Exam
14	factors affecting renal excretion of drugs	Lecture	BP604T.2	Mid Term-1, Quiz & End Sem Exam
15	factors affecting renal excretion of drugs	Lecture	BP604T.2	Mid Term-1, Quiz & End Sem Exam
16	renal clearance, Non renal routes of drug excretion of drugs	Lecture	BP604T.2	Mid Term-1, Quiz & End Sem Exam
17	Definition and Objectives of bioavailability ,absolute and relative bioavailability, measurement of bioavailability	Lecture	BP604T.2	Mid Term-1, Quiz & End Sem Exam
18	measurement of bioavailability	Lecture	BP604T.2	Mid Term-1, Quiz & End Sem Exam
19	in-vitro drug dissolution models, in-vitro-in-vivo correlations,	Lecture	BP604T.2	Mid Term-1, Quiz & End Sem Exam
20	in-vitro drug dissolution models, in-vitro-in-vivo correlations,	Lecture	BP604T.2	Mid Term-1, Quiz & End Sem Exam
21	methods to enhance the dissolution rates and bioavailability of poorly soluble drugs.	Lecture	BP604T.2	Mid Term-1, Quiz & End Sem Exam
22	methods to enhance the dissolution rates and bioavailability of poorly soluble drugs	Lecture	BP604T.2	Mid Term-1, Quiz & End Sem Exam
23	Definition and introduction to Pharmacokinetics	Lecture	BP604T.3	Mid Term-1, Quiz & End Sem Exam

P. Mohanalaxmi

24	Definition and introduction to Pharmacokinetics	Lecture	BP604T.3	Mid Term-1, Quiz & End Sem Exam
25	Compartment models, Non compartment models, physiological models	Lecture	BP604T.3	Mid Term-1, Quiz & End Sem Exam
26	Compartment models, Non compartment models, physiological models	Lecture	BP604T.3	Mid Term-1, Quiz & End Sem Exam
27	One compartment open model. (a). Intravenous Injection (Bolus)	Lecture	BP604T.3	Mid Term-1, Quiz & End Sem Exam
28	(a). Intravenous Injection (Bolus)	Lecture	BP604T.3	Mid Term-2, Quiz & End Sem Exam
29	Intravenous infusion	Lecture	BP604T.3	Mid Term-2, Quiz & End Sem Exam
30	Intravenous infusion	Lecture	BP604T.3	Mid Term-2, Quiz & End Sem Exam
31	Intravenous infusion	Lecture	BP604T.3	Mid Term-2, Quiz & End Sem Exam
32	Extra vascular administrations.	Lecture	BP604T.3	Mid Term-2, Quiz & End Sem Exam
33	Pharmacokinetics parameters	Lecture	BP604T.3	Mid Term-2, Quiz & End Sem Exam
34	Pharmacokinetics parameters	Lecture	BP604T.3	Mid Term-2, Quiz & End Sem Exam
35	Multi compartment models	Lecture	BP604T.4	Mid Term-2, Quiz & End Sem Exam
36	Two compartment open model	Lecture	BP604T.4	Mid Term-2, Quiz & End Sem Exam
37	Two compartment open model	Lecture	BP604T.4	Mid Term-2, Quiz & End Sem Exam
38	IV bolus Kinetics of multiple dosing,	Lecture	BP604T.4	Mid Term-2, Quiz & End Sem Exam
39	IV bolus Kinetics of multiple dosing,	Lecture	BP604T.4	Mid Term-2, Quiz & End Sem Exam
40	steady state drug levels	Lecture	BP604T.4	Mid Term-2, Quiz & End Sem Exam
41	steady state drug levels	Lecture	BP604T.4	Mid Term-2, Quiz & End Sem Exam
42	calculation of loading and maintenance doses	Lecture	BP604T.4	Mid Term-2, Quiz & End Sem Exam
43	calculation of loading and maintenance doses	Lecture	BP604T.4	Mid Term-2, Quiz & End Sem Exam



44	Nonlinear Pharmacokinetics: Introduction	Lecture	BP604T.5	Mid Term-2, Quiz & End Sem Exam
45	Factors causing Non-linearity	Lecture	BP604T.5	Mid Term-2, Quiz & End Sem Exam
46	Factors causing Non-linearity	Lecture	BP604T.5	Mid Term-2, Quiz & End Sem Exam
47	Michaelis-menton method of estimating parameters	Lecture	BP604T.5	Mid Term-2, Quiz & End Sem Exam
48	Michaelis-menton method of estimating parameters	Lecture	BP604T.5	Mid Term-2, Quiz & End Sem Exam
49	IV bolus Kinetics of multiple dosing	Lecture	BP604T.5	Mid Term-2, Quiz & End Sem Exam
50	IV bolus Kinetics of multiple dosing	Lecture	BP604T.5	Mid Term-2, Quiz & End Sem Exam
51	IV bolus Kinetics of multiple dosing	Lecture	BP604T.5	Mid Term-2, Quiz & End Sem Exam
52	IV bolus Kinetics of multiple dosing	Lecture	BP604T.5	Mid Term-2, Quiz & End Sem Exam
53	IV bolus Kinetics of multiple dosing	Lecture	BP604T.5	Mid Term-2, Quiz & End Sem Exam
54	IV bolus Kinetics of multiple dosing	Lecture	BP604T.5	Mid Term-2, Quiz & End Sem Exam
55	IV bolus Kinetics of multiple dosing	Lecture	BP604T.5	Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

(CO) with Program Outcome (PO)											
CO/PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**
CO1	3	1	2	0	0	0	1	3	0	0	3
CO2	3	2	3	0	0	0	1	3	0	0	3
CO3	3	2	3	1	0	0	1	3	0	0	3
CO4	3	2	3	2	0	0	1	3	0	0	3
CO5	3	2	2	2	0	0	1	3	0	0	3

Amity Institute of Pharmacy
Department of Pharmaceutics
MID-SEMESTER (SEM –VI) 2021-22

Class: B.Pharm, VI Semester

Subject Name: BP 604 T Biopharmaceutics And Pharmacokinetics-Theory	Time: 1 Hrs	Max. Marks: 30

Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3,5	Q.4,8, 10	Q.2,3	Q. 9,	Q 6,7	

The student will be able to

C604.1 explain and describe [Remembering] the physicochemical, dosage form and patient related factors affecting absorption, distribution, metabolism and excretion of drugs

C604.2 To analyses the bioavailability of a drug and compare the bioequivalence between formulations, describe [L1: Remembering] and evaluate [L5: Evaluating] bioavailability, bioequivalence and its regulatory requirements for conducting bioequivalence study

C604.3 the concept of compartment modelling and estimate [L5: Evaluating] the quantity/concentration of drug in body at any point of time.

C604.4 To evaluate various pharmacokinetic parameters for the drugs exhibiting saturation kinetics

C605.5 Apply [L3: Application] Pharmacokinetics in Clinical Situations

CO Map	Question No.	Question	Marks
CO2	Q.1	Define bioequivalence and bio-availability	2
CO2	Q.2	Define Biotransformation	2
CO2	Q.3	Define Apparent volume of drug distribution with formulae	2
CO5	Q.4	Define on set of action, Duration of action and Intensity of action	2
CO2	Q.5	Define Area Under the Curve(AUC)	2
CO2	Q.6	Discuss the method of measuring of bioavailability	10
CO2	Q.7	Explain various methods to enhance the dissolution rates and bioavailability of poorly soluble drugs	10
CO4	Q.8	Explain factors causing non linearity	5
CO2	Q.9	Explain theory of dissolution	5
CO5	Q.10	Explain Michaelis Menten equation for Non-Linear Kinetics.	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Below Level-1:

46.3 % of students secured more than 60% marks, so this course Biopharmaceutics and Pharmacokinetics Theory (BP604T) attainment is below level 1.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)
Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
AMITY INSTITUTE OF PHARMACY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge asscoited with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions

[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
VI SEM	BP605T	3	3	3	3	1	2	2	1	3	1	1	-	-	-

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACY
Course Handout
Course : Pharmaceutical Biotechnology (Theory)
Course Code : BP605T, Crédits : 04, Session : 2021-22 (Even Sem.), Class : B. Pharm. 6th Year
Faculty Name : Dr. Neeraj Mishra

A. Introduction: This course is designed to impart fundamental knowledge on pharmaceutical product development and translation from laboratory to market. Upon completion of the course, the student shall be able to:

1. Know the process of pilot plant and scale up of pharmaceutical dosage forms
2. Understand the process of technology transfer from lab scale to commercial batch
3. Know different Laws and Acts that regulate pharmaceutical industry
4. Understand the approval process and regulatory requirements for drug products

B. Course Outcomes: At the end of the course, students will be able to:

BP605T.1. Understanding the importance of Immobilized enzymes in Pharmaceutical Industries

BP605T.2. Genetic engineering applications in relation to production of pharmaceuticals

BP605T.3. Importance of Monoclonal antibodies in Industries

BP605T.4. Understand the humoral and cellular immunity

BP605T.5. Discuss the use of microorganisms in fermentation technology

C. Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge associated with the profession of pharmacy, including biomedical

sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	10%
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves Including medical leaves.	A	5%
End Semester Examination	End Semester Examination	EE	70%
Total			**100%**

E. Syllabus

Module I

a) Brief introduction to Biotechnology with reference to Pharmaceutical Sciences. b) Enzyme Biotechnology- Methods of enzyme immobilization and applications. c) Biosensors- Working and applications of biosensors in Pharmaceutical Industries. d) Brief introduction to Protein Engineering. e) Use of microbes in industry. Production of Enzymes- General consideration - Amylase, Catalase, Peroxidase, Lipase, Protease, Penicillinase. f) Basic principles of genetic engineering.

Module II

a) Study of cloning vectors, restriction endonucleases and DNA ligase. b) Recombinant DNA technology. Application of genetic engineering in medicine. c) Application of r DNA technology and genetic engineering in the production of: i) Interferon ii) Vaccines-hepatitis- B iii) Hormones-Insulin. d) Brief introduction to PCR

Module III

Types of immunity- humoral immunity, cellular immunity a) Structure of Immunoglobulins b) Structure and Function of MHC c) Hypersensitivity reactions, Immune stimulation and Immune suppressions. d) General method of the preparation of bacterial vaccines, toxoids, viral vaccine, antitoxins, serum-immune blood derivatives and other products relative to immunity. e) Storage conditions and stability of official vaccines f) Hybridoma technology- Production, Purification and Applications g) Blood products and Plasma Substituties.

Module IV

a) Immuno blotting techniques- ELISA, Western blotting, Southern blotting. b) Genetic organization of Eukaryotes and Prokaryotes c) Microbial genetics including transformation, transduction, conjugation, plasmids and transposons. d) Introduction to Microbial biotransformation and applications. e) Mutation: Types of mutation/mutants

Module V

a) Fermentation methods and general requirements, study of media, equipment's, sterilization methods, aeration process, stirring.

b) Large scale production fermenter design and its various controls.

c) Study of the production of - penicillin's, citric acid, Vitamin B12, Glutamic acid, Griseofulvin,

d) Blood Products: Collection, Processing and Storage of whole human blood, dried human plasma, plasma Substitutes.

Examination Scheme:

Components	**A**	**CT**	**S/V/Q/HA**	**EE**
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; A: Attendance

F. Suggested Text/Reference Books:

1. B.R. Glick and J.J. Pasternak: Molecular Biotechnology: Principles and Applications of RecombinantDNA: ASM Press Washington D.C.

2. RA Goldshy et. al., : Kuby Immunology.

3. J.W. Goding: Monoclonal Antibodies.

4. J.M. Walker and E.B. Gingold: Molecular Biology and Biotechnology by Royal8 Society of Chemistry.

5. Zaborsky: Immobilized Enzymes, CRC Press, Degraland, Ohio.

6. S.B. Primrose: Molecular Biotechnology (Second Edition) Blackwell Scientific Publication.

7. Stanbury F., P., Whitakar A., and Hall J., S., Principles of fermentation technology, 2nd edition, Aditya books Ltd., New Delhi

G. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Brief introduction to Biotechnology with reference to Pharmaceutical Sciences.	Lecture	BP605T.1	Mid Term-1, Quiz & End Sem Exam
2	Enzyme Biotechnology-Methods of enzyme immobilization	Lecture	BP605T.1	Mid Term-1, Quiz & End Sem Exam
3	Application of immobilization	Lecture	BP605T.1	Mid Term-1, Quiz & End Sem Exam
4	Working principal of biosensor	Lecture	BP605T.1	Mid Term-1, Quiz & End Sem Exam
5	Applications of biosensors in Pharmaceutical Industries.	Lecture	BP605T.1	Mid Term-1, Quiz & End Sem Exam
6	Brief introduction to Protein Engineering.	Lecture	BP605T.1	Mid Term-1, Quiz & End Sem Exam
7	Brief introduction to	Lecture	BP605T.1	Mid Term-

	Protein Engineering.			1, Quiz & End Sem Exam
8	Use of microbes in industry	Lecture	BP605T.1	Mid Term-1, Quiz & End Sem Exam
9	Production of Enzymes- General consideration – Amylase, Catalase, Peroxidase, Lipase, Protease, Penicillinase.	Lecture	BP605T.1	Mid Term-1, Quiz & End Sem Exam
10	Basic principles of genetic engineering.	Lecture	BP605T.1	Mid Term-1, Quiz & End Sem Exam
11	Basic principles of genetic engineering.	Lecture	BP605T.2	Mid Term-1, Quiz & End Sem Exam
12	Study of cloning vectors,		BP605T.2	
13	Restriction endonucleases	Lecture	BP605T.2	Mid Term-1, Quiz & End Sem Exam
14	DNA ligase.	Lecture	BP605T.2	Mid Term-1, Quiz & End Sem Exam
15	Recombinant DNA technology	Lecture	BP605T.2	Mid Term-1, Quiz & End Sem Exam
16	Application of genetic engineering in medicine	Lecture	BP605T.2	Mid Term-1, Quiz & End Sem Exam
17	Brief introduction to PCR	Lecture	BP605T.2	Mid Term-1, Quiz & End Sem Exam
18	Application of r DNA technology	Lecture	BP605T.2	Mid Term-1, Quiz & End Sem

				Exam
19	Application of r DNA technology	Lecture	BP605T.2	Mid Term-1, Quiz & End Sem Exam
20	Genetic engineering in the production of: i) Interferon ii) Vaccines- hepatitis-B	Lecture	BP605T.2	Mid Term-2, Quiz & End Sem Exam
21	Production of Hormones-Insulin	Lecture	BP605T.2	Mid Term-2, Quiz & End Sem Exam
22	Types of immunity-humoral immunity, cellular immunity	Lecture	BP605T.3	Mid Term-2, Quiz & End Sem Exam
23	a) Structure of Immunoglobulins	Lecture	BP605T.3	Mid Term-2, Quiz & End Sem Exam
24	b) Structure and Function of MHC	Lecture	BP605T.3	Mid Term-2, Quiz & End Sem Exam
25	c) Hypersensitivity reactions, Immune stimulation and Immune suppressions	Lecture	BP605T.3	Mid Term-2, Quiz & End Sem Exam
26	d) General method of the preparation of bacterial vaccines, toxoids, viral vaccine	Lecture	BP605T.3	Mid Term-2, Quiz & End Sem Exam
27	Antitoxins, serum-immune blood derivatives and other products relative to immunity.	Lecture	BP605T.3	Mid Term-2, Quiz & End Sem Exam
28	Storage conditions and stability of official vaccines	Lecture	BP605T.3	Mid Term-2, Quiz & End Sem Exam
29	Hybridoma technology-Production,	Lecture	BP605T.3	Mid Term-2, Quiz &

				End Sem Exam
30	Purification and Applications	Lecture	BP605T.3	Mid Term-2, Quiz & End Sem Exam
31	Blood products	Lecture	BP605T.3	Mid Term-2, Quiz & End Sem Exam
32	Plasma Substituties.	Lecture	BP605T.3	Mid Term-2, Quiz & End Sem Exam
33	Immuno blotting techniques- ELISA,	Lecture	BP605T.4	Mid Term-2, Quiz & End Sem Exam
34	Western blotting, Southern blotting	Lecture	BP605T.4	Mid Term-2, Quiz & End Sem Exam
35	Genetic organization of Eukaryotes and Prokaryotes	Lecture	BP605T.4	Mid Term-2, Quiz & End Sem Exam
36	Microbial genetics including transformation	Lecture	BP605T.4	Mid Term-2, Quiz & End Sem Exam
37	Transduction, conjugation, plasmids and transposons.	Lecture	BP605T.4	Mid Term-2, Quiz & End Sem Exam
38	Introduction to Microbial biotransformation	Lecture	BP605T.4	Mid Term-2, Quiz & End Sem Exam
39	Application of Biotransformation	Lecture	BP605T.4	Mid Term-2, Quiz & End Sem Exam
40	Mutation: Types of mutation/mutants.	Lecture	BP605T.4	Mid Term-2, Quiz & End Sem Exam

41	Fermentation methods and general requirements,	Lecture	BP605T.5	Mid Term-2, Quiz & End Sem Exam
42	Study of media, equipments, sterilization methods, aeration process, stirring.	Lecture	BP605T.5	Mid Term-2, Quiz & End Sem Exam
43	Large scale production fermenter design and its various controls;	Lecture	BP605T.5	Mid Term-2, Quiz & End Sem Exam
44	Study of the production of - penicillins, citric acid; Vitamin B12, Glutamic acid, Griseofulvin,	Lecture	BP605T.5	Mid Term-2, Quiz & End Sem Exam
45	Blood Products: Collection, Processing and Storage of whole human blood, dried human plasma, plasma Substituties	Lecture	BP605T.5	Mid Term-2, Quiz & End Sem Exam

H. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP605T.1	Understanding the importance of Immobilized enzymes in Pharmaceutical Industries	3	3	3	1	-	1	2	1	-	-	1
BP605T.2	Genetic engineering applications in relation to production of pharmaceuticals	2	2	2	3	-	1	1	1	-	-	1

BP605T.3	Importance of Monoclonal antibodies in Industries	2	1	1	-	-	1	3	2	-	-	-
BP605T.4	Understand the humoral and cellular immunity	2	2	2	1	-	1	-	-	-	-	-
BP605T.5	Discuss the use of microorganisms in fermentation technology	2	1	-	-	-	2	1	1	-	-	1

Amity Institute of Pharmacy
Department of Pharmaceutics
I MID-SEMESTER (SEM –VIII) 2021-22

Class: B.Pharm, VII Semester

Subject Name: BP704T.Novel Drug Delivery System (Theory)	Time: 1 Hr	Max. Marks: 30

Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3,4,5	Q.6,8,9	Q.2	Q.7, 10		

The student will be able to

CO1. Understanding the importance of Immobilized enzymes in Pharmaceutical Industries

CO2. Genetic engineering applications in relation to production of pharmaceuticals

CO3. Importance of Monoclonal antibodies in Industries

CO.4. Understand the humoral and cellular immunity

CO.5. Discuss the use of microorganisms in fermentation technology

CO Map	Question No.	Question	Marks
CO2	Q.1	What is glucose biosensor?	2
CO4	Q.2	Discuss the principle of rDNA technology.	2
CO4	Q.3	Define the term conjugation, transduction, and transformation.	2
CO5	Q.4	Define the term fermentation and discuss type of fermentation.	2
CO4	Q.5	What are Microbial genetics and how it occurs.	2
CO2	Q.6	Define rDNA technology. Explain the role of DNA ligase in rDNA	10

		technology.	
CO5	Q.7	Define fermentation and discuss method of production of citric by fermentation method.	10
CO3	Q.8	What are Immunoglobulins and discuss its type.	5
CO4	Q.9	Discuss the types of microbial biotransformation reactions.	5
CO1	Q.10	Explain the application of biosensor in pharmaceutical industry.	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 1:

64.8 % Percentage of students secured more than 60% marks, so this course Pharmaceutical Biotechnology – Theory (BP605T) attained Level 1.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
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AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICS

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

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Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

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PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
VI SEM																
	BP606T	3	2	3	3	3	2	3	3	1	1	2				
	-															
	-															
	-															
	-															
	-															

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICS
Course Handout
Course : PHARMACEUTICAL QUALITY ASSURANCE THEORY
Course Code : BP606T, Crédits : 04, Session :2021-23 (Even Sem.), Class : B.Pharm. 3rd Year
Faculty Name: Dr. Ankit Yadav & Dr. Satish Shilpi

A. Introduction: This course deals with the various aspects of quality control and quality assurance aspects of pharmaceutical industries. It deals with the important aspects like cGMP, QC tests, documentation, quality certifications and regulatory affairs..

B. Course Outcomes: At the end of the course, students will be able to:

BP606T.1. Understand the cGMP aspects in a pharmaceutical industry.

BP606T.2. Appreciate the importance of documentation.

BP606T.3. Understand the scope of quality certifications applicable to pharmaceutical industries.

BP606T.4. Understand the responsibilities of QA & QC departments.

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

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D. Assessment Plan:

Component of Evaluation	Description	Code	Weightage %

Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

UNIT – I

Quality Assurance and Quality Management concepts: Definition and concept of Quality control, Quality assurance and GMP

Total Quality Management (TQM): Definition, elements, philosophies

ICH Guidelines: purpose, participants, process of harmonization, Brief overview of QSEM, with special emphasis on Q-series guidelines, ICH stability testing guidelines

Quality by design (QbD): Definition, overview, elements of QbD program, tools

ISO 9000 & ISO14000: Overview, Benefits, Elements, steps for registration

NABL accreditation : Principles and procedures

UNIT - II

Organization and personnel: Personnel responsibilities, training, hygiene and personal records.

Premises: Design, construction and plant layout, maintenance, sanitation, environmental control, utilities and maintenance of sterile areas, control of contamination.

Equipments and raw materials: Equipment selection, purchase specifications, maintenance, purchase specifications and maintenance of stores for raw materials.

UNIT – III

Quality Control: Quality control test for containers, rubber closures and secondary packing materials.

