B.Sc. + M. Sc. Biotechnology (Dual Degree)

Programme Code: UMS

Duration – 5 Years Full Time

Programme Structure
And
Curriculum & Scheme of Examination

2010

AMITY UNIVERSITY UTTAR PRADESH
GAUTAM BUDDHA NAGAR
PREAMBLE

Amity University aims to achieve academic excellence by providing multi-faceted education to students and encourage them to reach the pinnacle of success. The University has designed a system that would provide rigorous academic programme with necessary skills to enable them to excel in their careers.

This booklet contains the Programme Structure, the Detailed Curriculum and the Scheme of Examination. The Programme Structure includes the courses (Core and Elective), arranged semester wise. The importance of each course is defined in terms of credits attached to it. The credit units attached to each course has been further defined in terms of contact hours i.e. Lecture Hours (L), Tutorial Hours (T), Practical Hours (P). Towards earning credits in terms of contact hours, 1 Lecture and 1 Tutorial per week are rated as 1 credit each and 2 Practical hours per week are rated as 1 credit. Thus, for example, an L-T-P structure of 3-0-0 will have 3 credits, 3-1-0 will have 4 credits, and 3-1-2 will have 5 credits.

The Curriculum and Scheme of Examination of each course includes the course objectives, course contents, scheme of examination and the list of text and references. The scheme of examination defines the various components of evaluation and the weightage attached to each component. The different codes used for the components of evaluation and the weightage attached to them are:

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It is hoped that it will help the students study in a planned and a structured manner and promote effective learning. Wishing you an intellectually stimulating stay at Amity University.

July, 2010
## PROGRAMME STRUCTURE

### FIRST SEMESTER

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Note: The students will study English from I semester but final evaluation will be done at the end of IInd semester. However continuous evaluation will start from the 1st Semester

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**FOURTH SEMESTER**

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**SUMMER TRAINING: 4 – 6 WEEKS**

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**SEVENTH SEMESTER**

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**EIGHTH SEMESTER**

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**SUMMER INTERNSHIP OF 8-10 WEEKS**

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**TENTH SEMESTER**

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Curriculum & Scheme of Examination

INTRODUCTORY BIOCHEMISTRY AND BIOPHYSICS

Course Code: UMS 101 Credit Units: 03

Course Objective:
Basics in Biochemistry and Biophysics will be taught to the students in the first year itself, which will act as a foundation for all further courses in Biotechnology. The students will be familiarized with structures and functions of biomolecules and basic energetic that governs the biological reactions.

Course Contents:

Module I: Nature of Biological materials

Module II: Perspectives of biological macromolecules
Types of chemical bonds, hydrophilic and hydrophobic groups in biomolecules, repeating units in proteins and nucleic acids, Basis for intermolecular interaction with examples.

Module III: Bio-energetic
Laws of thermodynamics (1st & 2nd laws), electrical properties of biological compartments; electrochemical gradients, membrane potential, chemiosmotic hypothesis.

Module IV: Energetic of a living body
Primary events in photosynthesis; strategies of light reception in microbes, plants and animals. Correction of vision faults, generation and reception of sonic vibrations.

Module V: Electrical properties of biological compartments
Electricity as a potential signal, Neurotransmitters, Intra and intermolecular interactions in biological system Spatial and charge compatibility as determinant of such interactions.

Examination Scheme:

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Text & References:

Text:
- Outline of Biochemistry, Conn & Stumph.
- Fundamentals of Biochemistry, J.L. Jain.

References:
- Textbook of Biochemistry, Lehninger.
- Instant notes in Biochemistry, Hames & Hooper.
- Anatomy and Physiology – Tortora & Grabowski.
- Biochemistry - Voet & Voit.
BIO-ANALYTICAL TECHNIQUES

Course Objective:
The student will be exposed to principles, instrumentation & application of various instruments & techniques used in biological field.

Course Contents:

Module I: Instruments, basic principles and usage
pH meter, absorption and emission spectroscopy, Principle and law of absorption, fluorimetry, colorimetry, spectrophotometry (visible, UV, infra-red), polarography, centrifugation, atomic absorption, NMR, X-ray crystallography.

Module II: Chromatography techniques
Paper chromatography, thin layer chromatography, column chromatography, gas chromatography, gel filtration and ion exchange chromatography,

Module III: Electrophoresis
SDS polyacrylamide electrophoresis, immunoelectrophoresis, Isoelectric focussing.

Module IV: Radioisotope tracer techniques and autoradiography

Examination Scheme:

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Text & References:

Text:
- Practical Biochemistry, Principles and Techniques, Keith Wilson and John Walker
- Bioinstrumentation, Webster

References:
- Advanced Instrumentation, Data Interpretation, and Control of Biotechnological Processes, J.F. Van Impe, Kluwer Academic
- Crystal Structure Analysis, J.P. Glusker and K.N. Trueblood, Oxford University Press
- Modern Spectroscopy, J.M. Hollas, John Wiley and Son Ltd.
- NMR Spectroscopy: Basic Principles, Concepts and Applications in Chemistry, H. Gunther, John Wiley and Sons Ltd.
- Principles of Physical Biochemistry, K.E. Van Holde, Prentice Hall.
- Principles and Practice of Bioanalysis, Richard F. Venn
- Microscopic Techniques in Biotechnology, Michael Hoppert
- Principles of Fermentation Technology, P.F. Stanbury, A. Whitaker, S.J. Hall
Course Objective:
The objective of this course is to provide a conceptual frame work for dealing with the evolving understanding of cell. The students will learn about cell as a unit of living systems, its various organelles, their structure, function and metabolic processes.

Course Contents:

Module I: Cell as a basic unit of living systems
The cell theory, precellular evolution; broad classification of cell types: archaebacteria, PPLOs, bacteria, eukaryotic microbes, plant – and animal cells.

Module II: Ultrastructure of the cell membrane and cell organelles
Ultrastructure of cell membrane and function, Structure of cell organelles; golgi bodies, endoplasmic reticulum (rough and smooth), ribosomes, mitochondria, chloroplast, lysosomes, peroxysomes, nucleus (nuclear membrane, nucleoplasm, nucleolus).

Module III: Chromosomes
Structural organisation of chromosomes, chromatids, centromere, telomere, chromatin, nucleosome organisations; eu-and heterochromatin.

Module IV: Cell division and cell cycle
Cell cycle, interphase, mitosis and meiosis

Module V: Cell – Cell interaction
Cell locomotion (amoeboid, flagellar and ciliar); cell senescence and death (apoptosis).

Module VI: Cell differentiation
Cytoskeleton, Mechanism of cell differention (e.g., RBC); difference between normal and cancer cells.