Good Laboratory Practices: General Provisions, Organization and Personnel, Facilities, Equipment, Testing Facilities Operation, Test and Control Articles, Protocol for Conduct of a Nonclinical Laboratory Study, Records and Reports, Disqualification of Testing Facilities

UNIT – IV

Complaints: Complaints and evaluation of complaints, Handling of return good, recalling and waste disposal.

Document maintenance in pharmaceutical industry: Batch Formula Record, Master Formula Record, SOP, Quality audit, Quality Review and Quality documentation, Reports and documents, distribution records.

UNIT – V

Calibration and Validation: Introduction, definition and general principles of calibration, qualification and validation, importance and scope of validation, types of validation, validation master plan. Calibration of pH meter, Qualification of UV-Visible spectrophotometer, General principles of Analytical method Validation.

Warehousing: Good warehousing practice, materials management

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. Quality Assurance Guide by organization of Pharmaceutical Products of India.
2. Good Laboratory Practice Regulations, 2nd Edition, Sandy Weinberg Vol. 69.
3. Quality Assurance of Pharmaceuticals- A compendium of Guide lines and Related materials Vol I WHO Publications.
4. A guide to Total Quality Management- Kushik Maitra and Sedhan K Ghosh
5. How to Practice GMP's – P P Sharma.
6. ISO 9000 and Total Quality Management – Sadhank G Ghosh
7. The International Pharmacopoeia – Vol I, II, III, IV- General Methods of Analysis and Quality specification for Pharmaceutical Substances, Excipients and Dosage forms
8. Good laboratory Practices – Marcel Deckker Series
9. ICH guidelines, ISO 9000 and 14000 guidelines

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Quality Assurance and Quality Management concepts: Definition and concept of Quality control	Lecture	1, 4	Mid Term-1, Quiz & End Sem Exam
2	Quality Assurance and Quality Management concepts: Quality assurance	Lecture	1, 4	Mid Term-1, Quiz & End Sem Exam
3	Quality Assurance and Quality Management concepts	Lecture	1, 4	Mid Term-1, Quiz & End Sem Exam
4	Total Quality Management (TQM)	Lecture	1, 4	Mid Term-1, Quiz & End Sem Exam
5	ICH Guidelines: purpose, participants, process of harmonization, Brief overview of QSEM	Lecture	1, 2	Mid Term-1, Quiz & End Sem Exam
6	ICH Guidelines: with special emphasis on	Lecture	1, 2	Mid Term-1,

	Q-series guidelines, ICH stability testing guidelines			Quiz & End Sem Exam
7	Quality by design (QbD): Definition, overview, elements of QbD program	Lecture	1, 2	Mid Term-1, Quiz & End Sem Exam
8	Quality by design (QbD): elements of QbD program, tools	Lecture	1, 2	Mid Term-1, Quiz & End Sem Exam
9	ISO 9000 & ISO14000	Lecture	2, 3	Mid Term-1, Quiz & End Sem Exam
10	NABL accreditation	Lecture	2, 3	Mid Term-1, Quiz & End Sem Exam
11	Quiz	Tutorial		Quiz & End Sem
12	Organization and personnel: Personnel responsibilities, training, hygiene and personal records	Lecture	1, 4	Mid Term-1, Quiz & End Sem Exam
13	Organization and personnel: Personnel responsibilities, training, hygiene and personal records	Lecture	1, 4	Mid Term-1, Quiz & End Sem Exam
14	Premises: Design, construction and plant layout, maintenance	Lecture	1, 4	Mid Term-1, Quiz & End Sem Exam
15	Premises: sanitation, environmental control	Lecture	1, 4	Mid Term-1, Quiz & End Sem

				Exam
16	Premises: utilities and maintenance of sterile areas, control of contamination	Lecture	1, 4	Mid Term-1, Quiz & End Sem Exam
17	Premises: utilities and maintenance of sterile areas, control of contamination	Lecture	1, 4	Mid Term-1, Quiz & End Sem Exam
18	Equipments and raw materials: Equipment selection	Lecture	1, 3, 4	Mid Term-1, Quiz & End Sem Exam
19	Equipments and raw materials: purchase specifications	Lecture	1, 3, 4	Mid Term-1, Quiz & End Sem Exam
20	Equipments and raw materials: maintenance, purchase specifications	Lecture	1, 3, 4	Mid Term-1, Quiz & End Sem Exam
21	Equipments and raw materials: maintenance of stores for raw materials	Lecture	1, 3, 4	Mid Term-1, Quiz & End Sem Exam
22	Unit test	Tutorial		Mid Term-1, Quiz & End Sem Exam
23	Quality Control: Quality control test for containers	Lecture	4	Mid Term-1, Quiz & End Sem Exam
24	Quality Control: Quality control test for containers	Lecture	4	Mid Term-1, Quiz & End Sem Exam

25	Quality Control: Quality control test for containers	Tutorial	4	Mid Term-1, Quiz & End Sem Exam
26	Quality Control: Quality control test for rubber closures	Lecture	4	Mid Term-1, Quiz & End Sem Exam
27	Quality Control: Quality control test for secondary packing materials	Lecture	4	Mid Term-1, Quiz & End Sem Exam
28	Good Laboratory Practices: General Provisions, organization and Personnel,	Lecture	1, 4	Mid Term-2, Quiz & End Sem Exam
29	Good Laboratory Practices: Facilities, Equipment, Testing Facilities Operation	Lecture	1, 4	Mid Term-2, Quiz & End Sem Exam
30	Good Laboratory Practices: Test and Control Articles,	Lecture	1, 4	Mid Term-2, Quiz & End Sem Exam
31	Good Laboratory Practices: Protocol for Conduct of a Nonclinical Laboratory Study	Lecture	1, 4	Mid Term-2, Quiz & End Sem Exam
32	Good Laboratory Practices: Records and Reports, Disqualification of Testing Facilities	Lecture	1, 4	Mid Term-2, Quiz & End Sem Exam
33	Complaints: Complaints and evaluation of complaints	Lecture	2	Mid Term-2, Quiz & End Sem Exam
34	Complaints:	Lecture	2	Mid

	Handling of return good			Term-2, Quiz & End Sem Exam
35	Complaints: Recalling and waste disposal	Lecture	2	Mid Term-2, Quiz & End Sem Exam
36	Document maintenance in pharmaceutical industry: Batch Formula Record, Master Formula Record	Lecture	2	Mid Term-2 Quiz & End Sem Exam
37	Document maintenance in pharmaceutical industry: SOP	Lecture	2	Mid Term-2, Quiz & End Sem Exam
38	Document maintenance in pharmaceutical industry: Quality audit	Lecture	2	Mid Term-2, Quiz & End Sem Exam
39	Document maintenance in pharmaceutical industry: Quality Review and Quality documentation	Lecture	2	Mid Term-2, Quiz & End Sem Exam
40	Document maintenance in pharmaceutical industry: Reports and documents, distribution records	Lecture	2	Mid Term-2, Quiz & End Sem Exam
41	Document maintenance in pharmaceutical industry: introduction, definition and general principles of calibration	Lecture	2	Mid Term-2, Quiz & End Sem Exam

42	Document maintenance in pharmaceutical industry: qualification and validation	Lecture	2	Mid Term-2, Quiz & End Sem Exam
43	Document maintenance in pharmaceutical industry: importance and scope of validation, types of validation	Lecture	2	Mid Term-2, Quiz & End Sem Exam
44	Document maintenance in pharmaceutical industry: validation master plan	Lecture	2	Mid Term-2, Quiz & End Sem Exam
45	Document maintenance in pharmaceutical industry: Calibration of pH meter	Lecture	1,4	Mid Term-2, Quiz & End Sem Exam
46	Document maintenance in pharmaceutical industry: Qualification of UV-Visible spectrophotometer	Lecture	1,4	Mid Term-2, Quiz & End Sem Exam
47	Document maintenance in pharmaceutical industry: General principles of Analytical method Validation	Lecture	1,4	Mid Term-2, Quiz & End Sem Exam
48	Quiz	Tutorial		Quiz & End Sem Exam
49	Warehousing: Good warehousing practice, materials management	Lecture	1, 2	Mid Term-2, Quiz & End Sem Exam

50	Stability problems and methods to overcome	Lecture	1, 2, 4	Mid Term-2, Quiz & End Sem Exam
51	Unit Test	Tutorial		Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP606T.1	**BP606T.1.** understand the cGMP aspects in a pharmaceutical industry.	3	3	2	2	1	1	3	3	1	1	3				
BP606T.2.	**BP606T.2.** appreciate the importance of documentation.	3	2	2	1	-	1	2	3	-	-	3				
BP606T.3.	**BP606T.3.** understand the scope of quality certifications applicable to pharmaceutical industries.	3	3	3	3	-	1	1	1	1	-	3				

BP606T.4.	**BP606T.4.** understand the responsibilities of QA & QC departments.	3	3	3	3	2	2	2	3	2	2	3				

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutics I MID-SEMESTER (SEM – 6th) 2022-23						
Class: B.Pharm, 6th Semester						
Subject Name: BP606T Pharmaceutical Quality Assurance Theory		Time: 1 Hrs			Max. Marks: 30	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,2,6,8	Q. 3,4, 6,8,9	Q.9,6	Q.10		

The student will be able to

CO1. Understand the cGMP aspects in a pharmaceutical industry.

CO2. Appreciate the importance of documentation.

CO3. Understand the scope of quality certifications applicable to pharmaceutical industries.

CO4. understand the responsibilities of QA & QC departments.

CO Map	Question No.	Question	Marks
CO4	Q.1	Why quality control and quality assurance are important?	2
CO3	Q.2	Write ICH guidelines for stability?	2
CO1, 4	Q.3	What is good laboratory practice.	2
CO1	Q.4	Write the philosophies of total quality management?	2
CO1	Q.5	Explain the objectives and scope of GMP?	2

CO3, 2	Q.6	Explain Q series guidelines of ICH. Give brief details on QSEM.	10
CO1	Q.7	Discuss the regulatory requirements for design, construction and plant layout of pharmaceutical manufacturing facility.	10
CO1,2	Q.8	Discuss importance of QbD.	5
CO1	Q.9	Discuss briefly on utilities and maintenance of sterile areas.	5
CO4	Q.10	What is validation? Discuss the three point calibration of pH meter.	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 2:

74.1 % Percentage of students secured more than 60% marks, so this course Quality Assurance –Theory (BP606T) attained Level 2.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)
Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I SEM																
II SEM																
III SEM																

IV SEM	-															
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V SEM	-															
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VI SEM	**BP607 P**	3	-	3	3	-	-	-	-	-	-	-	-	-	-	-
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VII SEM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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Dr. Mohanty

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICAL CHEMISTRY
Course Handout
Course : **MEDICINAL CHEMISTRY- III** PRACTICAL
Course Code : BP607P, Crédits : 02, Session : 2021-22 (Even Sem.), Class : B.Pharm. III Year
Faculty Name: Dr. V MURUGESAN

A. Introduction: The course is designed to impart skill development in the arts and science of preparing the different conventional dosage forms.

B. Course Outcomes: At the end of the course, students will be able to:

BP109P.1. To recall the principles used in Preparation of drugs and intermediates and assays

BP109P.2. Perform synthetics of drugs and intermediates by conventional method

BP109P.3. Perform synthetics of drugs and intermediates by microwave irradiation method

BP109P.4. Drawing structures and reactions using chem draw.

BP109P.5. Determination of physicochemical properties drug like moleclues

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	Description	Code	Weightage %
Continuous Internal Evaluation	Mid Term 1	CT	10%
	Mid Term 2		
	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

E. Syllabus

I Preparation of drugs and intermediates
1 Sulphanilamide
2 7-Hydroxy, 4-methyl coumarin
3 Chlorobutanol
4 Triphenyl imidazole
5 Tolbutamide
6 Hexamine
II Assay of drugs
1 Isonicotinic acid hydrazide
2 Chloroquine
3 Metronidazole
4 Dapsone
5 Chlorpheniramine maleate
6 Benzyl penicillin
III Preparation of medicinally important compounds or intermediates by Microwave irradiation technique
IV Drawing structures and reactions using chem draw®
V Determination of physicochemical properties such as logP, clogP, MR, Molecular weight, Hydrogen bond donors and acceptors for class of drugs course content using drug design software Drug likeliness screening (Lipinskies RO5)

F. Examination Scheme:

Components	A	CT	LR	V	EE
Weightage (%)	2	10	1	2	35

CT: Class Test, LR: Lab Record, V: Viva, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. Wilson and Giswold's Organic medicinal and Pharmaceutical Chemistry.
2. Foye's Principles of Medicinal Chemistry.
3. Burger's Medicinal Chemistry, Vol I to IV.
4. Introduction to principles of drug design- Smith and Williams.
5. Remington's Pharmaceutical Sciences.
6. Martindale's extra pharmacopoeia.
7. Organic Chemistry by I.L. Finar, Vol. II.
8. The Organic Chemistry of Drug Synthesis by Lednicer, Vol. 1-5.
9. Indian Pharmacopoeia.
10. Text book of practical organic chemistry- A.I.Vogel.

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	To prepare and submit Sulphanilamide	Practical	CO2	Mid Term-1, Quiz & End Sem Exam
2	To prepare and submit 7-Hydroxy, 4-methyl coumarin	Practical	CO2	Mid Term-1, Quiz & End Sem Exam
3	To prepare and submit Chlorobutanol	Practical	CO2	Mid Term-1, Quiz & End Sem Exam
4	To prepare and submit *Triphenyl imidazole*	Practical	CO2	Mid Term-1, Quiz & End Sem Exam
5	To prepare and submit Triphenyl imidazole	Practical	CO2	Mid Term-1, Quiz & End Sem Exam
6	To prepare and submit Hexamine	Practical	CO2	Mid Term-1, Quiz & End Sem Exam
7	Assay of Isonicotinic acid hydrazide	Practical	CO1	Mid Term-1, Quiz & End Sem Exam
8	Assay of Metronidazole	Practical	CO1	Mid Term-2, Quiz & End Sem Exam
9	Assay of Dapsone	Practical	CO1	Mid Term-2, Quiz & End Sem Exam
10	Assay of Chlorpheniramine maleate	Practical	CO1	Mid Term-2, Quiz & End Sem Exam
11	Assay of Benzyl penicillin	Practical	CO1	Mid Term-2, Quiz & End Sem Exam
12	Assay of Chloroquine	Practical	CO1	Mid Term-2, Quiz & End Sem Exam

13	Preparation of medicinally important compounds or intermediates by Microwave irradiation technique	Practical	CO3	Mid Term-2, Quiz & End Sem Exam
14	Drawing structures and reactions using chem draw®	Practical	CO4	Mid Term-2, Quiz & End Sem Exam
15	Determination of physicochemical properties such as logP, clogP, MR, Molecular weight, Hydrogen bond donors and acceptors for class of drugs course content using drug design software Drug likeliness screening (Lipinskies RO5)	Practical	CO5	Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	
BP109P.1	To recall the principles used in Preparation of drugs and intermediates and assays	3		3	3								
BP109P.2.	Perform synthetics of drugs and intermediates by conventional method	3		3	3								
BP109P.3.	Perform synthetics of drugs and intermediates by microwave irradiation method	3		3	3								
BP109P.4.	Drawing structures and reactions using chem draw	3		3	3								

BP109P.5.	Determination of physicochemical properties drug like molecules	3		3	3							

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutical Chemistry I MID-SEMESTER (SEM –VI) 2021-22						
Class: B.Pharm, VI Semester						
Subject Name: BP607P MEDICINAL CHEMISTRY-III Practical		Time: 4 Hrs			Max. Marks: 40	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,4	Q.2,3	Q.4	Q.2,5,6		

Student will be able to

CO.1. To recall the principles used in Preparation of drugs and intermediates and assays

CO.2. Perform synthetics of drugs and intermediates by conventional method

CO.3. Perform synthetics of drugs and intermediates by microwave irradiation method

CO.4. Drawing structures and reactions using chem draw.

CO.5. Determination of physicochemical properties drug like moleclues

CO Map	Question No.	Question	Marks
CO1,3,4	Q.1a	Synopsis- Write the chemical structure and therapeutic uses of fluconazole and naftifine hydrochloride.	2
CO1,3,4	Q.1b	Synopsis- Write the formula used to calculate the % purity of the tablet dosage form of drug substance.	2
CO1,3,4	Q.1c	Synopsis- Write the mechanism and clinical uses of Ciprofloxacin and Ofloxacin?	2
CO1,3,4	Q.1d	Synopsis- Write the common ADR occur in Chloramphenicol drugs?.	2
CO1,3,4	Q.1e	Synopsis- Write the importance of Microwave irradiation synthetic technique?	2
CO1,2	Q.2	Experiment To synthesize and submit chlorobutanol.	25

CO1,2,3,4,5	Q.3	Viva	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

98.1 % Percentage of students secured more than 60% marks, so this course Medicinal Chemistry Iii – Practical (BP607P) attained Level 3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)
Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
AMITY INSTITUTE OF PHARMACY

PROGRAMME OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1].**Pharmacy Knowledge:** Posses knowledge and compression of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess

societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "-"

PROGRAMME ARTICULATION MATRIX												
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
VI SEM	BP 608 P	3	3	3	3	1	3	2	1	3	1	2

AMITY UNIVERSITY
MADHYA PRADESH
Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACY
Course Handout
Course : Pharmacology-III (Practical)
Course Code : BP608P, Crédits : 02, Session : 2021-22 (Even Sem.), Class : B. Pharm. 3rd Year
Faculty Name : Mrs.Monika Kaushik

A. Introduction: This subject is designed to impart fundamental and practical knowledge of pharmaceutical additives and various pharmaceutical dosage forms on the performance of the drug product.

B. Course Outcomes: At the end of the course, students will be able to:

BP608P.1. Understand the various instruments and equipments used in the Pharmacology experiments and in vitro techniques of pharmacology.

BP608P.2. Biostatistics methods in experimental pharmacology (Chi square test, Wilcoxon Signed Rank test

BP608P.3. Estimation of serum biochemical parameters by using semi- auto analyser.

BP608P.4. Determination of acute oral toxicity (LD50, skin irritation, eye irritation) of a drug from a given data

BP608P.5. Calculation of pharmacokinetic parameters from a given drugs

C. Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers,

employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	20%
	Mid Term 2		
	A minimum of 80% attendance is required to be maintained by a student to be qualified for taking up the Odd Semester examination	A	4 %
	Practical Records/Regular viva/ Assignment	PR/RV/As	6%
End Semester Examination	End Semester Examination	EE	70%
Total			**100%**

PR: Practical Records, RV: Regular viva, As: Assignment

E. Syllabus

Module I: Introduction:

1. Dose calculation in pharmacological experiments

Module II: Effect of drugs:

2. Antiallergic activity by mast cell stabilization assay

3. Study of anti-ulcer activity of a drug using pylorus ligand (SHAY) rat model and NSAIDS induced ulcer model.

4. Study of effect of drugs on gastrointestinal motility

5. Effect of agonist and antagonists on guinea pig ileum

6. Estimation of serum biochemical parameters by using semi- autoanalyser

7. Effect of saline purgative on frog intestine

Module III: Toxicity Tests:

8. Determination of acute oral toxicity (LD50) of a drug from a given data

9. Determination of acute skin irritation / corrosion of a test substance

10. Determination of acute eye irritation / corrosion of a test substance

Module IV: Assays:

11. Insulin hypoglycemic effect in rabbit

12. Test for pyrogens (rabbit method)

Module V: Determination of pharmacokinetic parameters value:

13. Calculation of pharmacokinetic parameters from a given data

14. Biostatistics methods in experimental pharmacology(student's t test, ANOVA)

15. Biostatistics methods in experimental pharmacology (Chi square test, Wilcoxon

Signed Rank test)

F. Examination Scheme:

Components	CT	A	PR/RV/As	EE
Weightage (%)	10	4	6	70

PR: Practical Records, RV: Regular viva, As: Assignment

G. Suggested Text/Reference Books:

1. Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology, Churchil Livingstone Elsevier
2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill.
3. Goodman and Gilman's, The Pharmacological Basis of Therapeutics

4. Marry Anne K. K., Lloyd Yee Y., Brian K. A., Robbin L.C., Joseph G. B., Wayne A. K., Bradley R.W., Applied Therapeutics, The Clinical use of Drugs, The Point Lippincott Williams & Wilkins.
5. Mycek M.J, Gelnet S.B and Perper M.M. Lippincott's Illustrated Reviews- Pharmacology.
6. K.D.Tripathi. Essentials of Medical Pharmacology, , JAYPEE Brothers Medical Publishers (P) Ltd, New Delhi.
7. Sharma H. L., Sharma K. K., Principles of Pharmacology, Paras medical publisher
8. Modern Pharmacology with clinical Applications, by Charles R.Craig& Robert.
9. Ghosh MN. Fundamentals of Experimental Pharmacology. Hilton & Company, Kolkata.
10. Kulkarni SK. Handbook of experimental pharmacology. Vallabh Prakashan.