Examination Scheme:

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Text & References:

**Text:**
- Cell and Molecular Biology, DeRobertis, B.I. Publication Pvt. Ltd.
- Cell and Molecular Biology - Sheelar & Bianchi, John Wiley

**References:**
- Cell and Molecular Biology, Gerald Karp, John Wiley and Sons Inc.
- Cell Biology, Singh & Tomar
- The world of the cell – Becker, Klinshmith & Harden, Pearson
MATHS AND BIOSTATISTICS

Course Code: UMS 104
Credit Units: 03

Course Objective:
The course involves a working understanding of tools of mathematical & statistical skills in the field of biology.

Course Contents:

MATHS

Module I: Bridge course
Set theory and properties of subsets, Binomial theorem of integer, logarithm (definition & laws of logarithm, use of log table), surds, square root & cube root,

Module II
Function, limits of functions, (basic idea of limits of functions without analytic definition), derivatives of functions, Matrices (Fundamental calculations and calculation of Eigen values) and Series

BIOSTATISTICS

Module III
Measure of central tendency and measure of dispersion
Probability (classical & axiomatic definition of probability, theorem on total and compound probability), Addition and Multiplication theorem of Probability, Random variables and Probability Distribution
Simple problems involving Binomial, Poisson and Normal variables,

Module IV
Correlation and regression,
Methods of sampling, collection of data: primary & secondary data, Probability Sampling and non Probability Sampling methods

Examination Scheme:

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Text & References:

Text:
- Fundamental of Biostatistics, Bernard Rosner, Oxford University Press
- Mathematical Statistics, H.C. Saxena, S. Chand & Company

References:
- Introduction to Probability Theory, P.G. Hoel, Houghton Mifflin College
- Schaum’s Outline of Probability, Random Variables and Random Processes, H.P. Hsu, McGraw-Hill Trade
- Statistics of Extremes, E.J. Gumbel, Columbia University Press
Course Objective:
The objective of this course is to familiarize the students with the classification, morphology, reproduction and economic importance of various groups of lower plants which will provide the basic knowledge for the employment of these plants to study plant biotechnology.

Course Contents:

Module I: Algae
Fritsch Classification, occurrence, structure, systematic position mode of reproduction and economic importance of the following genera:
*Chlamydomonas, Chara, Sargassum, Polysiphonia, Nostoc*.

Module II: Fungi
Outlines of classification of fungi, position, occurrence, structure and mode of reproduction in fungi, based on the following representatives: *Eurotium, Morchella, Agaricus and Alternaria*. Economic importance of fungi, Lichens: Classification, occurrence, systematic position, mode of nutrition, reproduction and economic importance.

Module III: Bryophytes
Outlines of classification and importance of bryophytes, Systematic position occurrence, morphology, anatomy and reproduction in, *Marchantia, Anthoceros* (Development of Sporophyte only).

Module IV: Pteridophytes
Systematic Position, occurrence, morphology, anatomy and development of reproductive structures of *Selaginella, Equisetum and Marsilea*, Stelar system and its evolution in Pteridophytes, Heterospory and seed habit.

Examination Scheme:

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Text & References:

Text:
- College Botany Vol. I and II, Ganguli and Kar

References:
- Introductory Phycology, H. D. Kumar.
- Introductory Mycology, Alexopoulos and Mims
- Cryptogamic Botany, G. M. Smith.
- A Text book of Algae, B. R. Vashishta
- Bryophytes, N. S. Parihar
- Pteridophytes, N. S. Parihar
- An Introduction to Pteridophytes, A. Rashid.
Course Objective:
The objective of this course is to educate the students about molecules, their energy to form bonds, metallurgy of elements, kinetic theory of gases, Vander walls equation and also enzymatic catalysis.

Course Contents:

INORGANIC

Module I
Chemical bonds and molecules, Shapes of simple molecules, bond energy, bond length, resonance and Hydrogen bond.

Module II: Radioactivity
Natural and artificial, group displacement law, half life period, binding energy, nuclear reaction equations, isotopes, tracers, radio dating, Application of radioactivity.

Module III: Periodic Table
Modern periodic table, periodicity in properties of elements, atomic radii, ionic and covalent radii, ionization energies, electron affinity, electro-negativity.

Module IV
Metallurgy of S block elements (Na, K, Be, Mg, Ca)

PHYSICAL

Module V: Gases
Kinetic theory of gases, Vander Waal’s equation, critical constants, Liquefaction of gases.

Module VI: Chemical-Kinetics
Velocity of a reaction, Law of mass action; determination of rate constants for first and second order reactions, collision theory of bimolecular reactions.
Catalysis: Promoters and Poisons, Enzyme catalysis.

Examination Scheme:

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<td>70</td>
</tr>
</tbody>
</table>

Text & References:

Text:
- Test book of Inorganic Chemistry, P.L. Soni, Sultan Chand & Sons

References:
- Simplified Course in Inorganic Chemistry, Madan & Tuli, S. Chand & Co. Ltd.
- Concise Inorganic Chemistry, J.D. Lee, Black Well Sciences
- Essentials of Physical Chemistry, Bahl & Tuli, S. Chand & Co. Ltd.
- Simplified course in Physical Chemistry, Madan & Tuli, S. Chand & Co. Ltd.
- Atkin’s Physical Chemistry, Atkin, Oxford Press.
- Physical Chemistry, Vemulapalli, Printice Hall of India
BIOTECHNOLOGY LAB – I
(BASED ON BIOCHEMISTRY, CELL BIOLOGY AND BIOSTATISTICS)

Course Code: UMS 120      Credit Units: 03

Course Contents:

Module I: Biochemistry

Module II: Cell Biology
Cytological preparations, Fixation, dehydration and staining. Squash preparation of meiotic and mitotic cells, Embedding and sectioning.

Module III: Biostatistics
Problems on test of significance, t-test, chi-square test for goodness of fit and analysis of variance (ANOVA)

Examination Scheme:

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<td>Class Test (Practical Based)</td>
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Note: Minor variation could be there depending on the examiner.
Course Code: UMS 121       Credit Units: 01

Course Contents:

INORGANIC CHEMISTRY

Module I
Volumetric analysis: Oxidation-reduction titration using KMnO₄ and K₂ Cr₂ O₇

Module II
Iodometry titrations: Estimation of sodium thiosulphate & potassium dichromate.

Module III
Preparation of the following inorganic compounds: Prussion blue from iron fillings, chrome alum, cuprous chloride and potassium atrochrome trioxal.

PHYSICAL CHEMISTRY

Module IV
Determination of surface tension and viscosity of liquids

Module V
Heat of neutralisation of a strong acid and a strong base.

Module VI
Solubility curve of KNO₃ or benzoic acid.

Examination Scheme:

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Note: Minor variation could be there depending on the examiner.
Course Code: UMS 122       Credit Units: 01

Course Contents:

Module I: Algae
Study of Algal types with the help of permanent slides and also by preparing suitable slides as prescribed in the theory course. (Chlamydomonas, Chara, Sargassum, Polysiphonia,)

Module II: Fungi
Study of Fungal types with the help of permanent slides and also by preparing suitable slides as prescribed in the theory course. (Eurotium, Morchella, Agaricus)

Module III: Bryophytes
Study of Bryophytes like Marchantia, Anthoceros with the help of permanent slides and also by cutting sections and making suitable preparations.

Module IV: Pteridophytes
Study of the pteridophytes like Selanginella, Equisetum, and Marsilea with the help of permanent slides and also by cutting sections and making suitable preparations.

Examination Scheme:

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Note: Minor variation could be there depending on the examiner.
ENGLISH

Course Objective:
The course is intended to give a foundation of English Language. The literary texts are intended to help students to inculcate creative & aesthetic sensitivity and critical faculty through comprehension, appreciation and analysis of the prescribed literary texts. It will also help them to respond from different perspectives.

Course Contents:

Module I: Vocabulary
Use of Dictionary
Use of Words: Diminutives, Homonyms & Homophones

Module II: Essentials of Grammar - I
Articles
Parts of Speech
Tenses

Module III: Essentials of Grammar - II
Sentence Structure
Subject -Verb agreement
Punctuation

Module IV: Communication
The process and importance
Principles & benefits of Effective Communication

Module V: Spoken English Communication
Speech Drills
Pronunciation and accent
Stress and Intonation

Module VI: Communication Skills-I
Developing listening skills
Developing speaking skills

Module VII: Communication Skills-II
Developing Reading Skills
Developing writing Skills

Module VIII: Written English Communication
Progression of Thoughts/ideas
Structure of Paragraph
Structure of Essays

Module IX: Short Stories
Of Studies, by Francis Bacon
Dream Children, by Charles Lamb
The Necklace, by Guy de Maupassant
A Shadow, by R.K. Narayan
Glory at Twilight, Bhabani Bhattacharya

Module X: Poems
All the Worlds a Stage Shakespeare
To Autumn Keats
O! Captain, My Captain. Walt Whitman
Where the Mind is Without Fear Rabindranath Tagore
Psalm of Life H.W. Longfellow
Examination Scheme:

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</table>

Text & References:

- Madhulika Jha, Echoes, Orient Longman
- Successful Communications, Malra Treece (Allyn and Bacon)
- Effective Technical Communication, M. Ashraf Rizvi, Tata MacGrawhill

* 30 hrs Programme to be continued for Full year
BEHAVIOURAL SCIENCE – I
(UNDERSTANDING SELF FOR EFFECTIVENESS)

Course Code: UMS 143 Credit Units: 01

Course Objective:
This course aims at imparting an understanding of:
• Understanding self & process of self exploration
• Learning strategies for development of a healthy self esteem
• Importance of attitudes and its effective on personality
• Building Emotional Competency

Course Contents:

Module I: Self: Core Competency
Understanding of Self
Components of Self – Self identity
Self concept
Self confidence
Self image

Module II: Techniques of Self Awareness
Exploration through Johari Window
Mapping the key characteristics of self
Framing a charter for self
Stages – self awareness, self acceptance and self realization

Module III: Self Esteem & Effectiveness
Meaning
Importance
Components of self esteem
High and low self esteem
Measuring your self esteem

Module IV: Building Positive Attitude
Meaning and nature of attitude
Components and Types of attitude
Importance and relevance of attitude

Module V: Building Emotional Competence
Emotional Intelligence – Meaning, components, Importance and Relevance
Positive and negative emotions
Healthy and Unhealthy expression of emotions

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Text & References:
• Organizational Behaviour, Davis, K.
• Hoover, Judith D. Effective Small Group and Team Communication, 2002,Harcourt College Publishers
• Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour
• Lindzey, G. and Borgatta, E: Sociometric Measurement in the Handbook of Social Psychology, Addison – Welsley, US.
• LaFasto and Larson: When Teams Work Best, 2001, Response Books (Sage), New Delhi
• J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 2, Group (1996); Pfeiffer & Company
FRENCH – I

Course Code: UMS 144
Credit Units: 02

Course Objective:
To familiarize the students with the French language
- with the phonetic system
- with the syntax
- with the manners
- with the cultural aspects

Course Contents:

Module A: pp. 01 to 37: Unités 1, 2, Unité 3 Objectif 1,2
Only grammar of Unité 3: objectif 3, 4 and 5

Contenu lexical: Unité 1: Découvrir la langue française: (oral et écrit)
1. se présenter, présenter quelqu’un, faire la connaissance des autres, formules de politesse, rencontres
2. dire/interroger si on comprend
3. Nommer les choses

Unité 2: Faire connaissance
1. donner/demander des informations sur une personne, premiers contacts, exprimer ses goûts et ses préférences
2. Parler de soi: parler du travail, de ses activités, de son pays, de sa ville.

Unité 3: Organiser son temps
1. dire la date et l’heure

Contenu grammatical: 1. organisation générale de la grammaire
2. article indéfini, défini, contracté
3. nom, adjectif, masculin, féminin, singulier et pluriel
4. négation avec « de », "moi aussi", "moi non plus"
5. interrogation : Inversion, est-ce que, qui, que, quoi, qu’est-ce que, où, quand, comment, quel(s), quelle(s)
   Interro-négatif : réponses : oui, si, non
6. pronom tonique/disjoint- pour insister après une préposition
7. futur proche

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:
- le livre à suivre : Campus: Tome 1
GERMAN - I

Course Code:    UMS 145      Credit Units: 02

Course Objective:
To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany

Course Contents:

Module I: Introduction
Self introduction: heissen, kommen, wohnen, lernen, arbeiten, trinken, etc.
All personal pronouns in relation to the verbs taught so far.
Greetings: Guten Morgen!, Guten Tag!, Guten Abend!, Gute Nacht!, Danke sehr!, Danke!, Vielen Dank!, (es tut mir Leid!),
Hallo, wie geht’s?: Danke gut!, sehr gut!, prima!, ausgezeichnet!,
Es geht!, nicht so gut!, so la la!, miserabel!

Module II: Interviewspiel
To assimilate the vocabulary learnt so far and to apply the words and phrases in short dialogues in an interview – game for self introduction.

Module III: Phonetics
Sound system of the language with special stress on Diphthongs

Module IV: Countries, nationalities and their languages
To make the students acquainted with the most widely used country names, their nationalities and the language spoken in that country.

Module V: Articles
The definite and indefinite articles in masculine, feminine and neuter gender. All Vegetables, Fruits, Animals, Furniture, Eatables, modes of Transport

Module VI: Professions
To acquaint the students with professions in both the genders with the help of the verb “sein”.

Module VII: Pronouns
Simple possessive pronouns, the use of my, your, etc.
The family members, family Tree with the help of the verb “to have”

Module VIII: Colours
All the color and color related vocabulary – colored, colorful, colorless, pale, light, dark, etc.