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1.	Introduction to in-vitro pharmacology and physiological salt solutions.	Practical	BP608P	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
2.	Antiallergic activity by mast cell stabilization assay	Practical	BP608P	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
3.	Study of anti-ulcer activity of a drug using pylorus ligand (SHAY) rat model and NSAIDS induced ulcer model.	Practical	BP608P	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
4.	Study of effect of drugs on gastrointestinal motility	Practical	BP608P	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
5.	Effect of agonist and antagonists on guinea pig ileum	Practical	BP608P	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
6.	Estimation of serum biochemical parameters by using semi- autoanalyser	Practical	BP608P	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
7.	Effect of saline purgative on frog intestine	Practical	BP608P	Mid Term-1 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
8.	Determination of acute oral toxicity (LD50) of a drug from a given data	Practical	BP608P	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
9.	Determination of acute skin irritation / corrosion of a test substance	Practical	BP608P	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
10.	Determination of acute eye	Practical	BP608P	Mid Term-2 & End Sem

	irritation / corrosion of a test substance			Exam as Synopsis/ Experiments/ Viva voce for both
11.	Insulin hypoglycemic effect in rabbit anococcygeus muscle (by Schilds plot method).	Practical	BP608P	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
12.	Test for pyrogens (rabbit method)	Practical	BP608P	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
13.	Calculation of pharmacokinetic parameters from a given data	Practical	BP608P	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
14.	Biostatistics methods in experimental pharmacology(student's t test, ANOVA).	Practical	BP608P	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both
15.	Biostatistics methods in experimental pharmacology (Chi square test, Wilcoxon Signed Rank test)	Practical	BP608P	Mid Term-2 & End Sem Exam as Synopsis/ Experiments/ Viva voce for both

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
***BP608*P.1**.	Understand the various instruments and equipments used in the Pharmacology experiments and in vitro techniques of pharmacology.	3	1	3	2	1	-	-	-	3	1	3
BP608P.2.	Biostatistics methods in experimental pharmacology (Chi square test, Wilcoxon Signed Rank test	3	2	2	2	-	-	-	-	1	-	2
BP608P.3.	Estimation of serum biochemical parameters by using semi- auto analyser.	3	1	2	2	-	1	-	-	2	-	1
BP608P.4.	Determination of acute oral toxicity (LD50, skin irritation, eye irritation) of a drug from a given data	3	1	2	2	-	1	-	1	-	-	1

BP608P.5.	Calculation of pharmacokinetic parameters from a given drugs	2	2	2	1	1	1	-	-	-	-	1

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

98.1 % Percentage of students secured more than 60% marks, so this course Pharmacology III – Practical (BP608P) attained Level 3.

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacy I MID-SEMESTER (SEM–VI) 2021-22						
Class: B. Pharm VI Semester						
Subject Name: BP 608 P. Pharmacology-III (Practical)		Time: 4 Hrs			Max. Marks: 40	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3	Q.2	Q.3	Q.2	Q.2	

Student will be able to
CO1: Understand the various pharmaceutical Bioassay techniques.
CO2: Recall various considerations required in Experimental Pharmacology

CO Map	Question No.	Question	Marks
CO1 and CO2	Q.1	Synopsis	10
CO1	Q.2	Perform the Bioassay of Histamine by using Three point	25
CO1 and CO2	Q.3	Viva voce	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)
Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOGNOSY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

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[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

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[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
VI SEM BP609P	3	2	1	3	2	2	1	2	3	4	1					
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACOGNOSY
Course Handout
Course : HERBAL DRUG TECHNOLOGY – I PRACTICAL
Course Code : BP609P, Crédits : 02, Session : 2021-22 (Even Sem.), Class : B.Pharm. 6th sem
Faculty Name: Ms. Ankita Kishore

A. Introduction: The course is designed to impart skill development in the arts and science of preparing the different conventional dosage forms.

B. Course Outcomes: At the end of the course, students will be able to:

BP609P .1	To understand the preliminary phytochemical screening of crude drugs, determination of alcohol content of ayurvedic formulations and evaluation of excipient of natural origins
BP609P .2	Preparation and standardization of different herbal formulations, monograph analysis of herbal drugs
BP609P .3	To apply monographic analysis of herbal drugs as per pharmacopoeias
BP609P .4	To evaluate & assess the parameters such as aldehyde, phenol contents and total alkaloid content

C. Programme Outcomes:

[PO.1]. Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

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[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal	Mid Term 1	CT	10%
	Mid Term 2		

Evaluation	Lab record	LR	1%
	Viva	V	2%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	2%
End Semester Examination	End Semester Examination	EE	35%
Total			**50%**

E. Syllabus

1. To perform preliminary phytochemical screening of crude drugs.
2. Determination of the alcohol content of Asava and Arista
3. Evaluation of excipients of natural origin
4. Incorporation of prepared and standardized extract in cosmetic formulations like creams, lotions and shampoos and their evaluation.
5. Incorporation of prepared and standardized extract in formulations like syrups, mixtures and tablets and their evaluation as per Pharmacopoeial requirements.
6. Monograph analysis of herbal drugs from recent Pharmacopoeias
7. Determination of Aldehyde content
8. Determination of Phenol content
9. Determination of total alkaloids

F. Examination Scheme:

Components	**A**	**CT**	**LR**	**V**	**EE**
Weightage (%)	2	10	1	2	35

CT: Class Test, LR: Lab Record, V: Viva, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. Textbook of Pharmacognosy by Trease & Evans.
2. Textbook of Pharmacognosy by Tyler, Brady & Robber.
3. Pharmacognosy by Kokate, Purohit and Gokhale
4. Essential of Pharmacognosy by Dr.S.H.Ansari
5. Pharmacognosy & Phytochemistry by V.D.Rangari
6. Pharmacopoeal standards for Ayurvedic Formulation (Council of Research in Indian Medicine & Homeopathy)

7. Mukherjee, P.W. Quality Control of Herbal Drugs: An Approach to Evaluation of Botanicals. Business Horizons Publishers, New Delhi, India, 2002

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	To perform preliminary phytochemical screening of crude drugs.	Practical	CO1, 2, 4,	Mid Term-1, Quiz & End Sem Exam
2	Determination of the alcohol content of Asava and Arista	Practical	CO1, 2, 4	Mid Term-1, Quiz & End Sem Exam
3	Evaluation of excipients of natural origin	Practical	CO1, 2, 4	Mid Term-1, Quiz & End Sem Exam
4	Incorporation of prepared and standardized extract in cosmetic formulations like creams, lotions and shampoos and their evaluation	Practical	CO 2,	Mid Term-1, Quiz & End Sem Exam
5	Incorporation of prepared and standardized extract in formulations like syrups, mixtures and tablets and their evaluation as per Pharmacopoeial requirements.	Practical	CO 4	Mid Term-2, Quiz & End Sem Exam
6	Monograph analysis of herbal drugs from recent	Practica	CO4	Mid

	Pharmacopoeias	l		Term-2, Quiz & End Sem Exam
7	Determination of Aldehyde content	Practical	CO1, 2	Mid Term-2, Quiz & End Sem Exam
8	Determination of Phenol content	Practical	CO1, 2	Mid Term-2, Quiz & End Sem Exam
9	Determination of total alkaloids	Practical	CO1, 2	Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	
BP 609 P .1	To understand the preliminary phytochemical screening of crude drugs, determination of alcohol content of ayurvedic formulations and evaluatio	3		2	1	2	1	-	2	1	2	1	

	n of excipient of natural origins												
BP 609 P .2	Preparation and standardization of different herbal formulations, monograph analysis of herbal drugs	2	-	-	1	-	1	-	-	-	-	3	
BP609P .3	To apply monographic analysis of herbal drugs as per pharmacopoeias	3	2	2	1	-	2	-	2	-	-	3	
BP 609 P .4	To evaluate & assess the parameters such as aldehyde, phenol contents and total alkaloid content	2	2	2	1	-	2	-	2	-	-	3	

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacognosy I MID-SEMESTER (SEM –VI) 2021-22
Class: B.Pharm, VI Semester

Subject Name: BP609 Herbal Drug Technology Practical		Time: 4 Hrs			Max. Marks: 40	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,4	Q.2,3	Q.4	Q.2,5,6		

Student will be able to

CO.1.

To understand the preliminary phytochemical screening of crude drugs, determination of alcohol content of ayurvedic formulations and evaluation of excipient of natural origins

CO.2.

Preparation and standardization of different herbal formulations, monograph analysis of herbal drugs

CO.3.

To apply monographic analysis of herbal drugs as per pharmacopoeias

CO.4.

To evaluate & assess the parameters such as aldehyde, phenol contents and total alkaloid content

CO Map	Question No.	Question	Marks
CO1,2,4	Q.1a	Synopsis- examples of primary & secondary metabolites	2
CO1,2,4	Q.1b	Synopsis- Define ASAVA & ARISTA herbal formulations	2
CO1,2,4	Q.1c	Synopsis- Phytochemical screening definition	2
CO1,2,4	Q.1d	Synopsis- determination of secondary metabolite content	2
CO1,2,4	Q.1e	Synopsis- Evaluation of herbal cosmetics	2
CO1,2, 4,	Q.2	Experiment To formulate herbal formulations	25
CO1,2,3,4,	Q.3	Viva	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

98.1% Percentage of students secured more than 60% marks, so this course Herbal Drug Technology – Practical (BP609P) attained Level 3.

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR

AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)

Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

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PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

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AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1]. Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

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Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO 2	PSO 3
VII SEM	BP701T	2	3	1	3	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY
Course Handout
Course : INSTRUMENTAL METHODS OF ANALYSIS (Theory)
Course Code : BP701T Crédits : 04, Session :2021-22 (Odd Sem.), Class : B.Pharm. IV Year
Name of the faculty : Dr. S.Vijayaraj

A. **Introduction:** This subject deals with the application of instrumental methods in qualitative and quantitative analysis of drugs.

B. **Course Outcomes:** At the end of the course, students will be able to:

BP701T.1. Investigate the pharmaceutical substances by UV Visible and fluorescence spectroscopy and IR spectroscopy .

BP701T.2. Analyze the essentials of Nepheloturbidometry, flame photometry and atomic absorption spectroscopy.

BP701T.3. Apprehend the analysis of a pharmaceutical substances by chromatographic techniques and electrophoresis.

BP701T.4. Recognize the principle, instrumentation and applications of gas chromatography & high performance liquid chromatography.

BP701T.5. Deal with the fundamentals of ion exchange, affinity chromatography and gel chromatography.

C. **Programme Outcomes:**

[PO.1]. Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	Description	Code	Weightage %
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			100%

E. Syllabus

UNIT –I 10 Hours

UV Visible spectroscopy

Electronic transitions, chromophores, auxochromes, spectral shifts, solvent effect on absorption spectra, Beer and Lambert's law, Derivation and deviations.Instrumentation - Sources of radiation, wavelength selectors, sample cells, detectors- Photo tube, Photomultiplier tube, Photo voltaic cell, Silicon Photodiode. Applications - Spectrophotometric titrations, Single component and multi component analysis

Fluorimetry

Theory, Concepts of singlet, doublet and triplet electronic states, internal and external conversions, factors affecting fluorescence, quenching, instrumentation and applications

UNIT –II 10 Hours

IR spectroscopy

Introduction, fundamental modes of vibrations in poly atomic molecules, sample handling, factors affecting vibrations Instrumentation - Sources of radiation, wavelength selectors, detectors - Golay cell,Bolometer, Thermocouple, Thermister, Pyroelectric detector and applications

Flame Photometry-Principle, interferences, instrumentation and applications

Atomic absorption spectroscopy- Principle, interferences, instrumentation and applications

Nepheloturbidometry- Principle, instrumentation and applications

UNIT –III 10 Hours

Introduction to chromatography

Adsorption and partition column chromatography-Methodology, advantages, disadvantages and applications.

Thin layer chromatography- Introduction, Principle, Methodology, Rf values, advantages, disadvantages and applications.

Paper chromatography-Introduction, methodology, development techniques, advantages, disadvantages and applications

Electrophoresis– Introduction, factors affecting electrophoretic mobility, Techniques of paper, gel, capillary electrophoresis, applications

UNIT –IV 08 Hours

Gas chromatography - Introduction, theory, instrumentation, derivatization, temperature programming, advantages, disadvantages and applications

High performance liquid chromatography (HPLC)-Introduction, theory, instrumentation, advantages and applications.

UNIT –V 07 Hours

Ion exchange chromatography- Introduction, classification, ion exchange resins, properties, mechanism of ion exchange process, factors affecting ion exchange, methodology and applications.

Gel chromatography- Introduction, theory, instrumentation and applications

Affinity chromatography- Introduction, theory, instrumentation and applications

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. Instrumental Methods of Chemical Analysis by B.K Sharma
2. Organic spectroscopy by Y.R Sharma
3. Text book of Pharmaceutical Analysis by Kenneth A. Connors
4. Organic spectroscopy by William Kemp

H. LECTURE PLAN

Lecture	Topics	Mode of	Corres	Mode of
1	UV Visible spectroscopy Electronic transitions	**Lecture**	BP701T .1	Mid Term-1, Quiz & End Sem Exam
2	Chromophores, Auxochromes,	**Lecture**	BP701T.1	Mid Term-1, Quiz & End
3	Spectral shifts, Solvent effect	**Lecture**	BP701T.1	Mid Term-1,
4	Absorption spectra, Beer and Lambert's law, Derivation and	**Tutorial**	BP701T.1	Mid Term-1, Quiz & End Sem Exam
5	Instrumentation - Sources of radiation, wavelength selectors,	**Lecture**	BP701T.1	Mid Term-1, Quiz & End
6	detectors- Photo tube, Photomultiplier tube, Photo voltaic cell, Silicon Photodiode	**Lecture**	BP701T.1	Mid Term-1, Quiz & End Sem Exam
7	Applications - Spectrophotometric titrations, Single component and multi component analysis	**Lecture**	BP701T.1	Mid Term-1, Quiz & End Sem Exam
8	Fluorimetry Theory, Concepts of singlet, doublet and triplet electronic states	**Tutorial**	BP701T.1	Mid Term-1, Quiz & End Sem Exam
9	internal and external conversions, factors affecting fluorescence	**Lecture**	BP701T.1	Mid Term-1, Quiz & End Sem Exam
10	Quenching, instrumentation and applications	**Lecture**	BP701T.1	Mid Term-1, Quiz & End Sem Exam
11	IR spectroscopy - Introduction,	**Lecture**	BP701T.1	Mid Term-1, Quiz & End Sem Exam
12	fundamental modes of vibrations in poly atomic molecules,	**Tutorial**	BP701T.1	Mid Term-1, Quiz & End Sem Exam
13	Sample handling, factors affecting vibrations	**Lecture**	BP701T.1	Mid Term-1, Quiz & End Sem Exam
14	Instrumentation - Sources of radiation, wavelength selectors,	**Lecture**	BP701T.1	Mid Term-1, Quiz & End Sem Exam
15	Detectors - Golay cell, Bolometer, Thermocouple, Thermister, Pyroelectric detector and	**Lecture**	BP701T.1	Mid Term-1, Quiz & End Sem Exam
16	Flame Photometry-**Principle, interferences, instrumentation and applications**	**Tutorial**	BP701T.2	Mid Term-1, Quiz & End Sem Exam
17	**Atomic absorption spectroscopy**-Principle, interferences,	**Lecture**	BP701T.2	Mid Term-1, Quiz & End

18	**Instrumentation and**	**Lecture**	BP701T.2	Mid Term-1,
19	Nepheloturbidometry-	**Lecture**	BP701T.2	Mid Term-1,
20	**Instrumentation**	**Tutorial**	BP701T.2	Mid Term-1,
21	Introduction to chromatography	**Lecture**	BP701T.3	Mid Term-2,
22	Adsorption and partition column chromatography-	**Lecture**	BP701T.3	Mid Term-2, Quiz & End
23	Methodology, advantages,	**Lecture**	BP701T.3	Mid Term-2,
24	Applications.	**Tutorial**	BP701T.3	Mid Term-2,
25	**Thin layer chromatography-** Introduction, Principle	**Lecture**	BP701T.3	Mid Term-2, Quiz & End
26	Methodology, Rf values, advantages, disadvantages and applications.	**Lecture**	BP701T.3	Mid Term-2, Quiz & End
27	**Paper chromatography-** Introduction, methodology,	**Lecture**	BP701T.3	Mid Term-2, Quiz & End
28	Advantages, disadvantages and	**Tutorial**	BP701T.3	Mid Term-2,
29	**Electrophoresis**– Introduction, factors affecting electrophoretic	**Lecture**	BP701T.3	Mid Term-2, Quiz & End
30	Techniques of paper, gel, capillary electrophoresis, applications	**Lecture**	BP701T.3	Mid Term-2, Quiz & End
31	Gas chromatography	**Lecture**	BP701T.4	Mid Term-2,
32	Introduction, theory, ,	**Tutorial**	BP701T.4	Mid Term-2,
33	**instrumentation,**	**Lecture**	BP701T.4	Mid Term-2,
34	**derivatization**	**Lecture**	BP701T.4	Mid Term-2,
35	**Application**	**Lecture**	BP701T.4	Mid Term-2,
36	**Diagonalization**	**Tutorial**	BP701T.4	Mid Term-2,
37	**High performance liquid chromatography (HPLC)-** Introduction,	**Lecture**	BP701T.4	Quiz & End Sem Exam
38	Theory, instrumentation,	**Lecture**	BP701T.4	Quiz & End
39	**advantages**	**Lecture**	BP701T.4	Quiz & End
40	**applications.**	**Tutorial**	BP701T.4	Quiz & End
41	Ion exchange chromatography-	**Lecture**	BP701T.5	Quiz & End
42	classification, ion exchange resins, properties,	**Lecture**	BP701T.5	Quiz & End Sem Exam
43	**mechanism of ion exchange process**	**Lecture**	BP701T.5	Quiz & End Sem Exam
44	affecting ion exchange, **methodology and applications**	**Tutorial**	BP701T.5	Quiz & End Sem Exam
45	Gel chromatography- **Introduction, theory,**	**Lecture**	BP701T.5	Quiz & End Sem Exam
46	**instrumentation and applications**	**Lecture**	BP701T.5	Quiz & End Sem Exam
47	Affinity chromatography- **Introduction, theory**	**Lecture**	BP701T.5	Quiz & End Sem Exam
48	**instrumentation and applications**	**Tutorial**	BP701T.5	Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

Sample Question Paper

CO-PO MAPPING										
B. PHARM. YEAR / SEMESTER: IV / VII										
SUBJECT	PERIODS				EVALUATION					
	L	T	P	C	S	ESE				
Instrumental Methods of Analysis (Theory)	3	1	0	4	25	75	PO-1	PO-2	PO-3	PO-4
e pharmaceutical substances by UV Visible and fluorescence spectroscopy and IR spectroscopy .							3	3	3	3
ssentials of nepheloturbidometry, flame photometry and atomic absorption spectroscopy.							3	3	3	3
e analysis of a pharmaceutical substances by chromatographic techniques and electrophoresis.							3	3	3	3
principle, instrumentation and applications of gas chromatography & high performance liquid hy.							3	3	3	3
fundamentals of ion exchange, affinity chromatography and gel chromatography.							3	3	3	3

Amity Institute of Pharmacy
Department of Pharmaceutical Chemistry
I MID-SEMESTER (SEM –VIIth) 2021-22

Class: B.Pharm, VII Semester

Subject Name: BP701T Instrumental Methods of Analysis Theory	Time: 1 Hrs	Max. Marks: 30

Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,2,3,4	Q.5,6,8	Q.9	Q.10	-	

The student will be able to

CO.1. Investigate the pharmaceutical substances by UV Visible and fluorescence spectroscopy and IR spectroscopy .

CO.2. Analyze the essentials of nepheloturbidometry, flame photometry and atomic absorption spectroscopy.

CO.3. Apprehend the analysis of a pharmaceutical substances by chromatographic techniques and electrophoresis.

CO.4. Recognize the principle, instrumentation and applications of gas chromatography & high performance liquid chromatography.

CO.5. Deal with the fundamentals of ion exchange, affinity chromatography and gel chromatography.

CO Map	Question No.	Question	Marks
CO1	Q.1	Explain multi component analysis	2
CO2	Q.2	Write a note on application of florimetry.	2
CO1	Q.3	Name detectors in IR	2
CO1	Q.4	Explain Bathochromic shift.	2
CO3	Q.5	What is intersystem crossing?.	2
CO5	Q.6	a. Derive Beer Lambert's law and explain the limitations of Beer Lambert's law. b. Explain fundamental modes of vibrations in IR	10
CO2	Q.7	a. Explain the theory and concept of flame photometry. b. Write a note on factors affecting molecular vibrations.	10
CO1	Q.8	Explain the factors affecting fluorescence	5

CO1	Q.9	Write a note on paper chromatography.	5
CO4	Q.10	Explain the sample handling techniques in HPLC.	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 3:

97.8 % Percentage of students secured more than 60% marks, so this course Instrumental Methods Of Analysis – Theory (BP701T) attained Level 3.

AMITY UNIVERSITY
MADHYA PRADESH
Established vide Government of Madhya Pradesh Act No. 27 of 2010

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)
Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICS

PROGRAMME OUTCOMES

Bachelor of Pharmacy (B. Pharm.),Academic Year – 2021-22

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge asscoited with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions

[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

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[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

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[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess

societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

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Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "-"

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
VII SEM	BP 702 T	3	3	3	3	2	2	3	1	1	3	1	-	-	-

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICS
Course Handout
Course : INDUSTRIAL PHARMACY-II(Theory)
Course Code : BP702T, Credits : 04, Session :2021-22 (Odd Sem.), Class : B. Pharm. 4th Year
Faculty Name : Dr. Ankit Yadav

A. Introduction: This course is designed to impart fundamental knowledge on pharmaceutical product development and translation from laboratory to market.Upon completion of the course, the student shall be able to:

1. Know the process of pilot plant and scale up of pharmaceutical dosage forms
2. Understand the process of technology transfer from lab scale to commercial batch
3. Know different Laws and Acts that regulate pharmaceutical industry
4. Understand the approval process and regulatory requirements for drug products

B. Course Outcomes: At the end of the course, students will be able to:

BP702T.1. Explain the process of pilot plant scale up of pharmaceutical dosage forms and the process of technology transfer from lab scale to commercial.

BP702T.2. Demonstrate the practice and the process of technology transfer from lab scale to commercial.

BP702T.3. Recall the different laws and acts that regulate pharmaceutical industry and approval process and regulatory requirements of drug products.

BP702T.4. Outline the quality management systems and certifications for pharmaceutical product.

BP702T.5 Summarize the role and responsibility of Indian regulatory agencies in the approval of drugs.