Module IX: Numbers and calculations – verb “kosten”
The counting, plural structures and simple calculation like addition, subtraction, multiplication and division to test the knowledge of numbers.
“Wie viel kostet das?”

Module X: Revision list of Question pronouns
W – Questions like who, what, where, when, which, how, how many, how much, etc.

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice
Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs
Course Objective:
To enable students acquire the relevance of the Spanish language in today’s global context, how to greet each other. How to present / introduce each other using basic verbs and vocabulary

Course Contents:

Module I
A brief history of Spain, Latin America, the language, the culture…and the relevance of Spanish language in today’s global context.
Introduction to alphabets

Module II
Introduction to ‘Saludos’ (How to greet each other. How to present / introduce each other).
Goodbyes (despedidas)
The verb *llamarse* and practice of it.

Module III
Concept of Gender and Number
Months of the years, days of the week, seasons. Introduction to numbers 1-100, Colors, Revision of numbers and introduction to ordinal numbers.

Module IV
Introduction to *SER* and *ESTAR* (both of which mean To Be). Revision of ‘Saludos’ and ‘Llamarse’. Some adjectives, nationalities, professions, physical/geographical location, the fact that Spanish adjectives have to agree with gender and number of their nouns. Exercises highlighting usage of *Ser* and *Estar*.

Module V
Time, demonstrative pronoun (Este/esta, Aquel/aquella etc)

Module VI
Introduction to some key AR /ER/IR ending regular verbs.

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, En Directo I A
- Español Sin Fronteras
JAPANESE - I

Course Code: UMS 147 Credit Units: 02

Course Objective:
To enable the students to learn the basic rules of grammar and Japanese language to be used in daily life that will later help them to strengthen their language.

Course Contents:

Module I: Salutations
Self introduction, Asking and answering to small general questions

Module II: Cardinal Numbers
Numerals, Expression of time and period, Days, months

Module III: Tenses
Present Tense, Future tenses

Module IV: Prepositions
Particles, possession, Forming questions

Module V: Demonstratives
Interrogatives, pronoun and adjectives

Module VI: Description
Common phrases, Adjectives to describe a person

Module VII: Schedule
Time Table, everyday routine etc.

Module VIII: Outings
Going to see a movie, party, friend’s house etc.

Learning Outcome
➢ Students can speak the basic language describing above mentioned topics

Methods of Private study /Self help
➢ Handouts, audio-aids, and self-do assignments and role-plays will support classroom teaching

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

Text:
• Teach yourself Japanese

References:
• Shin Nihongo no kiso 1
CHINESE – I

Course Code: UMS 148 Credit Units: 02

Course Objective:
There are many dialects spoken in China, but the language which will help you through wherever you go is Mandarin, or Putonghua, as it is called in Chinese. The most widely spoken forms of Chinese are Mandarin, Cantonese, Gan, Hakka, Min, Wu and Xiang. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Show pictures, dialogue and retell.
Getting to know each other.
Practicing chart with Initials and Finals. (CHART – The Chinese Phonetic Alphabet Called “Hanyu Pinyin” in Mandarin Chinese.)
Practicing of Tones as it is a tonal language.
Changes in 3rd tone and Neutral Tone.

Module II
Greetings
Let me Introduce
The modal particle “ne”.
Use of Please ‘qing” – sit, have tea ………….. etc.
A brief self introduction – Ni hao ma? Zaijian!
Use of “bu” negative.

Module III
Attributives showing possession
How is your Health? Thank you
Where are you from?
A few Professions like – Engineer, Businessman, Doctor, Teacher, Worker.
Are you busy with your work?
May I know your name?

Module IV
Use of “How many” – People in your family?
Use of “zhe” and “na”.
Use of interrogative particle “shenme”, “shui”, “ma” and “nar”.
How to make interrogative sentences ending with “ma”.
Structural particle “de”.
Use of “Nin” when and where to use and with whom. Use of guixing.
Use of verb “zuo” and how to make sentences with it.

Module V
Family structure and Relations.
Use of “you” – “mei you”.
Measure words
Days and Weekdays.
Numbers.
Maps, different languages and Countries.

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- “Elementary Chinese Reader Part I” Lesson 1-10
BIOCHEMISTRY AND METABOLIC REGULATION

Course Code: UMS 201  Credit Units: 03

Course Objective:
The course aims on understanding of the relationships between structure and function in the major classes of biopolymers. It augurs understanding on central metabolic process and the role of enzymes in modulating pathways. The theoretical background of biochemical systems helps to interpret the results of laboratory experiments.

Course Contents:

Module I
Carbohydrate metabolism -glycolysis pathway and reactions, Glycogen breakdown and synthesis, control of glycogen metabolism, Citric acid cycle -Overview, Metabolic sources of Acetyl Co-A, enzymes and regulation, The amphibolic nature of the Citric acid cycle Electron transport chain and oxidative photophosphorylation -mitochondria and electron transport, phosphorylation and control of ATP production Gluconeogenesis, The glyoxylate pathway, Pentose phosphate pathway

Module II
Lipid metabolism - fatty acid oxidation, ketone bodies, fatty acid biosynthesis, regulation of fatty acid metabolism.

Module III
Amino acid metabolism -Amino acid deamination, urea cycle, amino acids as biosynthetic precursors, biosynthesis of amino acids.

Module IV
Nucleotide Metabolism -structure and metabolism of purines and pyrimidines,

Module V
Classification and nomenclature of enzymes, coenzymes-structure and function of coenzyme A; kinetics of enzyme catalyzed reactions; isolation and purification of enzymes; enzymes in food processing, medicines and production of chemical compounds

Examination Scheme:

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Text & References:

Text:
- Biochemistry, L. Stryer, W.H. Freeman and Company
- Tools of Biochemistry, T.G. Cooper, John Wiley and Sons Inc.

References:
- Biochemical calculations, I.H. Segal. Publisher, John Wiley and Sons
- Devlin’s Textbook of Biochemistry with Clinical correlations, John Wiley and Sons Inc.
BIOINFORMATICS

Course Code: UMS 202 Credit Units: 03

Course Objective:
The course involves a basic understanding of computer and bioinformatics tools and skills in the field of biology.

Course Contents:

Module I: Computers
General introduction (characteristics, capabilities, generations), software, hardware: organization of hardware (input devices, memory, control unit arithmetic logic unit, output devices); software: (System software; application software, languages -low level, high level), interpreter, compiler, data processing; batch, on-line, real-time (examples from bioindustries; e.g. application of computers in co-ordination of solute concentration, ph, temperature, etc., of a fermenter in operation); internet application.

Module II: Basic Bioinformatics
Introduction to Internet, Search Engines (Google, Yahoo, Entrez etc)

Module III: Biological Databases
Sequence databases (EMBL, GenBank, DDBJ, -UNIPROT, PIR, TrEMBL), Protein family/domain databases (PROSITE, PRINTS, Pfam, BLOCK, etc), Cluster databases-An Introduction, Specialised databases (KEGG, etc), Database technologies (Flat-file), Structural databases (PDB)

Module IV: Sequence Analysis
Goals, Atinen Alignment of sequences, Types of Sequence, Alignment: Globle and local, Pairwise & Multiple Sequence Aliment, Methods of Alignments, Scoring Materices and Gap Penalties.

Module V: Phylogenetic Analysis
Trees-splits and metrics on trees, tree interpretation, Distance – additive, ultrameric and nonadditive distances, tree building methods, Phylogenetic Analysis method, Persimomy, Neighbour Joining, UPGMA, Parsimony, tree evaluation, maximum likelihood trees continous time markow chains, estimatind the rate of change, likehood and trees: analysis software.

Module VI: Genome analysis
Annotation, comparison of different methods; ESTs – databases, clustering, gene discovery and identification, and functional classification.Reconstruction of metabolic pathways; Genome analysis, genome anatomy, genome rearrangements with inversions, signed inversions, gene identification, gene expression, expression analysis, gene identification and functional classification.

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Text & References:

Text:
- Computer Science, J.G. Brookshear, Pearson, Addison Wesley
- Introduction to Bioinformation – T.Attawood

References:
- Introduction to C++ for Engineers and Scientists, Prentice-Hall
- Schaum’s Outline of Introduction of Computer Science, P. Cushman and R. Mata-Toledo, McGraw Hill Trade
- Bioinformatics – Managing Scientific Data, Zoe’ Lacroix and Terence Critchlow
- Bioinfromatics – Sequence, Structure and Databanks, Des Higgins & Willie Taylor
- Structural Bioinformatics, Philip E. Bourne, Helge Weissig 2003
Course Objective:
The objective of this course is to acquaint the students with the details of gymnosperms, classification of angiosperms and taxonomy which will make a foundation for further studies.

Course Contents:

GYMNOSPERMS

Module I
General characteristics, affinities and classification of Gymnosperms (Chamberlains’ and D.D Pant’s classification)

Module II
Systematic position, occurrence, morphology and development of reproductive structures of the following taxa: *Cycas*, *Pinus*, *Ephedra*, Economic importance of *Cycas*, *Pinus* and *Ephedra*

TAXONOMY OF ANGIOSPERMS

Module III
Classification as proposed by Bentham and Hooker and Hutchinson, merits, demerits and comparison. Binomial Nomenclature and elementary knowledge of International Code of Botanical Nomenclature.

Module IV
Systematic position, distinguishing characters and economic importance of family: Rutaceae, Cucurbitaceae, Rosaceae, Apiaceae, Apocynaceae, Asclepiadaceae, Lamiaceae, Euphorbiaceae, and Poaceae.

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Text & References:

Text:

References:
- Taxonomy, V. Singh & D. K. Jain, Rastogi Publications.
- Botany for degree students – Gymnosperms, P.C. Vashishtha, S. Chand & Co.
- College Botany Vol.2, B.P. Pandey, S. Chand & Co.
- Systematic Botany, S.C. Datta, New Age.
- Introductory Botany, A. Bendre & P. C. Pandey, Rastogi Publication.
CHEMISTRY - II

Course Code: UMS 204      Credit Units: 03

Course Objective:
The students will acquire knowledge about the compounds of carbon mainly hydrocarbon. They will be acquainted with the methods of qualitative and quantitative analysis of elements of hydrocarbons and methods of preparation of these compounds. They will get knowledge about the behaviour of chemical and physical reactions along with electrolysis process.

Course Contents:

ORGANIC CHEMISTRY

Module I
Organic chemistry as chemistry of carbon compounds, Methods of purification, tests of purity: qualitative and quantitative elemental analysis, determination of molecular masses: calculation of Empirical and Molecular formula, Structural formula. Tetrahedral concept of carbon compounds; nomenclature of organic compounds; Isomerism; stereo-isomerism, geometrical and optical isomerism.

Module II
Petroleum: Fractionation, cracking and synthetic petrol.
General methods of preparation and properties of alkanes, alkenes, alkynes, Halogen substituted alkanes (CH₂Cl₂, CHCl₃, CCl₄, CHI₃), Electrophilic substitutions. General study of Cycloalkanes

Module III
Grignard reagent; preparation and uses,
Alcohol; ethanol, propanol, glycerol
Monocarboxylic acids and their simple derivatives, descriptive studies of dicarboxylic acids, viz. malic, oxalic, tartaric, maleic,
Keto-enol tautomerism; aceto-acetic ester and malonic ester.

PHYSICAL CHEMISTRY

Module IV: Chemical equilibrium
Reversible reactions, equilibrium law, equilibrium constant, factors influencing equilibrium states.

Module V: Electrochemistry
Electrolysis, laws of electrolysis, ionisation constant, specific, equivalent and molecular conductance, common ion effect; Hydrogen ion concentration, pH value, Theory of acid base indicators, buffer solutions, hydrolysis of salts and solubility product simple calculations based on these concepts.

Examination Scheme:

<table>
<thead>
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Text & References:

Text:

References:
• Advanced Organic Chemistry, Bahl & Bahl, S. Chand & Co. Ltd.
• Organic Chemistry Vol.I & II, I.L. Finar
• Fundamentals of Organic Chemistry, Nafis Haider, S. Chand & Co. Ltd.
• Essentials of Physical Chemistry, Bahl & Tuli, S. Chand & Co. Ltd.
• Simplified course in Physical Chemistry, Madan & Tuli, S. Chand & Co. Ltd.
• Atkin’s Physical Chemistry, Atkin, Oxford Press.
• Physical Chemistry, Vemulapalli, Printice Hall of India
Course Objective:
The term environment is used to describe, in the aggregate, all the external forces, influences and conditions, which affect the life, nature, behaviour and the growth, development and maturity of living organisms. At present a great number of environment issues, have grown in size and complexity day by day, threatening the survival of mankind on earth. A study of environmental studies is quite essential in all types of environmental sciences, environmental engineering and industrial management. The objective of environmental studies is to enlighten the masses about the importance of the protection and conservation of our environment and control of human activities which has an adverse effect on the environment.

Course Contents:

Module I: The multidisciplinary nature of environmental studies
   Definition, scope and importance
   Need for public awareness

Module II: Natural Resources
   Renewable and non-renewable resources:
   Natural resources and associated problems
   Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
   Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
   Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
   Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
   Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies.
   Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.
      - Role of an individual in conservation of natural resources.
      - Equitable use of resources for sustainable lifestyles.