C. Programme Outcomes:

[PO.1].**Pharmacy Knowledge:** Posses knowledge and compression of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

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[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

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D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	A minimum of 80% attendance is required to be maintained by a student to be qualified for taking up the Odd Semester examination	A	4 %
	Quiz/ Assignment/Open book test/Field work/Group discussion/ Seminar	Q/A/OBT/FW/GD/S	3%
	Student – Teacher interaction	STA	3%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

Q: Quiz, A: Assignment, OBT: Open book test, FW: Field work, GD: Group discussion, S: Seminar

E. Syllabus

Module I: **Pilot plant scale up techniques:**

General considerations - including significance ofpersonnel requirements, space requirements, raw materials, Pilot plant scale up considerations for solids, liquid orals, semi solids and relevant documentation, SUPAC guidelines, Introduction to platform technology

Module II: Technology development and transfer:

WHO guidelines for Technology Transfer(TT):Terminology, Technology transfer protocol, Quality risk management, Transfer from R& D to production (Process, packaging and cleaning), Granularity of TT Process (API,excipients, finished products, packaging materials) Documentation, Premises andequipments, qualification and validation, quality control, analytical method transfer,Approved regulatory bodies and agencies, Commercialization - practical aspects andproblems (case studies), TT agencies in India - APCTD, NRDC, TIFAC, BCIL, TBSE /SIDBI; TT related documentation - confidentiality agreement, licensing, MoUs, legal issues.

Module III: Regulatory affairs:

Introduction, Historical overview of Regulatory Affairs, Regulatoryauthorities, Role of Regulatory affairs department, Responsibility of Regulatory AffairsProfessionals.

Regulatory requirements for drug approval: Drug Development Teams, Non-Clinical Drug Development, Pharmacology, Drug Metabolism and Toxicology, General considerations of Investigational New Drug (IND) Application, Investigator's Brochure (IB) and New Drug Application (NDA), Clinical research / BE studies, Clinical Research Protocols, Biostatistics in Pharmaceutical Product Development, Data Presentation for FDA Submissions, Management of Clinical Studies.

Module IV: Quality management systems:

Quality management & Certifications: Concept ofQuality, Total Quality Management, Quality by Design (QbD), Six Sigma concept, Outof Specifications (OOS), Change control, Introduction to ISO 9000 series of qualitysystems standards, ISO 14000, NABL, GLP.

Module V: Indian Regulatory Requirements:

Central Drug Standard Control Organization(CDSCO) and State Licensing Authority: Organization, Responsibilities, Certificate ofPharmaceutical Product (COPP), Regulatory requirements and approval procedures forNew Drugs.

F. Examination Scheme:

Components	CT	A	Q/A/OBT/FW/GD/S	STI	EE
Weightage (%)	15	4	3	3	75

Q: Quiz, A: Assignment, OBT: Open book test, FW: Field work, GD: Group discussion, S: Seminar, STI: Student – Teacher interaction

G. Suggested Text/Reference Books:

1. Regulatory Affairs from Wikipedia, the free encyclopedia modified on 7th April available at http://en.wikipedia.org/wiki/Regulatory_ Affairs.
2. International Regulatory Affairs Updates, 2005. available at http://www.iraup.com/about.php
3. Douglas J Pisano and David S. Mantus. Text book of FDA Regulatory Affairs A Guide for Prescription Drugs, Medical Devices, and Biologics' Second Edition.
4. Regulatory Affairs brought by learning plus, inc. available at http://www.cgmp.com/ra.htm.

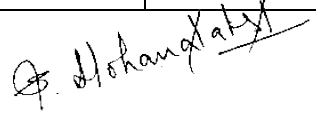
H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1.	General considerations	Lecture	BP702T.1	Mid Term-1, Quiz/ Assignment/Open book test/ & End Sem Exam
2.	Significance of personnel requirements	Lecture	BP702T.1	Mid Term-1, Quiz/ Assignment/Open book test/ & End Sem Exam
3.	Space requirements	Lecture	BP702T.1	Mid Term-1, Quiz/ Assignment/Open book test/ & End Sem Exam
4.	Tutorial 01	Tutorial 01		
5.	Raw materials	Lecture	BP702T.1	Mid Term-1, Quiz/ Assignment/Open book test/ & End Sem Exam
6.	Pilot plant scale up considerations for solids and relevant documentation	Lecture	BP702T.1	Mid Term-1, Quiz/ Assignment/Open book test/ & End Sem Exam
7.	Pilot plant scale up considerations for liquids	Lecture	BP702T.1	Mid Term-1, Quiz/ Assignment/Open

	oral and relevant documentation			book test/ & End Sem Exam
8.	Tutorial 03	Tutorial 03		
9.	Pilot plant scale up considerations for semi solids and relevant documentation	Lecture	BP702T.1	Mid Term-1, Quiz/ Assignment/Open book test/ & End Sem Exam
10.	SUPAC guidelines	Lecture	BP702T.1	Mid Term-1, Quiz/ Assignment/Open book test/ & End Sem Exam
11.	SUPAC guidelines	Lecture	BP702T.1	Mid Term-1, Quiz/ Assignment/Open book test/ & End Sem Exam
12.	Tutorial 04	Tutorial 04		
13.	Platform technology	Lecture	BP702T.1	Mid Term-1, Quiz/ Assignment/Open book test/ & End Sem Exam
14.	Technology Transfer(TT)	Lecture	BP702T.2	Mid Term-1, Quiz/ Assignment/Open book test/ & End Sem Exam
15.	Quality risk management, Transfer from R& D to production (Process, packaging and cleaning)	Lecture	BP702T.2	Mid Term-1, Quiz/ Assignment/Open book test/ & End Sem Exam
16.	Tutorial 04	Tutorial 04		
17.	Granularity of TT Process (API,excipients, finished products, packagingmaterials)	Lecture	BP702T.2	Mid Term-1, Quiz/ Assignment/Open book test/ & End Sem Exam
18.	Granularity of TT Process (API,excipients, finished products, packagingmaterials)	Lecture	BP702T.2	Mid Term-1, Quiz/ Assignment/Open book test/ & End Sem Exam
19.	Documentation, Premises andequipments,qualificatio n and validation, quality control, analytical method transfer	Lecture	BP702T.2	Mid Term-1, Quiz/ Assignment/Open book test/ & End Sem Exam
20.	Tutorial 05	Tutorial 05		
21.	Approved regulatory bodies and agencies, Commercialization - practical	Lecture	BP702T.2	Mid Term-1, Quiz/ Assignment/Open book test/ & End Sem

	aspects andproblems (case studies)			Exam
22.	TT agencies in India - APCTD, NRDC, TIFAC	Lecture	BP702T.2	Mid Term-1, Quiz/ Assignment/Open book test/ & End Sem Exam
23.	TT agencies in India - BCIL, TBSE /SIDBI	Lecture	BP702T.2	Mid Term-1, Quiz/ Assignment/Open book test/ & End Sem Exam
24.	Tutorial 06	Tutorial 06		
25.	TT related documentation - confidentiality agreement, licensing	Lecture	BP702T.2	Mid Term-1, Quiz/ Assignment/Open book test/ & End Sem Exam
26.	MoUs, legal issues	Lecture	BP702T.2	Mid Term-1, Quiz/ Assignment/Open book test/ & End Sem Exam
27.	Regulatory affairs: Introduction, Historical overview of Regulatory Affairs, Regulatory authorities	Lecture	BP702T.3	Mid Term-1, Quiz/ Assignment/Open book test/ & End Sem Exam
28.	Tutorial 07	Tutorial 07		
29.	Role of Regulatory affairs department, Responsibility of Regulatory Affairs Professionals	Lecture	BP702T.3	Mid Term-1, Quiz/ Assignment/Open book test/ & End Sem Exam
30.	Role of Regulatory affairs department, Responsibility of Regulatory Affairs Professionals	Lecture	BP702T.3	Mid Term-1, Quiz & End Sem Exam
31.	Regulatory requirements for drug approval: Drug Development Teams, Non-Clinical Drug Development, Pharmacology, Drug Metabolism and Toxicology	Lecture	BP702T.3	Mid Term-1, Quiz/ Assignment/Open book test/ & End Sem Exam
32.	Tutorial 08	Tutorial 08		
33.	Regulatory requirements for drug approval: Drug Metabolism and Toxicology	Lecture	BP702T.3	Mid Term-2, Quiz/ Assignment/Open book test/ & End Sem Exam
34.	General considerations of Investigational New Drug	Lecture	BP702T.3	Mid Term-2, Quiz/ Assignment/Open

	(IND) Application			book test/ & End Sem Exam
35.	Investigator's Brochure (IB) and New Drug Application(NDA)	Lecture	BP702T.3	Mid Term-2, Quiz/ Assignment/Open book test/ & End Sem Exam
36.	Tutorial 09	Tutorial 09		
37.	Clinical research / BE studies, Clinical Research Protocols,	Lecture	BP702T.3	Mid Term-2, Quiz/ Assignment/Open book test/ & End Sem Exam
38.	Biostatistics in Pharmaceutical Product Development,	Lecture	BP702T.3	Mid Term-2, Quiz/ Assignment/Open book test/ & End Sem Exam
39.	Data Presentation forFDA Submissions	Lecture	BP702T.3	Mid Term-2, Quiz/ Assignment/Open book test/ & End Sem Exam
40.	Tutorial 10	Tutorial 10		
41.	Management of Clinical Studies	Lecture	BP702T.3	Mid Term-2, Quiz/ Assignment/Open book test/ & End Sem Exam
42.	Quality management systems: Quality management & Certifications: Concept of Quality	Lecture	BP702T.4	Mid Term-2, Quiz/ Assignment/Open book test/ & End Sem Exam
43.	Total Quality Management,	Lecture	BP702T.4	Mid Term-2, Quiz/ Assignment/Open book test/ & End Sem Exam
44.	Tutorial 11	Tutorial 11		
45.	Quality by Design (QbD)	Lecture	BP702T.4	Mid Term-2, Quiz/ Assignment/Open book test/ & End Sem Exam
46.	Six Sigma concept	Lecture	BP702T.4	Mid Term-2, Quiz/ Assignment/Open book test/ & End Sem Exam
47.	Out of Specifications (OOS)	Lecture	BP702T.4	Mid Term-2, Quiz/ Assignment/Open book test/ & End Sem Exam
48.	Tutorial 12	Tutorial 12		



49.	Change control, Introduction to ISO 9000 series of quality systems standards	Lecture	BP702T.4	Mid Term-2, Quiz/ Assignment/Open book test/ & End Sem Exam
50.	Change control, Introduction to ISO 9000 series of quality systems standards	Lecture	BP702T.4	Mid Term-2, Quiz/ Assignment/Open book test/ & End Sem Exam
51.	ISO 14000	Lecture	BP702T.4	Mid Term-2, Quiz/ Assignment/Open book test/ & End Sem Exam
52.	Tutorial 13	Tutorial 13		
53.	NABL, GLP	Lecture	BP702T.4	Mid Term-2, Quiz/ Assignment/Open book test/ & End Sem Exam
54.	Indian Regulatory Requirements: Central Drug Standard Control Organization(CDSCO)	Lecture	BP702T.5	Mid Term-2, Quiz/ Assignment/Open book test/ & End Sem Exam
55.	Indian Regulatory Requirements: StateLicensing Authority	Lecture	BP702T.5	Mid Term-2, Quiz/ Assignment/Open book test/ & End Sem Exam
56.	Tutorial 14	Tutorial 14		
57.	Certificate of Pharmaceutical Product (COPP)	Lecture	BP702T.5	Mid Term-2, Quiz/ Assignment/Open book test/ & End Sem Exam
58.	Certificate of Pharmaceutical Product (COPP)	Lecture	BP702T.5	Mid Term-2, Quiz/ Assignment/Open book test/ & End Sem Exam
59.	Regulatory requirements and approval procedures forNew Drugs	Lecture	BP702T.5	Mid Term-2, Quiz/ Assignment/Open book test/ & End Sem Exam
60.	Tutorial 15	Tutorial 15		Mid Term-2, Quiz/ Assignment/Open book test/ & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP702T.1	Explain the process of pilot plant scale up of pharmaceutical dosage forms and the process of technology transfer from lab scale to commercial	2	2	3	2	-	1	2	1	-	-	1
BP702T.2	Demonstrate the practice and the process of technology transfer from lab scale to commercial	2	2	2	3	-	1	1	1	-	-	1
BP702T.3	Recall the different laws and acts that regulate pharmaceutical industry and approval process and regulatory requirements of drug products	2	1	1	-	-	1	3	2	-	-	-
BP702T.4	Outline the quality management systems and certifications for pharmaceutical product	2	2	2	1	-	1	-	-	-	-	-
BP702T.5	Summarize the role and responsibility of Indian regulatory agencies in the approval of drugs	2	1	-	-	-	2	1	1	-	-	1

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutics I MID-SEMESTER (SEM–VII) 2021-22						
Class: B. Pharm VII Semester						
Subject Name: Industrial Pharmacy II– Theory		Time: 1 Hrs		Max. Marks: 30		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q. 1,2,4	Q. 3,5,6	Q. 10	Q. 7,8,9		
Student will be able to CO1: Explain the process of pilot plant scale up of pharmaceutical dosage forms and the process of technology transfer from lab scale to commercial.						

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CO2: Demonstrate the practice and the process of technology transfer from lab scale to commercial. CO3: Recall the different laws and acts that regulate pharmaceutical industry and approval process and regulatory requirements of drug products			
CO Map	Question No.	Question	Marks
CO1	Q.1	What is Pilot plant scale up?	2
CO2	Q.2	What is Drug Master File?	2
CO3	Q.3	Write the importance of Regulatory affairs in pharmaceutical industry.	2
CO2	Q.4	What is platform technology?	2
CO3	Q.5	Write are the responsibilities of Regulatory Affairs Professionals?	2
CO1	Q.6	Write in details the Pilot plant scale up considerations for solids.	10
CO2	Q.7	Explain in detail the WHO guidelines for Technology Transfer.	
CO1	Q.8	Explain the concept and importance of SUPAC guidelines.	5
CO2	Q.9	Explain various Technology Transfer related documentation.	5
CO2	Q.10	Write a detail note on Quality risk management.	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

.

Attainment Level 3:

97.8 % Percentage of students secured more than 60% marks, so this course Industrial Pharmacy II – Theory (BP702T) attained Level 3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)
Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

AMITY UNIVERSITY
MADHYA PRADESH
Established vide Government of Madhya Pradesh Act No. 27 of 2010

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOLOGY

PROGRAMME OUTCOMES

Bachelor of Pharmacy (B. Pharm) Academic Year – 2021-22

Programme Outcomes:

1. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.
2. **Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.
3. **Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.
4. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.
5. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.
6. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).
7. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.
8. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

9. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

10. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

11. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11				
VII SEM	BP703T	3	2	3	-	-	-	-	-	-	-	-		-	-	-

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AMITY UNIVERSITY

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Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
Course Handout
Course : Pharmacy Practice
Course Code BP703T, Crédits : 04, Session :2021-22(odd Sem.), Class : B.Pharm. 4th Year
Faculty Name : Dr.V.Murugesan, Dr.M.Prathap

Introduction

Scope: The students are required to learn various skills like drug distribution, drug information, and therapeutic drug monitoring for improved patient care. In community pharmacy, students will be learning various skills such as dispensing of drugs, responding to minor ailments by providing suitable safe medication, patient counselling for improved patient care in the community set up.

Objectives

1. Able to know various drug distribution methods in a hospital
2. Acquire knowledge of pharmacy stores management and inventory control
3. Obtain medication history interview and counsel the patients
4. Identify drug related problems
6. Detect adverse drug reactions
7. Interpret selected laboratory results (as monitoring parameters in therapeutics) of specific disease states

Course Outcomes: At the end of the course, students will be able to:

BP703T.1	Discuss the basic components in organization of hospital & hospital Pharmacy.
BP703T.2	Explain in detail about adverse drug reactions and drug interactions.
BP703T.3	Outline various drug distribution systems, Drug Information and concepts of inventory control followed in hospital.
BP703T.4	Generalize about organization and functions of Hospital, Clinical and

	community Pharmacist and Therapeutic Committee.
BP703T.5	Recognize the communication abilities in Patient Counselling and Prescription interpretation.

A. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

PO.3]. **Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.1]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

12. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well-being.
13. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).
14. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.
15. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.
16. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

17. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

18. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

B. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2 quiz, assignment, open book test, field work, group discussion and seminar)		
	Seminar/ Assignment/Quiz/ Open book test	S/As/Q/OBT	3%
Interaction	Student-Teacher interaction	ST	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

C. Syllabus

Unit I

a) Hospital and it's organization Definition, Classification of hospital- Primary, Secondary and Tertiary hospitals, Classification based on clinical and non- clinical basis, Organization Structure of a Hospital, and Medical staffs involved in the hospital and their functions. b) Hospital pharmacy and its organization Definition, functions of

hospital pharmacy, Organization structure, Location, Layout and staff requirements, and Responsibilities and functions of hospital pharmacists. c) Adverse drug reaction Classifications - Excessive pharmacological effects, secondary pharmacological effects, idiosyncrasy, allergic drug reactions, genetically determined toxicity, toxicity following sudden withdrawal of drugs, Drug interaction- beneficial interactions, adverse interactions, and pharmacokinetic drug interactions, Methods for detecting 149 drug interactions, spontaneous case reports and record linkage studies, and Adverse drug reaction reporting and management. d) Community Pharmacy Organization and structure of retail and wholesale drug store, types and design, Legal requirements for establishment and maintenance of a drug store, Dispensing of proprietary products, maintenance of records of retail and wholesale drug store.

Unit II

a) Drug distribution system in a hospital Dispensing of drugs to inpatients, types of drug distribution systems, charging policy and labelling, Dispensing of drugs to ambulatory patients, and Dispensing of controlled drugs. b) Hospital formulary Definition, contents of hospital formulary, Differentiation of hospital formulary and Drug list, preparation and revision, and addition and deletion of drug from hospital formulary. c) Therapeutic drug monitoring Need for Therapeutic Drug Monitoring, Factors to be considered during the Therapeutic Drug Monitoring, and Indian scenario for Therapeutic Drug Monitoring. d) Medication adherence Causes of medication non-adherence, pharmacist role in the medication adherence, and monitoring of patient medication adherence. e) Patient medication history interview Need for the patient medication history interview, medication interview forms. f) Community pharmacy management Financial, materials, staff, and infrastructure requirements.

Unit III

a) Pharmacy and therapeutic committee Organization, functions, Policies of the pharmacy and therapeutic committee in including drugs into formulary, inpatient and outpatient prescription, automatic stop order, and emergency drug list preparation. b) Drug information services 150 Drug and Poison information centre, Sources of drug information, Computerised services, and storage and retrieval of information. c) Patient counseling Definition of patient counseling; steps involved in patient counseling, and Special cases that require the pharmacist d) Education and training program in the hospital Role of pharmacist in the education and training

program, Internal and external training program, Services to the nursing homes/clinics, Code of ethics for community pharmacy, and Role of pharmacist in the interdepartmental communication and community health education. e) Prescribed medication order and communication skills Prescribed medication order- interpretation and legal requirements, and Communication skills-communication with prescribers and patients.

Unit IV

a) Budget preparation and implementation Budget preparation and implementation b) Clinical Pharmacy Introduction to Clinical Pharmacy, Concept of clinical pharmacy, functions and responsibilities of clinical pharmacist, Drug therapy monitoring - medication chart review, clinical review, pharmacist intervention, Ward round participation, Medication history and Pharmaceutical care. Dosing pattern and drug therapy based on Pharmacokinetic & disease pattern. c) Over the counter (OTC) sales Introduction and sale of over the counter, and Rational use of common over the counter medications.

Unit V

a) Drug store management and inventory control Organisation of drug store, types of materials stocked and storage conditions, Purchase and inventory control: principles, purchase procedure, purchase order, procurement and stocking, Economic order quantity, Reorder quantity level, and Methods used for the analysis of the drug expenditure b) Investigational use of drugs 151 Description, principles involved, classification, control, identification, role of hospital pharmacist, advisory committee. c) Interpretation of Clinical Laboratory Tests Blood chemistry, hematology, and urinalysis

D. Examination Scheme:

Components	A	ST	CT	S/As/Q/OBT	EE
Weightage (%)	4	3	15	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; A: Attendance

Suggested Text/Reference Books:

1. Merchant S.H. and Dr. J.S.Quadry. A textbook of hospital pharmacy, 4th ed. Ahmadabad: B.S. Shah Prakakshan; 2001.

2. Parthasarathi G, Karin Nyfort-Hansen, Milap C Nahata. A textbook of Clinical Pharmacy Practice-essential concepts and skills, 1 st ed. Chennai: Orient Longman Private Limited; 2004.

3. William E. Hassan. Hospital pharmacy, 5th ed. Philadelphia: Lea & Febiger; 1986.

4. Tipnis Bajaj. Hospital Pharmacy, 1st ed. Maharashtra: Career Publications; 2008.

5. Scott LT. Basic skills in interpreting laboratory data, 4thed. American Society of Health System Pharmacists Inc; 2009.

6. Parmar N.S. Health Education and Community Pharmacy, 18th ed. India: CBS Publishers & Distributers; 2008.

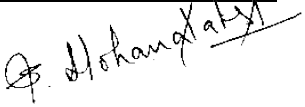
E. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Definition, Classification of hospital- Primary, Secondary and Tertiary hospitals	Lecture	BP703.1	Mid Term-1, Quiz & End Sem Exam
2	Classification based on clinical and non- clinical basis	Lecture	BP703.1	Mid Term-1, Quiz & End Sem Exam
3	Organization Structure of a Hospital	Lecture	BP703.1	Mid Term-1, Quiz & End Sem Exam
4	Medical staffs involved in the hospital	Lecture	BP703.1	Mid Term-1, Quiz & End Sem Exam
5	Non-Medical staffs involved in the	Lecture	BP703.1	Mid Term-1,

	hospital			Quiz & End Sem Exam
6	Medical staffs involved in the hospital and their Functions	Lecture	BP703.1	Mid Term-1, Quiz & End Sem Exam
7	Non-Medical staffs involved in the hospital and their Functions	Lecture	BP703.1	Mid Term-1, Quiz & End Sem Exam
8	Definition, functions of hospital pharmacy, Organization structure	Lecture	BP703.1	Mid Term-1, Quiz & End Sem Exam
9	Location, Layout and staff requirements,	Lecture	BP703.1	Mid Term-1, Quiz & End Sem Exam
10	Responsibilities and functions of hospital pharmacists.	Lecture	BP703.1	Mid Term-1, Quiz & End Sem Exam
11	Classifications - Excessive pharmacological effects, secondary pharmacological effects, idiosyncrasy, allergic drug reactions,	Lecture	BP703.1	Mid Term-1, Quiz & End Sem Exam
12	genetically determined toxicity, toxicity following sudden withdrawal of drugs, Drug interaction- beneficial interactions, adverse interactions, and pharmacokinetic	Lecture	BP703.1	Mid Term-1, Quiz & End Sem Exam

	drug interactions			
13	Methods for detecting drug interactions, spontaneous case reports and record linkage studies, and Adverse drug reaction reporting and management.	Lecture	BP703.1	Mid Term-1, Quiz & End Sem Exam
14	Organization and structure of retail and wholesale drug store, types and design, Legal requirements for establishment and maintenance of a drug store	Lecture	BP703.2	Mid Term-1, Quiz & End Sem Exam
15	Dispensing of proprietary products, maintenance of records of retail and wholesale drug store	Lecture	BP703.2	Mid Term-1, Quiz & End Sem Exam
16	Dispensing of drugs to inpatients, types of drug distribution systems, charging policy and labelling,	Lecture	BP703.2	Mid Term-1, Quiz & End Sem Exam
17	Dispensing of drugs to ambulatory patients, and Dispensing of controlled drugs.	Lecture	BP703.2	Mid Term-1, Quiz & End Sem Exam
18	Definition, contents of hospital formulary, Differentiation of hospital formulary and Drug list, preparation and revision	Lecture	BP703.2	Mid Term-1, Quiz & End Sem Exam
19	addition and deletion of drug from hospital formulary.	Lecture	BP703.2	Mid Term-1, Quiz & End Sem Exam

20	Need for Therapeutic Drug Monitoring, Factors to be considered during the Therapeutic Drug Monitoring, and Indian scenario for Therapeutic Drug Monitoring.	Lecture	BP703.2	Mid Term-1, Quiz & End Sem Exam
21	Causes of medication non-adherence, pharmacist role in the medication adherence, and	Lecture	BP703.2	Mid Term-2, Quiz & End Sem Exam
22	Monitoring of patient medication adherence	Lecture	BP703.2	Mid Term-2, Quiz & End Sem Exam
23	Need for the patient medication history interview, medication interview form	Lecture	BP703.2	Mid Term-2, Quiz & End Sem Exam
24	Financial, materials, staff, and infrastructure requirements	Lecture	BP703.2	Mid Term-2, Quiz & End Sem Exam
25	Organization, functions, Policies of the pharmacy and therapeutic committee in including drugs into formulary	Lecture	BP703.3	Mid Term-2, Quiz & End Sem Exam
26	inpatient and outpatient prescription, automatic stop order, and emergency drug list preparation	Lecture	BP703.3	Mid Term-2, Quiz & End Sem Exam
27	Drug and Poison information centre, Sources of drug information,	Lecture	BP703.3	Mid Term-2, Quiz & End Sem Exam



28	Computerized services, and storage and retrieval of information.	Lecture	BP703.3	Mid Term-2, Quiz & End Sem Exam
29	Definition of patient counseling; steps involved in patient counseling	Lecture	BP703.3	Mid Term-2, Quiz & End Sem Exam
30	Special cases that require the pharmacist d) Education and training program in the hospital Role of pharmacist in the education and training program, Internal and external training program	Lecture	BP703.4	Mid Term-2, Quiz & End Sem Exam
31	Services to the nursing homes/clinics, Code of ethics for community pharmacy, and Role of pharmacist in the interdepartmental communication and community health education	Lecture	BP703.4	Mid Term-2, Quiz & End Sem Exam
32	Prescribed medication order-interpretation and legal requirements, and Communication skills-communication with prescribers and patients.	Lecture	BP703.4	Mid Term-2, Quiz & End Sem Exam
33	National 158 programme for prevention and control of deafness,	Lecture	BP703.4	Mid Term-2, Quiz & End Sem Exam
34	Budget preparation and	Lecture	BP703.4	Mid

	implementation b) Introduction to Clinical Pharmacy, Concept of clinical pharmacy, functions and responsibilities of clinical pharmacist			Term-2, Quiz & End Sem Exam
35	Drug therapy monitoring - medication chart review, clinical review, pharmacist intervention	Lecture	BP703.4	Mid Term-2, Quiz & End Sem Exam
36	Ward round participation, Medication history and Pharmaceutical care	Lecture	BP703.4	Mid Term-2, Quiz & End Sem Exam
37	Dosing pattern and drug therapy based on Pharmacokinetic & disease pattern	Lecture	BP703.4	Quiz & End Sem Exam
38	Introduction and sale of over the counter, and Rational use of common over the counter medications.	Lecture	BP703.4	Quiz & End Sem Exam
39	Organisation of drug store, types of materials stocked and storage conditions, Purchase and inventory contro	Lecture	BP703.5	Quiz & End Sem Exam
40	Principles, purchase procedure, purchase order, procurement and stocking,	Lecture	BP703.5	Quiz & End Sem Exam
41	Economic order quantity, Reorder quantity level, and Methods used for the analysis of the drug expenditure	Lecture	BP703.5	Quiz & End Sem Exam
42	Investigational use of drugs	Lecture	BP703.5	Quiz & End Sem

	Description, principles involved, classification, control, identification			Exam
43	role of hospital pharmacist, advisory committee	Lecture	BP703.5	Quiz & End Sem Exam
44	Blood chemistry, hematology, and urinalysis	Lecture	BP703.5	Quiz & End Sem Exam
45	Blood chemistry, hematology, and urinalysis	Lecture	BP703.5	Quiz & End Sem Exam
46	Future aspects of hospital Pharmacist	Lecture	BP703.5	Quiz & End Sem Exam
47	Future aspects of Clinical Pharmacist	Lecture	BP703.5	Quiz & End Sem Exam
48	Future aspects of Community Pharmacist	Lecture	BP703.5	Quiz & End Sem Exam

F. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP703.1	Discuss the basic components in organization of hospital & hospital Pharmacy.	3	3	1	2	1				1		2
BP703.2	*Explain in detail about adverse drug reactions and drug interactions.*	3	3	1	3	2				2		2

BP703.3	*Outline various drug distribution systems, Drug Information and concepts of inventory control followed in hospital.*	3	3	2	3	2				3		2
BP703.4	Generalize about organization and functions of Hospital, Clinical and community Pharmacist and Therapeutic Committee.	3	3	2	2	2			2	2		2
BP703.5	Recognize the communication abilities in Patient Counselling and Prescription interpretation.	3	3	2	3	3			2	2		3

Sample Question Paper

Amity Institute of pharmacy Department of Pharmaceutical Chemistry II MID-SEMESTER (SEM –VII) 2021-22						
Class: B.Pharmacy VII Semester						
Subject Name: BP703T **Pharmacy Practice**		Time: 1 Hr			Max. Marks: 30	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3,4	Q.2,5,9,10	Q.6	Q.8		Q.7

Student will be

CO1: Discuss the basic components in organization of hospital & hospital Pharmacy.

CO2. Explain in detail about adverse drug reactions and drug interactions.

CO3: Outline various drug distribution systems, Drug Information and concepts of inventory control followed in hospital.

CO4: Generalize about organization and functions of Hospital, Clinical and community Pharmacist and Therapeutic Committee.

CO5: Recognize the communication abilities in Patient Counselling and Prescription interpretation.

CO Map	Question No.	Question	Marks
CO3	Q.1	Write the interpretation results of abnormal lipid profile in the blood sample.	2
CO3	Q.2	Write the types of medication non-adherence	2
	Q.3	Define TDM	2
CO5	Q.4	Define the term OTC medicines	2
CO4	Q.5	Write any two functions of Hospital Pharmacist	2
CO3	Q.6	Explain about different methods to control Inventory in Pharmacy	10
	Q.7	Discuss about interpretation of clinical laboratory urine tests	10
CO3	Q 8	Write the factors to be considered during the therapeutic drug monitoring	5
CO3	Q.9	Write short notes on drug therapy monitoring in clinical system.	5

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CO5	Q 10	Write about the role of hospital Clinical pharmacist in the investigational use of drugs	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

.

Attainment Level 3:

97.8 % Percentage of students secured more than 60% marks, so this course Pharmacy Practice – Theory (BP703T) attained Level 3.

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Bachelor of Pharmacy (B. Pharm.)

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PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
AMITY INSTITUTE OF PHARMACY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge asscoited with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. **Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions

[PO.4]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team -building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well- being.

[PO.6]. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
III SEM	BP304T	3	3	3	3	1	2	2	1	3	1	1	-	-	-
V SEM	BP 502 T	3	1	3	3	1	3	1	-	2	2	2	-	-	-
	BP 506 P	3	3	3	3	1	3	2	1	3	1	2	-	-	-
VII SEM	BP 704 T	3	3	3	3	2	2	3	1	1	3	1	-	-	-

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACY
Course Handout
Course : Novel Drug Delivery System (Theory)
Course Code : BP704T, Crédits : 04, Session : 2022-23 (Odd Sem.), Class : B. Pharm. 4th Year
Faculty Name : Dr. Neeraj Mishra

A. Introduction: This course is designed to impart fundamental knowledge on pharmaceutical product development and translation from laboratory to market. Upon completion of the course, the student shall be able to:

1. Know the process of pilot plant and scale up of pharmaceutical dosage forms
2. Understand the process of technology transfer from lab scale to commercial batch
3. Know different Laws and Acts that regulate pharmaceutical industry
4. Understand the approval process and regulatory requirements for drug products

B. Course Outcomes: At the end of the course, students will be able to:

BP704T.1. Discuss various approaches for development of novel drug delivery systems (NDDS).

BP704T.2. Understand the criteria for selection of drugs and polymers.

BP704T.3. Discuss the methods of preparation of NDDS.

BP704T.4. Discuss the evaluation of NDDS.

BP704T.5. Discuss the application of NDDS.

C. Programme Outcomes:

[PO.1].Pharmacy Knowledge: Posses knowledge and compression of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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[PO.11]. **Life-long learning:** Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self- assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**

Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	10%
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves Including medical leaves.	A	5%
End Semester Examination	End Semester Examination	EE	70%
Total			**100%**

E. Syllabus

Module I: Controlled drug delivery systems

Introduction, terminology/definitions and rationale, advantages, disadvantages, selection of drug candidates. Approaches to design-controlled release formulations based on diffusion, dissolution and ion exchange principles. Physicochemical and biological properties of drugs relevant to controlled release formulations

Polymers: Introduction, classification, properties, advantages, and application of polymers in formulation of controlled release drug delivery systems

Module II: Microencapsulation

Definition, advantages and disadvantages, microspheres /microcapsules, microparticles, methods of microencapsulation, applications

Mucosal Drug Delivery system

Introduction, Principles of bioadhesion / mucoadhesion, concepts, advantages, and disadvantages, transmucosal permeability and formulation considerations of buccal delivery systems

Implantable Drug Delivery Systems

Introduction, advantages and disadvantages, concept of implants and osmotic pump

Module III: Transdermal Drug Delivery Systems

Introduction, Permeation through skin, factors affecting permeation, permeation enhancers, basic components of TDDS, formulation approaches

Gastroretentive drug delivery systems

Introduction, advantages, disadvantages, approaches for GRDDS – Floating, high density systems, inflatable and gastroadhesive systems and their applications

Nasopulmonary drug delivery system

Introduction to Nasal and Pulmonary routes of drug delivery, Formulation of Inhalers (dry powder and metered dose), nasal sprays, nebulizers

Module IV: Targeted drug Delivery

Concepts and approaches advantages and disadvantages, introduction to liposomes, niosomes, nanoparticles, monoclonal antibodies and their applications

Module V: Ocular Drug Delivery Systems

Introduction, intra ocular barriers and methods to overcome –Preliminary study, ocular formulations and ocuserts

Intrauterine Drug Delivery System

Introduction, advantages and disadvantages, development of intra uterine devices (IUDs) and applications

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. Y W. Chien, Novel Drug Delivery Systems, 2 nd edition, revised and expanded, Marcel Dekker, Inc., New York, 1992.
2. Robinson, J. R., Lee V. H. L, Controlled Drug Delivery Systems, Marcel Dekker, Inc., New York, 1992.
3. Encyclopedia of Controlled Delivery. Edith Mathiowitz, Published by Wiley Interscience Publication, John Wiley and Sons, Inc, New York. Chichester/Weinheim
4. N.K. Jain, Controlled and Novel Drug Delivery, CBS PuKhar, Controlled Drug Delivery -conc blishers & Distributors, New Delhi, First edition 1997 (reprint in 2001).
5. S.P. Vyas and R.K. Controlled Drug Delivery -concepts and advances, Vallabh

Prakashan, New Delhi, First edition 2002.

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Introduction, terminology/definitions, and rationale of CDDS	Lecture	BP704T.1	Mid Term-1, Quiz & End Sem Exam
2	advantages, disadvantages	Lecture	BP704T.1	Mid Term-1, Quiz & End Sem Exam
3	selection of drug candidates	Lecture	BP704T.1	Mid Term-1, Quiz & End Sem Exam
4	*Tutorial 01*	Tutorial 01		Tutorial 01
5	Approaches to design controlled release formulations based on diffusion	Lecture	BP704T.1	Mid Term-1, Quiz & End Sem Exam
6	Dissolution and ion exchange principles.	Lecture	BP704T.1	Mid Term-1, Quiz & End Sem Exam
7	Physicochemical and biological properties of drugs relevant to controlled release formulations	Lecture	BP704T.1	Mid Term-1, Quiz & End Sem Exam
8	Tutorial 02	Tutorial 02		Tutorial 02
9	Introduction, classification, properties	Lecture	BP704T.1	Mid Term-1, Quiz & End Sem Exam
10	Advantages of polymers	Lecture	BP704T.1	Mid Term-1, Quiz & End Sem Exam
11	Application of polymers in formulation of controlled release drug delivery systems	Lecture	BP704T.1	Mid Term-1, Quiz & End Sem Exam

G. Mohanaboy

12	Tutorial 03	Tutorial 03		Tutorial 03
13	Application of polymers in formulation of controlled release drug delivery systems	Lecture	BP704T.1	Mid Term-1, Quiz & End Sem Exam
14	Definition, advantages and disadvantages of microencapsulation	Lecture	BP704T.2	Mid Term-1, Quiz & End Sem Exam
15	Microspheres /microcapsules, microparticles		BP704T.2	
16	Tutorial 04	Tutorial 04		Tutorial 04
17	Methods of microencapsulation, applications	Lecture	BP704T.2	Mid Term-1, Quiz & End Sem Exam
18	Introduction, Principles of bioadhesion / mucoadhesion	Lecture	BP704T.2	Mid Term-1, Quiz & End Sem Exam
19	concepts, advantages and disadvantages	Lecture	BP704T.2	Mid Term-1, Quiz & End Sem Exam
20	Tutorial 05	Tutorial 05		Tutorial 05
21	Transmucosal permeability of buccal delivery systems	Lecture	BP704T.2	Mid Term-1, Quiz & End Sem Exam
22	Formulation considerations of buccal drug delivery system	Lecture	BP704T.2	Mid Term-1, Quiz & End Sem Exam
23	Introduction, advantages, and disadvantages,	Lecture	BP704T.2	Mid Term-1, Quiz & End Sem Exam
24	Tutorial 06	Tutorial 06		Tutorial 06
25	Concept of implants	Lecture	BP704T.2	Mid Term-1, Quiz & End Sem

				Exam
26	Concept of osmotic pump	Lecture	BP704T.2	Mid Term-2, Quiz & End Sem Exam
27	Introduction, Permeation through skin	Lecture	BP704T.3	Mid Term-2, Quiz & End Sem Exam
28	Tutorial 07	Tutorial 07		Tutorial 07
29	Factors affecting permeation	Lecture	BP704T.3	Mid Term-2, Quiz & End Sem Exam
30	Permeation enhancers,	Lecture	BP704T.3	Mid Term-2, Quiz & End Sem Exam
31	Basic components of TDDS	Lecture	BP704T.3	Mid Term-2, Quiz & End Sem Exam
32	Tutorial 08	Tutorial 08		Tutorial 08
33	Formulation approaches	Lecture	BP704T.3	Mid Term-2, Quiz & End Sem Exam
34	Introduction, advantages and disadvantages of GRDDS	Lecture	BP704T.3	Mid Term-2, Quiz & End Sem Exam
35	Approaches for GRDDS	Lecture	BP704T.3	Mid Term-2, Quiz & End Sem Exam
36	Tutorial 09	Tutorial 09		Tutorial 09
37	Floating, high density systems, inflatable and gastroadhesive systems and their applications	Lecture	BP704T.3	Mid Term-2, Quiz & End Sem Exam
38	Introduction to Nasal and Pulmonary routes of drug delivery	Lecture	BP704T.3	Mid Term-2, Quiz & End Sem

				Exam
39	Formulation of Inhalers	Lecture	BP704T.3	Mid Term-2, Quiz & End Sem Exam
40	Tutorial 10	Tutorial 10		Tutorial 10
41	Nasal sprays	Lecture	BP704T.3	Mid Term-2, Quiz & End Sem Exam
42	Nebulizers	Lecture	BP704T.3	Mid Term-2, Quiz & End Sem Exam
43	Concepts of approaches of TDDS	Lecture	BP704T.4	Mid Term-2, Quiz & End Sem Exam
44	Tutorial 11	Tutorial 11		Tutorial 11
45	Approaches of TDDS	Lecture	BP704T.4	Mid Term-2, Quiz & End Sem Exam
46	Approaches of TDDS	Lecture	BP704T.4	Mid Term-2, Quiz & End Sem Exam
47	Advantages and disadvantages	Lecture	BP704T.4	Mid Term-2, Quiz & End Sem Exam
48	Tutorial 12	Tutorial 12		Tutorial 12
49	Introduction and application of liposomes	Lecture	BP704T.4	Mid Term-2, Quiz & End Sem Exam
50	Introduction to Niosomes	Lecture	BP704T.4	Mid Term-2, Quiz & End Sem Exam
51	Application of Niosomes	Lecture	BP704T.4	Mid Term-2, Quiz & End Sem

				Exam
52	Tutorial 13	Tutorial 13		Tutorial 13
53	Introduction and application of Mab	Lecture	BP704T.4	Mid Term-2, Quiz & End Sem Exam
54	Introduction of ocular drug delivery system	Lecture	BP704T.5	Mid Term-2, Quiz & End Sem Exam
55	Intra ocular barriers and methods to overcome	Lecture	BP704T.5	Mid Term-2, Quiz & End Sem Exam
56	Tutorial 14	Tutorial 14		Tutorial 14
57	Preliminary study, ocular formulations and ocuserts	Lecture	BP704T.5	Mid Term-2, Quiz & End Sem Exam
58	Introduction, advantages, and disadvantages	Lecture	BP704T.5	Mid Term-2, Quiz & End Sem Exam
59	Development of intra uterine devices (IUDs) and applications	Lecture	BP704T.5	Mid Term-2, Quiz & End Sem Exam
60	Tutorial 15	Tutorial 15		Tutorial 15

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11

BP704T.1	Discuss various approaches for development of novel drug delivery systems (NDDS).	3	3	3	1	-	1	2	1	-	-	1
BP704T.2	Understand the criteria for selection of drugs and polymers.	2	2	2	3	-	1	1	1	-	-	1
BP704T.3	Discuss the methods of preparation of NDDS.	2	1	1	-	-	1	3	2	-	-	-
BP704T.4	Discuss the evaluation of NDDS.	2	2	2	1	-	1	-	-	-	-	-
BP704T.5	Discuss the application of NDDS.	2	1	-	-	-	2	1	1	-	-	1

Amity Institute of Pharmacy
Department of Pharmaceutics
I MID-SEMESTER (SEM –VIII) 2021-22

Class: B.Pharm, VII Semester

Subject Name: BP704T.Novel Drug Delivery System (Theory)	Time: 1 Hr	Max. Marks: 30

Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3,4,5	Q.6,8,9	Q.2	Q.7, 10		

The student will be able to

CO1. Discuss various approaches for development of novel drug delivery systems (NDDS).

CO2. Understand the criteria for selection of drugs and polymers.

CO3. Discuss the methods of preparation of NDDS.

CO.4. Discuss the evaluation of NDDS.

CO.5. Discuss the application of NDDS.

CO Map	Question No.	Question	Marks
CO1	Q.1	What are various approaches for designing controlled release formulations.	2
CO3	Q.2	What are advantages of microencapsulation.	2
CO3	Q.3	Enumerate the advantages and disadvantages of GRDDS.	2
CO3	Q.4	Enumerate factor affecting permeation through skin.	2
CO4	Q.5	Explain the application of nanoparticles in drug delivery.	2
CO1	Q.6	Discuss various approaches for designing controlled release formulation with special reference to dissolution.	10
CO4	Q.7	What are IUDs? Write the methods used for development of intrauterine devices.	10
CO2	Q.8	Explain the principles of mucoadhesion.	5
CO3	Q.9	Write note on application of nanoparticles.	5
CO3	Q.10	Discuss the formulation consideration of TDDS.	5

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 2:

73.3% Percentage of students secured more than 60% marks, so this course Novel Drug Delivery System – Theory (BP704T) attained Level 2.

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AMITY UNIVERSITY MADHYA PRADESH, GWALIOR

AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)
Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

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AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICS

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

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Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I SEM																
	BP706PS	3	3	3	3	3	2	2	2	2	1	2				
II SEM																

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III SEM																
IV SEM	-															
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VII SEM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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AMITY UNIVERSITY
MADHYA PRADESH
Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
Course Handout
Course : Practice School
Course Code : BP706PS, Crédits : 06, Session :2021-22 (Odd Sem.), Class : B.Pharm. 4th Year
Faculty Name: Dr. Jovita Kanoujia

A. **Introduction:** The course is designed to impart basic knowledge and skills of domains decided by the supervisor or mentor.

B. Course Outcomes: At the end of the course, students will be able to:

BP706PS.1. Plan research/review topic to create new knowledge

BP706PS.2. Analyse and conduct the literature review on given topic.

BP706PS.3. Choose methodology, analyse data and interpret results.