Module III: Ecosystems
   Concept of an ecosystem
   Structure and function of an ecosystem
   Producers, consumers and decomposers
   Energy flow in the ecosystem
   Ecological succession
   Food chains, food webs and ecological pyramids
   Introduction, types, characteristic features, structure and function of the following ecosystem:
      a. Forest ecosystem
      b. Grassland ecosystem
      c. Desert ecosystem
      d. Aquatic ecosystems (ponds, streams, lakes, rivers, ocean estuaries)

Module IV: Biodiversity and its conservation
   Introduction – Definition: genetic, species and ecosystem diversity
   Biogeographical classification of India
   Value of biodiversity: consumptive use, productive use, social, ethical aesthetic and option values
   Biodiversity at global, national and local levels
   India as a mega-diversity nation
   Hot-spots of biodiversity
   Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts
   Endangered and endemic species of India
   Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity

Module V: Environmental Pollution
   Definition
   Causes, effects and control measures of:
      a. Air pollution
b. Water pollution  
c. Soil pollution  
d. Marine pollution  
e. Noise pollution  
f. Thermal pollution  
g. Nuclear pollution

Solid waste management: Causes, effects and control measures of urban and industrial wastes.
Role of an individual in prevention of pollution.
Pollution case studies.
Disaster management: floods, earthquake, cyclone and landslides.

**Module VI: Social Issues and the Environment**
From unsustainable to sustainable development
Urban problems and related to energy
Water conservation, rain water harvesting, watershed management
Resettlement and rehabilitation of people; its problems and concerns. Case studies.
Environmental ethics: Issues and possible solutions
Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
Wasteland reclamation
Consumerism and waste products
Environmental Protection Act
Air (Prevention and Control of Pollution) Act
Water (Prevention and control of Pollution) Act
Wildlife Protection Act
Forest Conservation Act
Issues involved in enforcement of environmental legislation
Public awareness

**Module VII: Human Population and the Environment**
Population growth, variation among nations
Population explosion – Family Welfare Programmes
Environment and human health
Human Rights
Value Education
HIV / AIDS
Women and Child Welfare
Role of Information Technology in Environment and Human Health
Case Studies

**Module VIII: Field Work**
Visit to a local area to document environmental assets-river/forest/grassland/hill/mountain.
Visit to a local polluted site – Urban/Rural/Industrial/Agricultural
Study of common plants, insects, birds
Study of simple ecosystems-pond, river, hill slopes, etc (Field work equal to 5 lecture hours)

**Examination Scheme:**

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</table>

**Text & References:**
- Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad 380 013, India, Email:mapin@icenet.net (R)
- Clark R.S., Marine Pollution, Claderson Press Oxford (TB)
- De A.K., Environmental Chemistry, Wiley Eastern Ltd.
- Down to Earth, Centre for Science and Environment (R)
- Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R)
- Mhaskar A.K., Matter Hazardous, Techno-Science Publication (TB)
- Survey of the Environment, The Hindu (M)
- Trivedi R. K. and P.K. Goel, Introduction to air pollution, Techno-Science Publication (TB)
Course Code: UMS 220 Credit Units: 03

Course Contents:

Module I: Biochemistry

Module II: Computers
Handling of computers and Data analysis using Oracle (create, append, delete, pack, display, list count, set, order, index, sort)

Module III: Bioinformatics
Pubmed searching, Entrez (Meta search engine), Phylogenetic software – Phylip, Sequence analysis tools, Multiple sequence analysis Clustal W.

Module IV: Genetics
Study of mendelian ratios
Study of bacterial conjugation

Examination Scheme:

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Note: Minor variation could be there depending on the examiner.
CHEMISTRY LAB – II

Course Code: UMS 221
Credit Units: 01

Course Contents:

INORGANIC CHEMISTRY

Module I
Qualitative analysis of inorganic mixtures, containing not more than four ionic species (excluding insoluble substances) out of the following:

Pb²⁺, Hg²⁺, Ag¹⁺, Bi³⁺, Cu²⁺, Cd²⁺, As³⁺, Sn²⁺, Sn⁴⁺, Fe²⁺, Fe³⁺, Al³⁺, Co²⁺, Ni²⁺, Mn²⁺, Zn²⁺, Ba²⁺, Sr²⁺, Ca²⁺, Mg²⁺, NH₄⁺, K⁺, CO₃²⁻, S²⁻, SO₃²⁻, NO₂⁻, CH₃COO⁻, F⁻, Cl⁻, Br⁻, I⁻, NO₃⁻, SO₄²⁻, C₂O₄²⁻, PO₄³⁻, BO₃³⁻.

Module II
Purification of Organic compounds by crystallization (from water or alcohol) and distillation.

Examination Scheme:

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Note: Minor variation could be there depending on the examiner.
Course Contents:

Module I: Gymnosperm
Study of the Gymnosperms like *Cycas*, *Pinus* and *Ephedra* with the help of permanent slides and also by cutting sections and making suitable preparations.

Module II: Taxonomy
Detailed description and identification of locally available plants of the families as prescribed in theory course.

Examination Scheme:

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Note: Minor variation could be there depending on the examiner.
Course Objective:
The course is intended to give a foundation of English Language. The literary texts are intended to help students to inculcate creative & aesthetic sensitivity and critical faculty through comprehension, appreciation and analysis of the prescribed literary texts. It will also help them to respond from different perspectives.

Course Contents:

Module I: Vocabulary
Use of Dictionary
Use of Words: Diminutives, Homonyms & Homophones

Module II: Essentials of Grammar - I
Articles
Parts of Speech
Tenses

Module III: Essentials of Grammar - II
Sentence Structure
Subject -Verb agreement
Punctuation

Module IV: Communication
The process and importance
Principles & benefits of Effective Communication

Module V: Spoken English Communication
Speech Drills
Pronunciation and accent
Stress and Intonation

Module VI: Communication Skills-I
Developing listening skills
Developing speaking skills

Module VII: Communication Skills-II
Developing Reading Skills
Developing Writing Skills

Module VIII: Written English communication
Progression of Thoughts/ideas
Structure of Paragraph
Structure of Essays

Module IX: Short Stories
Of Studies, by Francis Bacon
Dream Children, by Charles Lamb
The Necklace, by Guy de Maupassant
A Shadow, by R.K.Narayan
Glory at Twilight, Bhabani Bhattacharya

Module X: Poems
All the Worlds a Stage Shakespeare
To Autumn Keats
O! Captain, My Captain Walt Whitman
Where the Mind is Without Fear Rabindranath Tagore
Psalm of Life H.W. Longfellow
Examination Scheme:

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</table>

Text & References:

- Madhulika Jha, Echoes, Orient Longman
- Successful Communications, Malra Treece (Allyn and Bacon)
- Effective Technical Communication, M. Ashraf Rizvi, Tata MacGrawhill
BEHAVIOURAL SCIENCE – II
(PROBLEM SOLVING AND CREATIVE THINKING)

Course Code: UMS 243  Credit Units: 01

Course Objective:
To enable the students:
• Understand the process of problem solving and creative thinking.
• Facilitation and enhancement of skills required for decision-making.