BP706PS.4. Compile report for submission on given topic.

BP706PS.5. Defend viva-voice through presentation.

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term Presentation	MTP	25%
End Semester Examination	End Semester Examination	EE	125%
Total			**150%**

E. Syllabus

In the VII semester, every candidate shall undergo practice school for a period of 150 hours evenly distributed throughout the semester. The student shall opt any one of the domains for practice school declared by the program committee from time to time. At the end of the practice school, every student shall submit a printed report (in triplicate) on the practice school he/she attended (not more than 25 pages). Along with the exams of semester VII, the report submitted by the student, knowledge and skills acquired by the student through practice school shall be evaluated by the subject experts at college

Level and grade point shall be awarded.

F. Examination Scheme:

Components	**MTP**	**EE**
Weightage (%)	25	125

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

- John Bowden, Writing A Report, 2011, Constable & Robinson

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Week 1- Planning of Project	Teacher-student interaction	1	Mid Term-1, Quiz & End Sem Exam
2	Week 2- Review of Literature on decided topic	Teacher-student interaction	2	Mid Term-1, Quiz & End Sem Exam
3	Week 3- Laboratory work or Paper writing	Teacher-student interaction	2,3	Mid Term-1, Quiz & End Sem Exam
4	Week 4- Laboratory work or Paper writing	Teacher-student interaction	2,3	Mid Term-1, Quiz & End Sem Exam
5	Week 5- Laboratory work or Paper writing	Teacher-student interaction	2,3	Mid Term-1, Quiz & End Sem Exam
6	Week 6- Laboratory work or Paper writing	Teacher-student interaction	2,3	Mid Term-1, Quiz & End Sem Exam
7	Week 7- Laboratory work or Paper writing	Teacher-student interaction	2,3	Mid Term-1, Quiz & End Sem Exam
8	Week 8- Laboratory work or Paper writing	Teacher-student interaction	2,3	Mid Term-2, Quiz & End Sem Exam
9	Week 8- Laboratory work or Paper writing	Teacher-student interaction	2,3	Mid Term-2, Quiz & End Sem Exam
10	Week 8- Laboratory work or Paper writing	Teacher-student interaction	2,3	Mid Term-2, Quiz & End Sem Exam
11	Week 8- Laboratory work or Paper writing	Teacher-student interaction	2,3	Mid Term-2, Quiz & End Sem Exam

12	Week 9- Compilation of data and report writing	Teacher -student interaction	2,3	Mid Term-2, Quiz & End Sem Exam
13	Week-10 Report writing and plagiarism check	Teacher -student interaction	4	Mid Term-2, Quiz & End Sem Exam
14	Week-11 Report editing and submission	Teacher -student interaction	4	Mid Term-2, Quiz & End Sem Exam
15	Week-12 Report submission and presentation preparation	Teacher -student interaction	4,5	Mid Term-2, Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP706PS.1.	**BP706PS.1.** Plan research/review topic to create new knowledge	3	3	3	3	-	2	3	1	1	1	3				
BP706PS.2.	**BP706PS.2**. Analyse and conduct the literature review on given topic.	3	3	3	3	-	2	2	2	1	1	3				
BP706PS.3.	**BP706PS.3**. Choose methodology, analyse data and interpret results.	3	3	3	3	1	2	2	2	1	1	3				
BP706PS.4.	**BP706PS.4**. Compile report for submission on given topic.	3	3	1	3	-	2	2	2	2	1	3				
BP706PS.5.	**BP706PS.5**. Defend viva-voice through presentation.	3	3	2	3	3	2	2	3	2	1	3				

Attainments		Rubric
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

.

Attainment Level 3:

100 % Percentage of students secured more than 60% marks, so this course Practice School (BP706PS) attained Level 3.

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Programme Educational Objectives (PEOs)
Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

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AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICS

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
VIII SEM	BP801T	2	2	1	3	1	1	2								
	-															
	-															
	-															

AMITY UNIVERSITY

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DEPARTMENT OF PHARMACEUTICS
Course Handout
Course : BIOSTATISITCS AND RESEARCH METHODOLOGY – I THEORY
Course Code : BP801T, Crédits : 04, Session :2021-22 (Even Sem.), Class : B.Pharm. IVth Year
Faculty Name: Dr. M.Prathap, Dr. Ram Kumar

A. Introduction: This subject deals with descriptive statistics, Graphics, Correlation, Regression, logistic regression Probability theory, Sampling technique, Parametric tests, Non Parametric tests, ANOVA,
Introduction to Design of Experiments, Phases of Clinical trials and Observational and Experimental studies

B. Course Outcomes: At the end of the course, students will be able to:

BP801T.1. Define, classify, and list the uses & applications of various bio-statistical tools and
Experimental designs. Derive equations and solve problems related to various statistical technique

BP801T.2. Appreciate statistical techniques in solving the problems.

BP801T.3. Know the various statistical techniques to solve statistical problems.

BP801T.4. Know the operation of M.S. Excel, SPSS, R and MINITAB®, DoE (Design of Experiment).

BP801T.5. Application of Design and Analysis of experiments

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time

management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

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[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

C. Assessment Plan:

Component of Evaluation	Description	Code	Weightage %
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

D. Syllabus

UNIT – I

Introduction: Statistics, Biostatistics, Frequency distribution

Measures of central tendency: Mean, Median, Mode- Pharmaceutical examples

Measures of dispersion: Dispersion, Range, standard deviation, Pharmaceutical problems

Correlation: Definition, Karl Pearson's coefficient of correlation, Multiple correlation - Pharmaceuticals examples.

UNIT – II

Regression: Curve fitting by the method of least squares, fitting the lines y= a + bx and x = a + by, Multiple regression, standard error of regression– Pharmaceutical Examples

Probability: Definition of probability, Binomial distribution, Normal distribution, Poisson's distribution, properties - problems

Sample, Population, large sample, small sample, Null hypothesis, alternative hypothesis, sampling, essence of sampling, types of sampling, Error-I type, Error-II type, Standard error of mean (SEM) - Pharmaceutical examples
Parametric test: t-test(Sample, Pooled or Unpaired and Paired) , ANOVA, (One way and Two way), Least Significance difference

UNIT – III

Non Parametric tests: Wilcoxon Rank Sum Test, Mann-Whitney U test, Kruskal-Wallis test, Friedman Test
Introduction to Research: Need for research, Need for design of Experiments, Experiential Design Technique, plagiarism
Graphs: Histogram, Pie Chart, Cubic Graph, response surface plot, Counter Plot graph
Designing the methodology: Sample size determination and Power of a study, Report writing and presentation of data, Protocol, Cohorts studies, Observational studies, Experimental studies, Designing clinical trial, various phases

UNIT – IV

Blocking and confounding system for Two-level factorials
Regression modelling: Hypothesis testing in Simple and Multiple regression models
Introduction to Practical components of Industrial and Clinical Trials Problems: Statistical Analysis Using Excel, SPSS, MINITAB®, DESIGN OF EXPERIMENTS, R - Online Statistical Software's to Industrial and Clinical trial approach.

UNIV – V

Design and Analysis of experiments:
Factorial Design: Definition, 22, 23design. Advantage of factorial design
Response Surface methodology: Central composite design, Historical design, Optimization Techniques

E. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

F. Suggested Text/Reference Books:

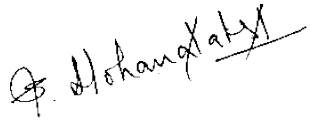
- 1. Pharmaceutical statistics- Practical and clinical applications, Sanford Bolton, publisher Marcel Dekker Inc. NewYork.
- 2. Fundamental of Statistics – Himalaya Publishing House- S.C.Guptha
- 3. Design and Analysis of Experiments –PHI Learning Private Limited, R. Pannerselvam,
- 4. Design and Analysis of Experiments – Wiley Students Edition, Douglas and C. Montgomery

G. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Statistics, Biostatistics, Frequency distribution	Lecture	1	Mid Term-1, Quiz & End Sem Exam

2	Statistics, Biostatistics, Frequency distribution	Lecture	1	Mid Term-1, Quiz & End Sem Exam
3	Mean, Median, Mode- Pharmaceutical examples	Lecture	1	Mid Term-1, Quiz & End Sem Exam
4	Mean, Median, Mode- Pharmaceutical examples	Tutorial	1	Mid Term-1, Quiz & End Sem Exam
5	Mean, Median, Mode- Pharmaceutical examples	Lecture	1	Mid Term-1, Quiz & End Sem Exam
6	Dispersion, Range	Lecture	1	Mid Term-1, Quiz & End Sem Exam
7	standard deviation	Lecture	1	Mid Term-1, Quiz & End Sem Exam
8	Definition, Karl Pearson's coefficient of correlation	Tutorial	1	Mid Term-1, Quiz & End Sem Exam
9	Definition, Karl Pearson's coefficient of correlation	Lecture	1	Mid Term-1, Quiz & End Sem Exam
10	Multiple correlation - Pharmaceuticals examples	Lecture	1	Mid Term-1, Quiz & End Sem Exam
11	Multiple correlation - Pharmaceuticals examples	Lecture	1	Mid Term-1, Quiz & End Sem Exam
12	Multiple correlation - Pharmaceuticals examples	Tutorial	1	Mid Term-1, Quiz & End Sem Exam
13	**Regression:** Curve fitting by the method of least squares, fitting the lines y= a + bx and x = a + by	Lecture	2	Mid Term-1, Quiz & End Sem Exam
14	**Regression:** Curve fitting by the method of least squares, fitting the lines y= a + bx and x = a + by	Lecture	2	Mid Term-1, Quiz & End Sem Exam
15	Multiple regression, standard error of regression– Pharmaceutical Examples	Lecture	2	Mid Term-1, Quiz & End Sem Exam
16	Multiple regression, standard error of regression– Pharmaceutical Examples	Tutorial		Mid Term-1, Quiz & End Sem Exam
17	Multiple regression, standard error of regression– Pharmaceutical Examples	Lecture		Mid Term-1, Quiz & End Sem Exam
18	Definition of probability, Binomial distribution	Lecture		Mid Term-1, Quiz & End Sem Exam
19	Definition of probability, Binomial distribution	Lecture	2	Mid Term-1, Quiz & End Sem Exam
20	Normal distribution,	Tutorial	2	Mid Term-1, Quiz

	Poisson's distribution, properties - problems			& End Sem Exam
21	Normal distribution, Poisson's distribution, properties - problems	Lecture	2	Mid Term-1, Quiz & End Sem Exam
22	**Parametric test**: t-test(Sample, Pooled or Unpaired and Paired) , ANOVA, (One way and Two way), Least Significance difference	Lecture	2	Mid Term-1, Quiz & End Sem Exam
23	Null hypothesis, alternative hypothesis, sampling, essence of sampling, types of sampling, Error-I type, Error-II type, Standard error of mean (SEM)	Lecture	2	Mid Term-1, Quiz & End Sem Exam
24	**Parametric test**: t-test(Sample, Pooled or Unpaired and Paired) , ANOVA, (One way and Two way), Least Significance difference	Tutorial	2	Mid Term-1, Quiz & End Sem Exam
25	**Non Parametric tests:** Wilcoxon Rank Sum Test	Lecture	3	Mid Term-1, Quiz & End Sem Exam
26	**Non Parametric tests:** Wilcoxon Rank Sum Test	Lecture	3	Mid Term-1, Quiz & End Sem Exam
27	Mann-Whitney U test	Lecture	3	Mid Term-1, Quiz & End Sem Exam
28	Mann-Whitney U test, Kruskal-Wallis test, Friedman Test	Tutorial	3	Mid Term-1, Quiz & End Sem Exam
29	Need for research, Need for design of Experiments, Experiential Design Technique, plagiarism	Lecture	3	Mid Term-1, Quiz & End Sem Exam
30	Need for research, Need for design of Experiments, Experiential Design Technique, plagiarism	Lecture	3	Mid Term-1, Quiz & End Sem Exam
31	**Graphs:** Histogram, Pie Chart, Cubic Graph, response surface plot, Counter Plot graph	Lecture	3	Mid Term-2, Quiz & End Sem Exam
32	**Graphs:** Histogram, Pie Chart, Cubic Graph, response surface plot, Counter Plot graph	Tutorial	3	Mid Term-2, Quiz & End Sem Exam



33	**Designing the methodology:** Sample size determination and Power of a study,	Lecture	3	Mid Term-2, Quiz & End Sem Exam
34	**Designing the methodology:** Sample size determination and Power of a study,	Lecture	3	Mid Term-2, Quiz & End Sem Exam
35	Report writing and presentation of data, Protocol, Cohorts studies, Observational studies, Experimental studies, Designing clinical trial, various phases.	Lecture	3	Mid Term-2, Quiz & End Sem Exam
36	Blocking and confounding system for Two-level factorials	Tutorial	4	Mid Term-2, Quiz & End Sem Exam
37	Hypothesis testing in Simple and Multiple regression models	Lecture	4	Mid Term-2, Quiz & End Sem Exam
38	Hypothesis testing in Simple and Multiple regression models	Lecture	4	Mid Term-2, Quiz & End Sem Exam
39	Statistical Analysis Using Excel, SPSS, MINITAB®, DESIGN OF EXPERIMENTS, R -Online Statistical Software's to Industrial and Clinical trial approach	Lecture	4	Mid Term-2, Quiz & End Sem Exam
40	Excel, SPSS, MINITAB®, DESIGN OF EXPERIMENTS, R -Online Statistical Software's	Tutorial	4	Mid Term-2, Quiz & End Sem Exam
41	Excel, SPSS, MINITAB®, DESIGN OF EXPERIMENTS, R -Online Statistical Software's	Lecture	4	Mid Term-2, Quiz & End Sem Exam
42	Excel, SPSS, MINITAB®, DESIGN OF EXPERIMENTS, R -Online Statistical Software's	Lecture	4	Mid Term-2, Quiz & End Sem Exam
43	Blocking and confounding system for Two-level factorials	Lecture	4	Mid Term-2, Quiz & End Sem Exam
44	Blocking and confounding system for Two-level	Tutorial	4	Mid Term-2, Quiz & End Sem Exam

	factorials			
45	Design and Analysis of experiments	Lecture	4	Mid Term-2, Quiz & End Sem Exam
46	Design and Analysis of experiments	Lecture	4	Mid Term-2, Quiz & End Sem Exam
47	Definition, 2^2, 2^3design. Advantage of factorial design	Lecture	5	Quiz & End Sem Exam
48	Definition, 2^2, 2^3design. Advantage of factorial design	Tutorial	5	Quiz & End Sem Exam
49	Response Surface methodology: Central composite design, Historical design, Optimization Techniques	Lecture	5	Quiz & End Sem Exam
50	Response Surface methodology: Central composite design, Historical design, Optimization Techniques	Lecture	5	Quiz & End Sem Exam
51	Response Surface methodology: Central composite design, Historical design, Optimization Techniques	Lecture	5	Quiz & End Sem Exam
52	Response Surface methodology: Central composite design, Historical design, Optimization Techniques	Tutorial	5	Quiz & End Sem Exam
53	MINITAB®, DESIGN OF EXPERIMENTS	Lecture	5	Quiz & End Sem Exam
54	MINITAB®, DESIGN OF EXPERIMENTS	Lecture	5	Quiz & End Sem Exam
55	Blocking and confounding system for Two-level factorials	Lecture	5	Quiz & End Sem Exam
56	Blocking and confounding system for Two-level factorials	Tutorial	5	Quiz & End Sem Exam
57	Central composite design, Historical design	Lecture	5	Quiz & End Sem Exam
58	Central composite design, Historical design	Lecture	5	Quiz & End Sem Exam
59	Response Surface methodology	Lecture	5	Quiz & End Sem Exam
60	Response Surface methodology	Tutorial	5	Quiz & End Sem Exam

H. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP801	**BP801.1**. Define, classify, and list the uses & applications of various bio-statistical tools and Experimental designs. Derive equations and solve problems related to various statistical technique .	3	1	1	3	1	1	1	2	2	-	-				
BP801.	**BP801.2** Appreciate statistical techniques in solving the problems..	1	1	3	1	1	1	2	2	-	-	1				
BP801	**BP801.3** Know the various statistical techniques to solve statistical problems.	1	3	3	1	1	1	2	2	-	-	1				
BP801	**BP801T.4**. Know the operation of M.S. Excel, SPSS, R and MINITAB®, DoE (Design of Experiment).	2	2	3	3	-	1	-	-	-	-	3				
BP801	**BP801T.5**. Application of Design and Analysis of experiments	1	3	3	1	1	1	2	2	-	-	1				

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutics I MID-SEMESTER (SEM –VIIIth) 2021-22						
Class: B.Pharm, VIII Semester						
Subject Name: BIOSTATISITCS AND RESEARCH METHODOLOGY – I THEORY		Time: 1 Hrs		Max. Marks: 30		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3,4,5	Q.6,9	Q.2,8	Q.7, 10		

The student will be able to

BP801T.1. Define, classify, and list the uses & applications of various bio-statistical tools and Experimental designs. Derive equations and solve problems related to various statistical technique

BP801T.2. Appreciate statistical techniques in solving the problems.

BP801T.3. Know the various statistical techniques to solve statistical problems.

BP801T.4. Know the operation of M.S. Excel, SPSS, R and MINITAB®, DoE (Design of Experiment).

BP801T.5. Application of Design and Analysis of experiments.

CO Map	Question No.	Question	Marks
CO4	Q.1	Factorial design	2
CO5	Q.2	Systemic random sampling	2
CO1	Q.3	Define Blocking	2
CO4	Q.4	Define Histogram and Response surface plot	2
CO2	Q.5	A coin is tossed two times, what is the probability of getting head exactly one?	2
CO5	Q.6	Definition, design and Advantages of 23 factorial design	10
CO4	Q.7	Describe briefly the design of clinical designs	10
CO3	Q.8	Explain SPSS and R -Online Statistical Software's	5
CO2	Q.9	Definition, 2^2, 2^3design. Advantage of factorial design	5

CO2	Q.10	Calculate median from the following frequency distribution:	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment below Level 1:

42.2 % of students secured more than 60% marks, so this course Biostatistics and Research Methodology - Theory (BP801T) attainment is below level 1.

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PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

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AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOLOGY

PROGRAMME OUTCOMES

Bachelor of Pharmacy (B. Pharm) Academic Year – 2021-22

Programme Outcomes (POs):

1. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.
2. **Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.
3. **Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.
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5. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.
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11. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11				
VIII SEM	BP802T	3	2	3	-	-	-	-	-	-	-	-		-	-	-

Dr. Mohanty

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
Course Handout
Course : Social and Préventive Pharmacy
Course Code BP802T, Crédits : 04, Session :2021-22(Even Sem.), Class : B.Pharm. 4th Year
Faculty Name : Dr.K.Anitha

A. Introduction: Objectives of this course, the student shall be able to: • Acquire high consciousness/realization of current issues related to health and pharmaceutical problems within the country and worldwide. • Have a critical way of thinking based on current healthcare development. • Evaluate alternative ways of solving problems related to health and pharmaceutical issues

B. Course Outcomes: At the end of the course, students will be able to:

BP802.1. Discuss the concept of public health and diseases in Indian and International Scenario.

BP802.2. Explain the control measures for various preventable diseases.

BP802.3. Describe the objectives, functioning and outcome of various National Health Programmes.

BP802.4. Write about contemporary pharmacy and health-related concerns.

BP802.5. Explain the function of pharmacists in generalizing and promoting health.

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. **Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

PO.3]. **Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.1]. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

12. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well-being.
13. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).
14. **Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.
15. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.
16. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.
17. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
18. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

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D. Assessment Plan:

Component of Evaluation	Description	Code	Weightage %
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2 quiz, assignment, open book test, field work, group discussion and seminar)		
	Seminar/ Assignment/Quiz/ Open book test	S/As/Q/OBT	3%
Interaction	Student-Teacher interaction	ST	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

Unit I: 10 Hours

Concept of health and disease: Definition, concepts and evaluation of public health. Understanding the concept of prevention and control of disease, social causes of diseases and social problems of the sick. Social and health education: Food in relation to nutrition and health, Balanced diet, Nutritional deficiencies, Vitamin deficiencies, Malnutrition and its prevention. Sociology and health: Socio cultural factors related to health and disease, Impact of urbanization on health and disease, Poverty and health Hygiene and health: personal hygiene and health care; avoidable habits.

Unit II: 10 Hours

Preventive medicine: General principles of prevention and control of diseases such as cholera, SARS, Ebola virus, influenza, acute respiratory infections, malaria, chicken guinea, dengue, lymphatic filariasis, pneumonia, hypertension, diabetes mellitus, cancer, drug addiction-drug substance abuse

Unit III: 10 Hours

National health programs, its objectives, functioning and outcome of the following: HIV AND AIDS control programme, TB, Integrated disease surveillance program (IDSP), National leprosy control programme, National mental health program, National 158 programme for prevention and control of deafness, Universal immunization programme, National programme for control of blindness, Pulse polio programme.

Unit IV: 08 Hours

National health intervention programme for mother and child, National family welfare programme, National tobacco control programme, National Malaria Prevention Program, National programme for the health care for the elderly, Social health programme; role of WHO in Indian national program

Unit V: 07 Hours

Community services in rural, urban and school health: Functions of PHC, Improvement in rural sanitation, national urban health mission, Health promotion and education in school.