Course Contents:

Module I: Thinking as a tool for Problem Solving
What is thinking: The Mind/Brain/Behaviour
Critical Thinking and Learning:
- Making Predictions and Reasoning
- Memory and Critical Thinking
- Emotions and Critical Thinking
Thinking skills

Module II: Hindrances to Problem Solving Process
Perception
Expression
Emotion
Intelect
Work environment

Module III: Problem Solving
Recognizing and Defining a problem
Analyzing the problem (potential causes)
Developing possible alternatives
Evaluating Solutions
Resolution of problem
Implementation
Barriers to problem solving:
- Perception
- Expression
- Emotion
- Intellect
- Work environment

Module IV: Plan of Action
Construction of POA
Monitoring
Reviewing and analyzing the outcome

Module V: Creative Thinking
Definition and meaning of creativity
The nature of creative thinking
- Convergent and Divergent thinking
- Idea generation and evaluation (Brain Storming)
- Image generation and evaluation
- Debating
The six-phase model of Creative Thinking: ICEDIP model

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer
**Text & References:**

- Michael Steven: How to be a better problem solver, Kogan Page, New Delhi, 1999
- Geoff Petty: How to be better at creativity; Kogan Page, New Delhi, 1999
- Phil Lowe Koge Page: Creativity and Problem Solving, New Delhi, 1996
Course Code: UMS 244  Credit Units: 02

Course Objective:
- To enable the students to overcome the fear of speaking a foreign language and take position as a foreigner speaking French.
- To make them learn the basic rules of French Grammar.

Course Contents:

Module A: pp.38 – 47: Unité 3: Objectif 3, 4, 5, 6

Module B: pp. 47 to 75 Unité 4, 5

Contenu lexical: Unité 3: Organiser son temps
1. donner/demander des informations sur un emploi du temps, un horaire SNCF – Imaginer un dialogue
2. rédiger un message/une lettre pour …
   i) prendre un rendez-vous/accepter et confirmer/annuler
   ii) inviter/accepter/refuser
3. Faire un programme d’activités
   imaginer une conversation téléphonique/un dialogue
   Propositions- interroger, répondre

Unité 4: Découvrir son environnement
1. situer un lieu
2. s’orienter, s’informer sur un itinéraire.
3. Chercber, décrire un logement
4. connaître les rythmes de la vie

Unité 5: s’informer
1. demander/donner des informations sur un emploi du temps passé.
2. donner une explication, exprimer le doute ou la certitude.
3. découvrir les relations entre les mots
4. savoir s’informer

Contenu grammatical:
1. Adjectifs démonstratifs
2. Adjectifs possessifs/exprimer la possession à l’aide de :
   i. « de » ii. A+nom/pronom disjoint
3. Conjugaison pronominale – négative, interrogative - construction à l’infinitif
4. Impératif/exprimer l’obligation/l’interdiction à l’aide de « il faut… »/« il ne faut pas… »
5. passé composé
6. Questions directes/indirectes

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:
- le livre à suivre : Campus: Tome 1
Course Objective:
To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany
Introduction to Grammar to consolidate the language base learnt in Semester I

Course Contents:

Module I: Everything about Time and Time periods
Time and times of the day.
Weekdays, months, seasons.
Adverbs of time and time related prepositions

Module II: Irregular verbs
Introduction to irregular verbs like to be, and others, to learn the conjugations of the same, (fahren, essen, lessen, schlafen, sprechen und ähnliche).

Module III: Separable verbs
To comprehend the change in meaning that the verbs undergo when used as such
Treatment of such verbs with separable prefixes

Module IV: Reading and comprehension
Reading and deciphering railway schedules/school time table
Usage of separable verbs in the above context

Module V: Accusative case
Accusative case with the relevant articles
Introduction to 2 different kinds of sentences – Nominative and Accusative

Module VI: Accusative personal pronouns
Nominative and accusative in comparison
Emphasizing on the universal applicability of the pronouns to both persons and objects

Module VII: Accusative prepositions
Accusative propositions with their use
Both theoretical and figurative use

Module VIII: Dialogues
Dialogue reading: ‘In the market place’
‘At the Hotel’

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
• Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1.2
• Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs
SPANISH – II

Course Code: UMS 246  Credit Units: 02

Course Objective:
To enable students acquire more vocabulary, grammar, Verbal Phrases to understand simple texts and start describing any person or object in Simple Present Tense.

Course Contents:

Module I
Revision of earlier modules.

Module II
Some more AR/ER/IR verbs. Introduction to root changing and irregular AR/ER/IR ending verbs

Module III
More verbal phrases (eg, Dios Mio, Que lastima etc), adverbs (bueno/malo, muy, mucho, bastante, poco). Simple texts based on grammar and vocabulary done in earlier modules.

Module IV
Possessive pronouns

Module V
Writing/speaking essays like my friend, my house, my school/institution, myself….descriptions of people, objects etc, computer/internet related vocabulary

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, En Directo I A
- Español Sin Fronteras
Course Objective:
To enable the students to converse in the language with the help of basic particles and be able to define the situations and people using different adjectives.

Course Contents:

Module I: Verbs
Transitive verbs, intransitive verbs

Module II: More prepositions
More particles, articles and likes and dislikes.

Module III: Terms used for instructions
No parking, no smoking etc.

Module IV: Adverbs
Different adverbial expression.

Module V: Invitations and celebrations
Giving and receiving presents,
Inviting somebody for lunch, dinner, movie and how to accept and refuse in different ways

Module VI: Comprehension’s
Short essay on Family, Friend etc.

Module VII: Conversations
Situational conversations like asking the way, At a post office, family

Module VIII: Illness
Going to the doctor, hospital etc.

Learning Outcome
➢ Students can speak the language describing above-mentioned topics.

Methods of Private study /Self help
➢ Handouts, audio-aids, and self-do assignments.
➢ Use of library, visiting and watching movies in Japan and culture center every Friday at 6pm.

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

Text:
➢ Teach yourself Japanese

References:
➢ Shin Nihongo no kiso 1
Course Objective:
Chinese is a tonal language where each syllable in isolation has its definite tone (flat, falling, rising and rising/falling), and same syllables with different tones mean different things. When you say, “ma” with a third tone, it mean horse and “ma” with the first tone is Mother. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Drills
Practice reading aloud
Observe Picture and answer the question.
Tone practice.
Practice using the language both by speaking and by taking notes.
Introduction of basic sentence patterns.
Measure words.
Glad to meet you.

Module II
Where do you live?
Learning different colors.
Tones of “bu”
Buying things and how muchit costs?
Dialogue on change of Money.
More sentence patterns on Days and Weekdays.
How to tell time. Saying the units of time in Chinese. Learning to say useful phrases like – 8:00, 11:25, 10:30 P.M. everyday, afternoon, evening, night, morning 3:58, one hour, to begin, to end ..... etc.
Morning, Afternoon, Evening, Night.