F. Examination Scheme:

Components	A	ST	CT	S/As/Q/OBT	EE
Weightage (%)	4	3	15	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

H. 1. Short Textbook of Preventive and Social Medicine, Prabhakara GN, 2 nd Edition, 2010, ISBN: 9789380704104, JAYPEE Publications

I. 2. Textbook of Preventive and Social Medicine (Mahajan and Gupta), Edited by Roy Rabindra Nath, Saha Indranil, 4 th Edition, 2013, ISBN: 9789350901878,

JAYPEE Publications

J. 3. Review of Preventive and Social Medicine (Including Biostatistics), Jain Vivek, 6 th Edition, 2014, ISBN: 9789351522331, JAYPEE Publications 4. Essentials of Community Medicine—A Practical Approach, Hiremath Lalita D, Hiremath Dhananjaya A, 2 nd Edition, 2012, ISBN: 9789350250440, JAYPEE Publications

K. 5. Park Textbook of Preventive and Social Medicine, K Park, 21 st Edition, 2011, ISBN-14: 9788190128285, BANARSIDAS BHANOT PUBLISHERS. 6. Community Pharmacy Practice, Ramesh Adepu, BSP publishers, Hyderabad

L. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Definition,	Lecture	BP802.1	Mid Term-1, Quiz & End Sem Exam
2	concepts and evaluation of public health.	Lecture	BP802.1	Mid Term-1, Quiz & End Sem Exam
3	Understanding the concept of prevention and control of disease,	Lecture	BP802.1	Mid Term-1, Quiz & End Sem Exam
4	*diseases and social problems of the sick.*	Lecture	BP802.1	Mid Term-1, Quiz & End Sem Exam
5	Social and health education: Food in relation to nutrition and health,	Lecture	BP802.1	Mid Term-1, Quiz & End Sem Exam
6	Balanced diet,	Lecture	BP802.1	Mid Term-1, Quiz & End Sem Exam
7	Nutritional	Lecture	BP802.1	Mid

	deficiencies			Term-1, Quiz & End Sem Exam
8	Vitamin deficiencies,	Lecture	BP802.1	Mid Term-1, Quiz & End Sem Exam
9	Malnutrition and its prevention	Lecture	BP802.1	Mid Term-1, Quiz & End Sem Exam
10	Sociology and health: Socio cultural factors related to health and disease,.	Lecture	BP802.1	Mid Term-1, Quiz & End Sem Exam
11	Impact of urbanization on health and disease,	Lecture	BP802.1	Mid Term-1, Quiz & End Sem Exam
12	Poverty and health Hygiene and health:	Lecture	BP802.1	Mid Term-1, Quiz & End Sem Exam
13	personal hygiene and health care; avoidable habits	Lecture	BP802.1	Mid Term-1, Quiz & End Sem Exam
14	General principles of prevention and control of cholera	Lecture	BP802.2	Mid Term-1, Quiz & End Sem Exam
15	General principles of prevention and control of SARS,	Lecture	BP802.2	Mid Term-1, Quiz & End Sem Exam

P. Mohanty

16	General principles of prevention and control of Ebola virus,	Lecture	BP802.2	Mid Term-1, Quiz & End Sem Exam
17	General principles of prevention and control of influenza,	Lecture	BP802.2	Mid Term-1, Quiz & End Sem Exam
18	General principles of prevention and control of acute respiratory infections	Lecture	BP802.2	Mid Term-1, Quiz & End Sem Exam
19	General principles of prevention and control of malaria,	Lecture	BP802.2	Mid Term-1, Quiz & End Sem Exam
20	General principles of prevention and control of chicken guinea,	Lecture	BP802.2	Mid Term-1, Quiz & End Sem Exam
21	General principles of prevention and control of dengue,	Lecture	BP802.2	Mid Term-2, Quiz & End Sem Exam
22	General principles of prevention and control of lymphatic filariasis	Lecture	BP802.2	Mid Term-2, Quiz & End Sem Exam
23	General principles of prevention and control of pneumonia, ,	Lecture	BP802.2	Mid Term-2, Quiz & End Sem Exam
24	General principles of prevention and control of hypertension,	Lecture	BP802.2	Mid Term-2, Quiz & End Sem Exam
25	General principles	Lecture	BP802.2	Mid

	of prevention and control of diabetes mellitus,			Term-2, Quiz & End Sem Exam
26	General principles of prevention and control of cancer	Lecture	BP802.2	Mid Term-2, Quiz & End Sem Exam
27	drug addiction-drug substance abuse	Lecture	BP802.2	Mid Term-2, Quiz & End Sem Exam
28	National health programs, its objectives, functioning and outcome of HIV AND AIDS control programme	Lecture	BP802.3	Mid Term-2, Quiz & End Sem Exam
29	National health programs, its objectives, functioning and outcome of TB	Lecture	BP802.3	Mid Term-2, Quiz & End Sem Exam
30	Integrated disease surveillance program (IDSP)	Lecture	BP802.3	Mid Term-2, Quiz & End Sem Exam
31	National leprosy control programme	Lecture	BP802.3	Mid Term-2, Quiz & End Sem Exam
32	National mental health program	Lecture	BP802.3	Mid Term-2, Quiz & End Sem Exam
33	National 158 programme for prevention and control of deafness,	Lecture	BP802.3	Mid Term-2, Quiz & End Sem Exam

34	Universal immunization programme, National programme for control of blindness	Lecture	BP802.3	Mid Term-2, Quiz & End Sem Exam
35	Pulse polio programme.	Lecture	BP802.3	Mid Term-2, Quiz & End Sem Exam
36	National health intervention programme for mother and child,	Lecture	BP802.3	Mid Term-2, Quiz & End Sem Exam
37	National family welfare programme,	Lecture	BP802.3	Quiz & End Sem Exam
38	National tobacco control programme	Lecture	BP802.3	Quiz & End Sem Exam
39	National Malaria Prevention Program	Lecture	BP802.3	Quiz & End Sem Exam
40	Programme for the health care for the elderly	Lecture	BP802.3	Quiz & End Sem Exam
41	Social health programme; role of WHO in Indian national program	Lecture	BP802.4	Quiz & End Sem Exam
42	Community services in rural,	Lecture	BP802.4	Quiz & End Sem Exam
43	Community services in Urban	Lecture	BP802.4	Quiz & End Sem Exam
44	Functions of PHC	Lecture	BP802.4	Quiz & End Sem Exam
45	Improvement in rural sanitation,	Lecture	BP802.4	Quiz & End Sem Exam

46	National urban health mission	Lecture	BP802.4	Quiz & End Sem Exam
47	Health promotion and education in school.	Lecture	BP802.5	Quiz & End Sem Exam
48	Health promotion and education in school.	Lecture	BP802.5	Quiz & End Sem Exam

M. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
BP802.1	Discuss the concept of public health and diseases in Indian and International Scenario	3	3	1	2	1				1		2

BP802.2.	*Explain the control measures for various preventable diseases.*	3	3	1	3	2				2		2
BP802.3.	*Describe the objectives, functioning and outcome of various National Health Programmes.*	3	3	2	3	2				3		2
BP802.4.	Write about contemporary pharmacy and health-related concerns.	3	3	2	2	2			2	2		2
BP802.5..	Explain the function of pharmacists in generalizing and promoting health	3	3	2	3	3			2	2		3

Sample Question Paper

Amity Institute of pharmacy Department of Pharmaceutical Chemistry II MID-SEMESTER (SEM –VIII) 2021-22						
Class: B.Pharmacy VIII Semester						
Subject Name: BP802T **SOCIAL AND PREVENTIVE PHARMACY**		Time: 1 Hr		Max. Marks: 30		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3,4	Q.2,5,9,10	Q.6	Q.8		Q.7

Student will be

CO1: Discuss the concept of public health and diseases in Indian and International Scenario.

CO2:. Explain the control measures for various preventable diseases.

CO3:. Describe the objectives, functioning and outcome of various National Health Programmes.

CO4:. Write about contemporary pharmacy and health-related concerns.

CO5: Explain the function of pharmacists in generalizing and promoting health.

CO Map	Question No.	Question	Marks
CO3	Q.1	List out the National Schemes related to TB Program	2
CO3	Q.2	Define Polio Control Programme	2
	Q.3	Note on Community services in urban areas	2
CO5	Q.4	Mention the components of PHC	2
CO4	Q.5	Role of WHO in Public health	2
CO3	Q.6	What are the Objectives and functioning of Leprosy programme	10
	Q.7	Functioning and outcomes of National Family Welfare Programme	10
CO3	Q 8	Describe the National AIDS control programme	5

CO3	Q.9	Explain the Objectives and functioning of Tobacco control Programs	5
CO5	Q 10	Include all the core function of PHC in public health	5

. **Attainments**	**Rubric**
Level - 1	IF 60% of students secure more than 60% marks then level 1
Level - 2	IF 70% of students secure more than 60% marks then level 2
Level - 3	IF 80% of students secure more than 60% marks then level 3

Attainment Level – 3:

84.4 % Percentage of students secured more than 60% marks, So this course Social and Preventive Pharmacy – Theory (BP802T) attained level -3.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)
Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACOLOGY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
VIII SEM	BP805ET	3	2	3	4	1	3	2	1	3	1	3	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACOLOGY
Course Handout
Course : PHARMACOVIGILANCE -THEORY
Course Code : BP805ET, Crédits : 04, Session :2021-22 (Even Sem.), Class : B.Pharm. 4TH Year
Faculty Name: Dr. Ankit Yadav, Mr. Deepak Singh Janoti, Dr. Satish Shilpi

A. **Introduction:** This subject is designed to learn about development of pharmacovigilance as a science, basic terminologies used in pharmacovigilance, global scenario of Pharmacovigilance, train students on establishing pharmacovigilance programme in an organization, various methods that can be used to generate safety data and signal detection.

B. **Course Outcomes:** At the end of the course, students will be able to explain:

BP805ET.1. Why drug safety monitoring is important?

BP805ET.2 History and development of pharmacovigilance

BP805ET.3 National and international scenario of pharmacovigilance

BP805ET.4 Dictionaries, coding and terminologies used in pharmacovigilance

BP805ET.5 Detection of new adverse drug reactions and their assessment

BP805ET.6 International standards for classification of diseases and drugs

BP805ET.7 Adverse drug reaction reporting systems and communication in pharmacovigilance

C. **Programme Outcomes:**

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time

management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

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[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	Description	Code	Weightage %
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

Unit I

Introduction to Pharmacovigilance

- History and development of Pharmacovigilance
- Importance of safety monitoring of Medicine
- WHO international drug monitoring programme
- Pharmacovigilance Program of India(PvPI)

Introduction to adverse drug reactions

- Definitions and classification of ADRs
- Detection and reporting
- Methods in Causality assessment

- Severity and seriousness assessment
- Predictability and preventability assessment
- Management of adverse drug reactions

Basic terminologies used in pharmacovigilance

- Terminologies of adverse medication related events
- Regulatory terminologies

Unit II

Drug and disease classification

- Anatomical, therapeutic and chemical classification of drugs
- International classification of diseases
- Daily defined doses
- International Non proprietary Names for drugs

Drug dictionaries and coding in pharmacovigilance

- WHO adverse reaction terminologies
- MedDRA and Standardised MedDRA queries
- WHO drug dictionary
- Eudravigilance medicinal product dictionary

Information resources in pharmacovigilance

- Basic drug information resources
- Specialised resources for ADRs

Establishing pharmacovigilance programme

- Establishing in a hospital
- Establishment & operation of drug safety department in industry
- Contract Research Organisations (CROs)
- Establishing a national programme

Unit III 10 Hours

Vaccine safety surveillance

- Vaccine Pharmacovigilance
- Vaccination failure
- Adverse events following immunization

Pharmacovigilance methods

- Passive surveillance – Spontaneous reports and case series
- Stimulated reporting
- Active surveillance – Sentinel sites, drug event monitoring and registries
- Comparative observational studies – Cross sectional study, case control study and cohort study
- Targeted clinical investigations

Communication in pharmacovigilance

- Effective communication in Pharmacovigilance
- Communication in Drug Safety Crisis management

 Communicating with Regulatory Agencies, Business Partners, Healthcare facilities & Media

Unit IV

Safety data generation

 Pre clinical phase

 Clinical phase

 Post approval phase (PMS)

ICH Guidelines for Pharmacovigilance

 Organization and objectives of ICH

 Expedited reporting

 Individual case safety reports

 Periodic safety update reports

 Post approval expedited reporting

 Pharmacovigilance planning

 Good clinical practice in pharmacovigilance studies

Unit V

Pharmacogenomics of adverse drug reactions

 Genetics related ADR with example focusing PK parameters.

Drug safety evaluation in special population

 Paediatrics

 Pregnancy and lactation

 Geriatrics

CIOMS

 CIOMS Working Groups

 CIOMS Form

CDSCO (India) and Pharmacovigilance

 D&C Act and Schedule Y

 Differences in Indian and global pharmacovigilance requirements

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. Textbook of Pharmacovigilance: S K Gupta, Jaypee Brothers, Medical Publishers.

2. Practical Drug Safety from A to Z By Barton Cobert, Pierre Biron, Jones and Bartlett Publishers.

3. Mann's Pharmacovigilance:Elizabeth B. Andrews, Nicholas, Wiley Publishers.

4. Stephens' Detection of New Adverse Drug Reactions: John Talbot, Patrick Walle, Wiley Publishers.

5. An Introduction to Pharmacovigilance: Patrick Waller,Wiley Publishers.

6. Cobert's Manual of Drug Safety and Pharmacovigilance: Barton Cobert,Jones& Bartlett Publishers.

7. Textbook of Pharmacoepidemiolog edited by Brian L. Strom, Stephen E Kimmel, Sean Hennessy,Wiley Publishers.

8. A Textbook of Clinical Pharmacy Practice -Essential Concepts and Skills:G. Parthasarathi, Karin NyfortHansen,Milap C. Nahata

9. National Formulary of India

10. Text Book of Medicine by Yashpal Munjal

11. Text book of Pharmacovigilance: concept and practice by GP Mohanta and PK Manna

A. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	History and development of Pharmacovigilance Importance of safety monitoring of Medicine	Lecture	1	Mid Term-1, Quiz & End Sem Exam
2	WHO international drug monitoring programme	Lecture	1	Mid Term-1, Quiz & End Sem Exam
3	Pharmacovigilance Program of India(PvPI)	Lecture	1	Mid Term-1, Quiz & End Sem Exam
4	Definitions and classification of ADRs	Lecture	1	Mid Term-1, Quiz & End Sem Exam
5	Detection and reporting of ADR	Lecture	1	Mid Term-1, Quiz & End Sem Exam
6	Methods in Causality assessment Severity and seriousness assessment	Lecture	1,4	Mid Term-1, Quiz & End Sem Exam
7	Predictability and preventability assessment	Lecture	1	Mid Term-1, Quiz & End Sem Exam
8	Management of adverse drug reactions	Lecture	1	Mid Term-1, Quiz & End Sem Exam
9	Terminologies of adverse	Lecture	4	Mid Term-1, Quiz

	medication related events ▯ Regulatory terminologies			& End Sem Exam
10	Unit-1	Tutorial		Mid Term-1, Quiz & End Sem Exam
11	▯ Anatomical, therapeutic and chemical classification of drugs			Mid Term-1, Quiz & End Sem Exam
12	▯ International classification of diseases	Lecture	1	Mid Term-1, Quiz & End Sem Exam
13	▯ Daily defined doses ▯ International Non proprietary Names for drugs	Lecture	4	Mid Term-1, Quiz & End Sem Exam
14	▯ WHO adverse reaction terminologies ▯ MedDRA and Standardised MedDRA queries	Lecture	4	Mid Term-1, Quiz & End Sem Exam
15	▯ WHO drug dictionary ▯ Eudravigilance medicinal product dictionary	Lecture	4	Mid Term-1, Quiz & End Sem Exam
16	▯ Basic drug information resources ▯ Specialised resources for ADRs	Lecture	2,3	Mid Term-1, Quiz & End Sem Exam
17	▯ Establishing in a hospital ▯ Establishment & operation of drug safety department in industry	Lecture	1	Mid Term-1, Quiz & End Sem Exam
18	▯ Contract Research Organisations (CROs)	Lecture	1	Mid Term-1, Quiz & End Sem Exam
19	▯ Establishing a national programme	Lecture	2,3	Mid Term-1, Quiz & End Sem Exam
20	Unit 2	Tutorial		Mid Term-1, Quiz & End Sem Exam
21	▯ Vaccine Pharmacovigilance ▯ Vaccination failure	Lecture	1	Mid Term-1, Quiz & End Sem Exam
22	▯ Adverse events following immunization	Lecture	4	Mid Term-1, Quiz & End Sem Exam
23	▯ Passive surveillance – Spontaneous reports and case series	Lecture	4	Mid Term-1, Quiz & End Sem Exam
24	▯ Stimulated reporting ▯ Active surveillance – Sentinel sites, drug event monitoring and registries	Lecture	1	Mid Term-1, Quiz & End Sem Exam
25	▯ Comparative observational studies – Cross sectional study,	Lecture	4	Mid Term-1, Quiz & End Sem Exam

	case control study and cohort study			
26	Targeted clinical investigations	Lecture	1	Mid Term-1, Quiz & End Sem Exam
27	Effective communication in Pharmacovigilance	Lecture	1	Mid Term-1, Quiz & End Sem Exam
28	Communication in Drug Safety Crisis management	Lecture	4	Mid Term-1, Quiz & End Sem Exam
29	Communicating with Regulatory Agencies, Business Partners, Healthcare facilities & Media	Lecture	5	Mid Term-1, Quiz & End Sem Exam
30	Unit 3	Tutorial		Mid Term-1, Quiz & End Sem Exam
31	Pre clinical phase	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
32	Clinical phase	Lecture	1,6	Mid Term-2, Quiz & End Sem Exam
33	Post approval phase (PMS)	Lecture	1,4	Mid Term-2, Quiz & End Sem Exam
34	Organization and objectives of ICH	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
35	Expedited reporting Individual case safety reports	Lecture	4	Mid Term-2, Quiz & End Sem Exam
36	Periodic safety update reports Post approval expedited reporting	Lecture	1,6	Mid Term-2, Quiz & End Sem Exam
37	Pharmacovigilance planning Good clinical practice in pharmacovigilance studies	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
38	Unit 4	Tutorial		Mid Term-2, Quiz & End Sem Exam
39	Genetics related ADR with example focusing PK parameters.	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam
40	ADR in Paediatrics Geriatrics	Lecture	1,6	Mid Term-2, Quiz & End Sem Exam
41	ADR in Pregnancy and lactation	Lecture	4	Mid Term-2, Quiz & End Sem Exam
42	CIOMS Working Groups	Lecture	5,45	Mid Term-2, Quiz & End Sem Exam
43	CIOMS Form D&C Act and Schedule Y	Lecture	2,3	Mid Term-2, Quiz & End Sem Exam

44	Differences in Indian and global pharmacovigilance requirements	Lecture	4,6	Mid Term-2, Quiz & End Sem Exam
45	Unit 5	Tutorial		Mid Term-2, Quiz & End Sem Exam

B. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP805ET.1.	**BP805ET.1**. Why drug safety monitoring is important?	3	1	3	2	1	1	1	1	3	1	3				
BP805ET.2.	**BP805ET.2** History and development of pharmacovigilance	2	1	3	2	1	1	1	1	2	1	3				
BP805ET.3.	**BP805ET.3** National and international scenario of pharmacovigilance	3	1	2	2	1	1	1	1	3	1	3				
BP805ET.4.	**BP805ET.4** Dictionaries, coding and terminologies used in pharmacovigilance	3	1	3	2	1	1	1	1	2	1	3				

BP805ET.5.	**BP805ET.5** Detection of new adverse drug reactions and their assessment	2	1	3	2	1	1	1	1	3	1	3				
BP805ET.6.	**BP805ET.6** International standards for classification of diseases and drugs	3	1	2	2	1	1	1	1	3	1	3				
BP805ET.7.	**BP805ET.7** Adverse drug reaction reporting systems and communication in pharmacovigilance	3	1	3	3	1	1	1	1	2	1	3				

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmacology I MID-SEMESTER (SEM –VIIIth) 2021-22						
Class: B.Pharm, VIII Semester						
Subject Name: BP805ET Pharmacovigilance Theory		Time: 1 Hrs		Max. Marks: 30		
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3,4,5,9	Q.6,7,8		Q.2		
The student will be able to **CO.1**. Why drug safety monitoring is important? **CO.2** History and development of pharmacovigilance						

CO.3 National and international scenario of pharmacovigilance **CO.4** Dictionaries, coding and terminologies used in pharmacovigilance			
CO Map	Question No.	Question	Marks
CO1	Q.1	Define pharmacovigilance	2
CO1	Q.2	Write the type of ADR	2
CO1	Q.3	Write the importance of ADR monitoring	2
CO2	Q.4	Define the PvPI in short.	2
CO2	Q.5	Write the name of Methods in Causality assessment	2
CO4	Q.6	Give a detailed note on Anatomical, therapeutic, and chemical classification of drugs	10
CO2	Q.7	Write the History and development of Pharmacovigilance.	10
CO4	Q.8	Write a note on WHO drug dictionary	5
CO3	Q.9	What do you mean by Contract Research Organisations (CROs).	5
CO2	Q.10	Write about Predictability and preventability assessment	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment below Level 1:

48.9 % of students secured more than 60% marks, so this course Biostatistics and Research Methodology - Theory (BP801T) attainment is below level 1.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY

Programme Educational Objectives (PEOs)
Bachelor of Pharmacy (B. Pharm.)

PEO 1: To provide basic and core knowledge and application in the field of pharmaceutical technology and abilities in organizational and management skills with a strong focus on analysis and problem-solving potential.

PEO 2: To identify and nurture the leadership qualities to facilitate improvement in the healthcare sector with a distinct professional identity and strong technical competence.

PEO 3: To inculcate ethical and moral values among the students to serve efficiently and contribute positively to society through effective and clear communication.

PEO 4: To understand and apply the strategies of pharmacy practice to support environmental sustainability and prepare the students as a lifelong learner to deliver pharmaceutical care in the ever-changing world.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I SEM																

II SEM																
III SEM																
IV SEM	-															
	-															
	-															
	-															
	-															
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V SEM VI SEM																
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VII SEM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VIII SEM	BP103T	3	-	1	3	1	3	1	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Dr. Mohanty

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF Pharmaceutical chemistry
Course Handout
Course : COMPUTER AIDED DRUG DESIGN THEORY
Course Code : BP 807 ET, Crédits : 04, Session :2021-22 (Even Sem.), Class : B.Pharm. IV Year
Faculty Name: Dr. Srabanti Jana

A. Introduction: The course is designed to impart fundamental knowledge on the preparatory
pharmacy with arts and science of preparing the different conventional dosage forms.

B. Course Outcomes: At the end of the course, students will be able to:

BP501T.1. Understand the understand Design and discovery of lead molecules

BP501T.2. Understand the role of drug design in drug discovery process

BP501T.3. The concept of QSAR and docking

BP501T.4. Know the various strategies to develop new drug like molecules.

BP501T.5. Study the design of new drug molecules using molecular modelingsoftware

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal	Mid Term 1	CT	15%
	Mid Term 2		

Evaluation	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

UNIT – I

Introduction to Drug Discovery and Development

Stages of drug discovery and development

Lead discovery and Analog Based Drug Design

Rational approaches to lead discovery based on traditional medicine, Random screening, Non-random screening, serendipitous drug discovery, lead discovery based on drug metabolism, lead discovery based on clinical observation.

Analog Based Drug Design: Bioisosterism, Classification, Bioisosteric replacement. Any three case studies

UNIT – II

Quantitative Structure Activity Relationship (QSAR) SAR versus QSAR, History and development of QSAR, Types of physicochemical parameters, experimental and theoretical approaches for the determination of physicochemical parameters such as Partition coefficient, Hammet's substituent constant and Tafts steric constant. Hansch analysis, Free Wilson analysis, 3D-QSAR approaches like COMFA and COMSIA.

UNIT – III

Molecular Modeling and virtual screening techniques

Virtual Screening techniques: Drug likeness screening, Concept of pharmacophore mapping and pharmacophore based Screening,

Molecular docking: Rigid docking, flexible docking, manual docking, Docking based screening. *De novo* drug design.

UNIT – IV

Informatics & Methods in drug design

Introduction to Bioinformatics, chemoinformatics. ADME databases, chemical, biochemical and pharmaceutical databases.

UNIV – V

Molecular Modeling: Introduction to molecular mechanics and quantum mechanics.Energy Minimization methods and Conformational Analysis, global conformational minima determination.

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. Robert GCK, ed., "Drug Action at the Molecular Level" University Prak Press Baltimore.
2. Martin YC. "Quantitative Drug Design" Dekker, New York.
3. Delgado JN, Remers WA eds "Wilson & Gisvolds's Text Book of Organic Medicinal & Pharmaceutical Chemistry" Lippincott, New York.
4. Foye WO "Principles of Medicinal chemistry 'Lea & Febiger.
5. Koro lkovas A, Burckhalter JH. "Essentials of Medicinal Chemistry" Wiley Interscience.
6. Wolf ME, ed "The Basis of Medicinal Chemistry, Burger's Medicinal Chemistry" JohnWiley& Sons, New York.
7. Patrick Graham, L., An Introduction to Medicinal Chemistry, Oxford University Press.
8. Smith HJ, Williams H, eds, "Introduction to the principles of Drug Design" Wright Boston.
9. Silverman R.B. "The organic Chemistry of Drug Design and Drug Action" Academic Press New York.

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Introduction to Drug Discovery and Development	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
2	Drug Discovery and Development	Lecture	4,5	Mid Term-1, Quiz & End Sem Exam
3	Lead discovery	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
4	Analog Based Drug Design	Tutorial	1,2,3	Mid Term-1, Quiz & End Sem Exam
5	Stages of drug discovery and development	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
6	Rational approaches to lead discovery based on traditional medicine,	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
7	Random screening	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
8	Non-random screening,	Tutorial	1,2,3,4	Mid Term-1, Quiz & End Sem Exam
9	serendipitous drug	Lecture	1,2,3	Mid Term-1, Quiz

	discovery			& End Sem Exam
10	lead discovery based on drug metabolism	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
11	lead discovery based on clinical observation.	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
12	Analog Based Drug Design:	Tutorial	4, 1,2,3	Mid Term-1, Quiz & End Sem Exam
13	Bioisosterism,	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
14	Classification,	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
15	Bioisosteric replacement.	Lecture	5,1,2,3	Mid Term-1, Quiz & End Sem Exam
16	Any three case studies	Tutorial	1,2,3	Mid Term-1, Quiz & End Sem Exam
17	Molecular Modeling .	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
18	and virtual screening techniques	Lecture	5, 1,2,3	Mid Term-2, Quiz & End Sem Exam
19	Virtual Screening techniques:	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
20	Drug likeness screening,	Tutorial	1,2,3	Mid Term-2, Quiz & End Sem Exam
21	Concept of pharmacophore mapping and	Lecture	5, 1,2,3	Mid Term-2, Quiz & End Sem Exam
22	pharmacophore based Screening,	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
23	Molecular docking:	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
24	Rigid docking,	Tutorial	1,2,3	Mid Term-2, Quiz & End Sem Exam
25	flexible docking	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
26	manual docking,	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
27	Docking based screening.	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
28	*De novo* drug design	Tutorial	1,2,3	Mid Term-2, Quiz & End Sem Exam
29	Applications of docking	Lecture	1,2,3	Mid Term-1, Quiz & End Sem Exam
30	Applications of pharmacophore based Screening,	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam

31	Quantitative Structure Activity Relationship (QSAR)	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
32	SAR versus QSAR, History	Tutorial	1,2,3	Mid Term-2, Quiz & End Sem Exam
33	and development of QSAR,	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
34	Types of physicochemical parameters,	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
35	experimental and theoretical approaches	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
36	the determination of physicochemical parameters	Tutorial	1,2,3	Mid Term-2, Quiz & End Sem Exam
37	Partition coefficient	Lecture	5, 1,2,3	Mid Term-2, Quiz & End Sem Exam
38	Hammet's substituent constant .	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
39	Tafts steric constant.	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
40	Hansch analysis,	Tutorial	1,2,3	Mid Term-2, Quiz & End Sem Exam
41	Free Wilson analysis,	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
42	3D-QSAR approaches	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
43	COMFA	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
44	COMSIA	Tutorial	5	Mid Term-2, Quiz & End Sem Exam
45	Molecular Modeling	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
46	Informatics	Lecture	1,2,3	Mid Term-2, Quiz & End Sem Exam
47	Methods in drug design	Lecture	1,2,3	Quiz & End Sem Exam
48	LBDD	Tutorial	1,2,3	Quiz & End Sem Exam
49	SBDD	Lecture	1,2,3	Quiz & End Sem Exam

P. Mohanaty

50	Introduction to Bioinformatics,	Lecture	5	Quiz & End Sem Exam
51	chemoinformatics.	Lecture	5	Quiz & End Sem Exam
52	ADME databases, .	Tutorial	1,2,3	Quiz & End Sem Exam
53	*chemical, databases*	Lecture	1,2,3	Quiz & End Sem Exam
54	*biochemical databases*	Lecture	1,2,3	Quiz & End Sem Exam
55	*pharmaceutical databases*	Lecture	1,2,3	Quiz & End Sem Exam
56	**Molecular Modeling:** Introduction to molecular mechanics and quantum mechanics.	Tutorial	1,2,3	Quiz & End Sem Exam
57	Energy Minimization methods	Lecture	1,2,3	Quiz & End Sem Exam
58	Conformational Analysis,	Lecture	1,2,3	Quiz & End Sem Exam
59	Conformational Analysis,	Lecture	5	Quiz & End Sem Exam
60	global conformational minima determination.	Tutorial	5	Quiz & End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BP501T.1	***BP501T.1.*** Understand the Design and discovery of lead molecules	3	-	-	3	2	2	1	-	1	-	-				

BP501T.2.	**BP501T.2.** Understand the role of drug design in drug discovery process	3	-	-	3	-	2	-	-	-	-	1				
BP501T.3.	***BP501T.3.*** Understand the concept of QSAR and docking	3	2	-	3	-	1	-	-	-	-	1				
BP501T.4.	**BP501T.4**. Know the Various strategies to develop new drug like molecules.	2	1	3	3	-	1	-	-	-	-	1				
BP501T.5.	***BP501T.5***. Study the design of new drug molecules using molecular modeling software	3	-	3	3	-	-	-	-	-	-					

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutical Chemistry I MID-SEMESTER (SEM – VIII) 2021-22						
Class: B.Pharm, VIII Semester						
Subject Name: BP 807 ET. COMPUTER AIDED DRUG DESIGN ((Theory)		Time: 1 Hrs			Max. Marks: 30	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,3,4,5	Q.6,8,9	Q.2	Q.7, 10		
The student will be able to CO1. Understand the understand Design and discovery of lead molecules CO2. Understand the role of drug design in drug discovery process CO.3. Understand the concept of QSAR and docking CO4. Know the various strategies to develop new drug like molecules. CO5. Study the design of new drug molecules using molecular						

modeling software			
CO Map	Question No.	Question	Marks
CO4	Q.1	Write the application of serendipitous drug discovery with suitable example	2
CO5	Q.2	Write the difference between lead discovery and analog based drug design	2
CO1	Q.3	What is lead optimization and hit identification?	2
CO2	Q.4	Define Quantitative Structure Activity Relationship (QSAR) and its applications	2
CO2	Q.5	What are Hansch analysis and its significance?	2
CO1	Q.6	Explain in detail about the drug likeness screening and the concept of pharmacophore mapping.	10
CO4	Q.7	Discuss about the 3D-QSAR approaches like COMFA and COMSIA in the drug discovery process.	10
CO3	Q.8	Write short notes on types of Physicochemical parameter in QSAR analysis with suitable examples.	5
CO2	Q.9	Outline Stages of drug discovery and development process.	5
CO4	Q.10	Discuss about rigid docking, flexible docking used in drug design	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3

Attainment Level 1:

62.2 % Percentage of students secured more than 60% marks, so this course Computer Aided Drug Design -Theory (BP807ET) attained Level 1.

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY INSTITUTE OF PHARMACY
DEPARTMENT OF PHARMACEUTICS

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Pharmacy (B. Pharm.), Academic Year – 2021-22

Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

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[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Note: - Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
VIII SEM	BP813ET	3	3	3	3	1	1	2	2	1	1	3				
	-															
	-															
	-															

AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

DEPARTMENT OF PHARMACEUTICS
Course Handout
Course : Pharmaceutical Product Development
Course Code :BP813ET, Crédits:04, Session :2021-22 (Even Sem.), Class : B.Pharm. 4th Year
Faculty Name: Dr. Jovita Kanoujia

A. Introduction: This course deals with the various aspects of quality control and quality assurance aspects of pharmaceutical industries. It deals with the important aspects like cGMP, QC tests, documentation, quality certifications and regulatory affairs..

B. Course Outcomes: At the end of the course, students will be able to:

BP813ET.1. Provide the enhanced product and process understanding and regulation in product development.

BP813ET.2. Achieve the goal of large-scale product with reproducible quality product.

BP813ET.3. Understand the advancement in pharmaceutical manufacturing and analytical techniques.

BP813ET.4. Understand design, development, optimization and stability of pharmaceutical products.

BP813ET.5. Provide the enhanced knowledge of excipients.

C. Programme Outcomes:

[PO.1]. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

[PO.2]. Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

[PO.3]. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

[PO.4]. Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

[PO.5]. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

[PO.6]. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

[PO.7]. Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

[PO.8]. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

[PO.9]. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

[PO.10]. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.11]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

D. Assessment Plan:

Component of Evaluation	**Description**	**Code**	**Weightage %**
Continuous Internal Evaluation	Mid Term 1	CT	15%
	Mid Term 2		
	Seminar/Viva-Voce/Quiz/Home Assignment	S/V/Q/HA	3%
	Student – Teacher interaction	S-T I	3%
Attendance	A minimum of 80% Attendance is required to be maintained by a studentto be qualified for taking up the End Semester examination. The allowance of 20% includes all types of leaves including medical leaves.	A	4%
End Semester Examination	End Semester Examination	EE	75%
Total			**100%**

E. Syllabus

UNIT – I

Introduction to pharmaceutical product development, objectives, regulations related to preformulation, formulation development, stability assessment, manufacturing and quality control testing of different types of dosage forms.

UNIT - II

An advanced study of Pharmaceutical Excipients in pharmaceutical product development with a special reference to the following categories

i. Solvents and solubilizers
ii. Cyclodextrins and their applications
iii. Non-ionic surfactants and their applications
iv. Polyethylene glycols and sorbitols
v. Suspending and emulsifying agents
vi. Semi solid excipients**.**

UNIT – III

An advanced study of Pharmaceutical Excipients in pharmaceutical product development with a special reference to the following categories

i. Tablet and capsule excipients
ii. Directly compressible vehicles
iii. Coat materials
iv. Excipients in parenteral and aerosols products
v. Excipients for formulation of NDDS

Selection and application of excipients in pharmaceutical formulations with specific industrial applications.

UNIT – IV

Optimization techniques in pharmaceutical product development. A study of various optimization techniques for pharmaceutical product development with specific examples. Optimization by factorial designs and their applications. A study of QbD and its application in pharmaceutical product development.

UNIT – V

Selection and quality control testing of packaging materials for pharmaceutical product development- regulatory considerations.

F. Examination Scheme:

Components	A	CT	S/V/Q/HA	STI	EE
Weightage (%)	4	15	3	3	75

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, STI: Student-Teacher Interaction, EE: End Semester Examination; A: Attendance

G. Suggested Text/Reference Books:

1. HA Pawar and KG Lalitha. Pharmaceutical Product Development: A systematic Approach. Lambert Publication.
2. Vandana B. Patravale. Pharmaceutical Product Development: Insights into Pharmaceutical Processes, Management and Regulatory Affairs. CRC Press.

3. Published Research and Review articles.

H. Lecture Plan

Lecture	Topics	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Introduction to pharmaceutical product development, objectives,	Lecture	1, 2,3	Mid Term-1, Quiz & End Sem Exam
2	Regulations related to preformulation	Lecture	1	Mid Term-1, Quiz & End Sem Exam
3	Formulation development	Lecture	1,2,3,4	Mid Term-1, Quiz & End Sem Exam
4	Formulation development	Lecture	1,2,3,4	Mid Term-1, Quiz & End Sem Exam
5	Stability assessment	Lecture	4	Mid Term-1, Quiz & End Sem Exam
6	Stability assessment	Lecture	4	Mid Term-1, Quiz & End Sem Exam
7	Manufacturing and quality control testing of different types of dosage forms	Lecture	3	Mid Term-1, Quiz & End Sem Exam
8	Manufacturing and quality control testing of different types of dosage forms	Lecture	3	Mid Term-1, Quiz & End Sem Exam
9	Manufacturing and	Lecture	3	Mid

	quality control testing of different types of dosage forms			Term-1, Quiz & End Sem Exam
10	Manufacturing and quality control testing of different types of dosage forms	Lecture	3	Mid Term-1, Quiz & End Sem Exam
11	Quiz	Tutorial		Quiz & End Sem
12	An advanced study of Pharmaceutical Excipients in pharmaceutical product development with a special reference to the following categories: Solvents and solubilizers	Lecture	1, 4, 5	Mid Term-1, Quiz & End Sem Exam
13	Solvents and solubilizers	Lecture	1, 3	Mid Term-1, Quiz & End Sem Exam
14	Cyclodextrins and their applications	Lecture	1, 5	Mid Term-1, Quiz & End Sem Exam
15	Non-ionic surfactants and their applications	Lecture	1, 4, 5	Mid Term-1, Quiz & End Sem Exam
16	Polyethylene glycols and sorbitols	Lecture	1, 4, 5	Mid Term-1, Quiz & End Sem Exam
17	Suspending and emulsifying agents	Lecture	1, 4, 5	Mid Term-1, Quiz & End Sem Exam
18	Suspending and	Lecture	1, 4, 5	Mid

	emulsifying agents			Term-1, Quiz & End Sem Exam
19	Semi solid excipients	Lecture	1,4, 5	Mid Term-1, Quiz & End Sem Exam
20	Semi solid excipients	Lecture	1,4,5	Mid Term-1, Quiz & End Sem Exam
21	Semi solid excipients	Lecture	1,4,5	Mid Term-1, Quiz & End Sem Exam
22	Unit test	Tutorial		Mid Term-1, Quiz & End Sem Exam
23	An advanced study of Pharmaceutical Excipients in pharmaceutical product development with a special reference to the following categories: Tablet and capsule excipients	Lecture	4,5	Mid Term-1, Quiz & End Sem Exam
24	Tablet and capsule excipients	Lecture	1,4,5	Mid Term-1, Quiz & End Sem Exam
25	Directly compressible vehicles	Tutorial	1,4,5	Mid Term-1, Quiz & End Sem Exam
26	Coat materials	Lecture	1,4,5	Mid

				Term-1, Quiz & End Sem Exam
27	Coat materials	Lecture	1,4,5	Mid Term-1, Quiz & End Sem Exam
28	Excipients in parenteral and aerosols products	Lecture	1, 4, 5	Mid Term-2, Quiz & End Sem Exam
29	Excipients in parenteral and aerosols products	Lecture	1, 4, 5	Mid Term-2, Quiz & End Sem Exam
30	Excipients for formulation of NDDS	Lecture	1, 4, 5	Mid Term-2, Quiz & End Sem Exam
31	Excipients for formulation of NDDS	Lecture	1, 4, 5	Mid Term-2, Quiz & End Sem Exam
32	Excipients for formulation of NDDS Selection and application of excipients in pharmaceutical formulations with specific industrial applications.	Lecture	1, 4, 5	Mid Term-2, Quiz & End Sem Exam
33	Optimization techniques in pharmaceutical product development.	Lecture	1,4	Mid Term-2, Quiz & End Sem Exam
34	Optimization techniques in	Lecture	1,4	Mid Term-2,

	pharmaceutical product development.			Quiz & End Sem Exam
35	A study of various optimization techniques for pharmaceutical product development with specific examples.	Lecture	1,4	Mid Term-2, Quiz & End Sem Exam
36	A study of various optimization techniques for pharmaceutical product development with specific examples.	Lecture	1,4	Mid Term-2 Quiz & End Sem Exam
37	Optimization by factorial designs and their applications.	Lecture	4	Mid Term-2, Quiz & End Sem Exam
38	Optimization by factorial designs and their applications.	Lecture	4	Mid Term-2, Quiz & End Sem Exam
39	A study of QbD and its application in pharmaceutical product development.	Lecture	4	Mid Term-2, Quiz & End Sem Exam
40	A study of QbD and its application in pharmaceutical product development.	Lecture	4	Mid Term-2, Quiz & End Sem Exam
41	Selection and quality control testing of packaging materials for pharmaceutical product development-regulatory considerations.	Lecture	1,5	Mid Term-2, Quiz & End Sem Exam
42	Selection and quality	Lecture	1,5	Mid

	control testing of packaging materials for pharmaceutical product development-regulatory considerations.			Term-2, Quiz & End Sem Exam
43	Selection and quality control testing of packaging materials for pharmaceutical product development-regulatory considerations.	Lecture	1,5	Mid Term-2, Quiz & End Sem Exam
44	Selection and quality control testing of packaging materials for pharmaceutical product development-regulatory considerations.	Lecture	1,5	Mid Term-2, Quiz & End Sem Exam
45	Selection and quality control testing of packaging materials for pharmaceutical product development-regulatory considerations.	Lecture	1,5	Mid Term-2, Quiz & End Sem Exam
46	Selection and quality control testing of packaging materials for pharmaceutical product development-regulatory considerations.	Lecture	1,5	Mid Term-2, Quiz & End Sem Exam
47	Selection and quality control testing of packaging materials for pharmaceutical product development-regulatory considerations.	Lecture	1,5	Mid Term-2, Quiz & End Sem Exam
48	Quiz	Tutorial		Quiz &

				End Sem Exam

I. Course Articulation Matrix (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAMME OUTCOMES												CORRELATION WITH PROGRAMME SPECIFIC OUTCOMES		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
***BP813ET.*1.**	**CO1**. Provide the enhanced product and process understanding and regulation in product development.	3	3	3	3	1	3	2	3	1	3	3				
BP813ET.2.	**CO2**. Achieve the goal of large-scale product with reproducible quality product.	3	3	3	3	2	3	2	3	3	3	3				
BP813ET.3.	**CO3**. Understand the advancement in pharmaceutical manufacturing and analytical techniques.	3	3	3	3	1	3	2	2	2	1	3				
BP813ET.4.	**CO4.** Understand design, development, optimization and stability of pharmaceutical products.	3	3	3	3	2	2	2	3	1	3	3				
***BP813ET.*5.**	CO5. Provide the enhanced knowledge of excipients.	3	2	3	2	1	2	2	1	1	2	3				

Sample Question Paper

Amity Institute of Pharmacy Department of Pharmaceutics I MID-SEMESTER (SEM –8th) 2022-23						
Class: B.Pharm, 8th Semester						
Subject Name: Pharmaceutical Product Development (BP813ET)		Time: 1 Hrs			Max. Marks: 30	
Levels of the questions as per Blooms Taxonomy	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Question Mapping	Q.1,2,3,4,7	Q. 2,3, 5,8,9	Q.7,8,10	Q.5,6,9		

CO1. Provide the enhanced product and process understanding and regulation in product development.

CO2. Achieve the goal of large-scale product with reproducible quality product.

CO3. Understand the advancement in pharmaceutical manufacturing and analytical techniques.

CO4. Understand design, development, optimization and stability of pharmaceutical products.

CO5. Provide the enhanced knowledge of excipients.

CO Map	Question No.	Question	Marks
CO1,2	Q.1	What is pharmaceutical product development? Write two objectives.	2
CO3	Q.2	What is quality control of drug?	2
CO1,2,3	Q.3	Why preformulation study is important in product development?	2
CO5	Q.4	What are solubilizers? Give two examples.	2
CO3,5	Q.5	What is surfactant? Write some application of non-ionic surfactant.	2
CO3	Q.6	Explain the quality control of tablets.	10
CO4,5	Q.7	What are the objectives of product development. Discuss the different techniques used for preformulation studies. Explain the applications of cyclodextrin.	10

CO1,2	Q.8	Discuss the advancement in the emulsifying agents.	5
CO3	Q.9	Discuss in brief the in-process quality control of tablets.	5
CO4	Q.10	Write the stability assessment of parenteral products.	5

Attainments		**Rubric**
Level	1	IF 60% of students secure more than 60% marks then level 1
Level	2	IF 70% of students secure more than 60% marks then level 2
Level	3	IF 80% of students secure more than 60% marks then level 3