Module III
Use of words of location like-li, wais hang, xia
Furniture – table, chair, bed, bookshelf... etc.
Description of room, house or hostel room.. eg what is placed where and how many things are there in it?
Review Lessons – Preview Lessons.
Expression “yao”, “xiang” and “yaoshi” (if).
Days of week, months in a year etc.
I am learning Chinese. Is Chinese difficult?

Module IV
Counting from 1-1000
Use of “chang-chang”.
Making an Inquiry – What time is it now? Where is the Post Office?
Days of the week. Months in a year.
Use of Preposition – “zai”, “gen”.
Use of interrogative pronoun – “duoshao” and “ji”.
“Whose”??? Sweater etc is it?
Different Games and going out for exercise in the morning.

Module V
The verb “qu”
− Going to the library issuing a book from the library
− Going to the cinema hall, buying tickets
− Going to the post office, buying stamps
− Going to the market to buy things.. etc
− Going to the buy clothes .... Etc.
Hobby. I also like swimming.
Comprehension and answer questions based on it.
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C – Project + Presentation  
I – Interaction/Conversation Practice  

Text & References:  
- “Elementary Chinese Reader Part I” Lesson 11-20
Course Objective:
The objective of the course is to focus on the basic principles of genetics incorporating the concepts of classical, molecular genetics. Compilation is required for recent advances in genetic principles for strong foundation in Biotechnology. The objective of the course is to focus on basic principles of inheritance.

Course Contents:

Module I

Module II
Basic microbial genetics, Conjugation, transformation, transduction and their use in genetic mapping.

Module III
Classical and modern concept of gene, pseudoallelism, position effect, intragenic crossing over and complementation test, Benzers work on rII locus in T4 Bacteriophage.

Module IV

Module V
Sex determination in plant and animal. Non disjunction as a proof of chromosomal theory of inheritance. Sex linked, sex influenced and sex limited inheritance.

Module VI
Extra chromosomal inheritance; cytoplasmic inheritance, Mitochondrial and Chloroplast genetic system.

Module VII
Population genetics; Hardy-Weinberg equilibrium law, Gene and genotype frequencies.

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Text & References:

Text:
- Principles of Genetics, E. J. Gardner, John Wiley & Sons Inc.
- Genetics, P.K. Gupta, Rastogi Publication.

References:
- Concepts of Genetics (Sixth Edition), William S. Klug and Michael R, Cummings, Pearson Education.
- Genetics, M.W. Strickberger, Prentice Hall College Division.
- Genetics, P.J. Russell, Benjamin/Cummings.
- Principles of Genetics, D.P. Snustad & M.J. Simmons, John Wiley and Sons Inc.
MICROBIOLOGY

Course Code: UMS 302  Credit Units: 03

Course Objective:
The basic knowledge of Microbiology gained in the previous semester would be applied in the various disciplines like evolution, Immunology & Industrial fermentation.

Course Contents:

Module I
Microbial nutrition and growth - The definition of growth, mathematical expression of growth, growth curve, measurement of growth and growth yields, synchronous growth, continuous culture, Diauxic growth, culture collection and maintenance of cultures.

Module II
Microbial evolution, systematics and taxonomy - new approaches to bacterial taxonomy, classification including ribotyping, ribosomal RNA sequencing, and characteristics of primary domains, taxonomy, nomenclature and Bergey's manual.

Module III
Host-parasite relationship (Normal micro flora of skin, oral cavity, gastrointestinal tract), types of toxins (Exo, endo, entero) and their structure and mode of actions, Microbe Interactions with other populations.

Module IV
Microbes in extreme environments: Archae as the earliest forms, thermophiles, pyshrophiles, halophiles, alkalophiles, acidophiles, hyperthermophiles.

Module V
Introduction to industrially important microbes and microbial fermentative products (Production of antibiotics with special reference to penicillin & streptomycin, enzymes, biotransformation of steroids), food products from microbes (Dairy & SCP etc)

Examination Scheme:

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<th>Components</th>
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</table>

Text & References:

Text:
- The Microbial World, Roger Y. Stanier, Prentice Hall
- Microbiology, Prescott and Dunn, C.B.S. Publishers

References:
- General Microbiology, R.Y. Stanier, J.L. Ingraham, M.L. Wheelis and P.R. Painter, Macmillian
- Principles of Microbiology, R.M. Atlas, Wm C. Brown Publisher.
- The microbes – An Introduction to their Nature and Importance, P.V. Vandenmark and B.L. Batzing, Benjamin Cummings.
- Microbiology, Tortora, Funke and Chase, Benjamin & Cummings
- Principles of Fermentation Technology, Salisbury, Whitaker and Hall, Aditya Books Pvt. Ltd.
- Industrial Microbiology, Casida, New Age International
MOLECULAR CELL BIOLOGY- I

Course Code: UMS 303
Credit Units: 03

Course Objective:
The aim is to extend understanding of the molecular mechanisms via which genetic informations are stored, expressed and transmitted among generations.

Course Contents:

Module I: Introduction to Molecular Biology

Module II: Molecular basis of life
Structure of DNA; DNA replication in prokaryotes and eukaryotes; DNA recombination molecular mechanisms,

Module III: Insertion elements, transposons and retrotransposons

Module IV: Organisation of genetic material:
Split genes; overlapping genes; pseudogenes; cryptic genes

Module V: Genetic Code
Properties of genetic code, codon assignment, chain termination codons, wobble hypothesis.

Examination Scheme:

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</table>

Text & References:

Text:
- Gene VIII, Benjamin Lewin 2005, Oxford University Press
- Molecular Biology of the Cell, B. Alberts, D. Bray, J. Lewis, M. Raff, K. Roberts and J.D. Watson,
  Garland Publishing.

References:
- Concepts of Genetics, W.S. Klug, and M.R. Cummings 2004, Pearson Education
- Genome, T.A. Brown, John Willey & Sons Inc.
- Molecular Cell Biology, H. Lodish, A.Berk, S. Zipursky, P Matsundaira, D.Baltimore and J.E. Barnell,
  W. H Freeman and Company.
- Molecular Cloning: A Laboratory Manual (3-Vilcume set), J. Sambrook, E.F. Fritsch and T. Maniatis,
  Cold spring Harbor Laboratory Press.
- Introduction to Practical Molecular Biology, P.D. Dabre, John Wiley and Sons Inc.
Course Objective:
The objective of this course is to familiarize the students with mechanisms of various physiological activities of higher plants, anatomy and ecology which will help them to understand the various profiles of biotechnology and assessment of environment.

Course Contents:

Module I

Module II

Module III
Photosynthesis: Importance of the process, role of the pigments, light and dark reactions, photophosphorylation and electron transport system, C_{3} and C_{4} pathway and factors affecting photosynthesis. Respiration: Glycolysis, Krebs cycle, factors affecting respiration.

Module IV

Module V

Examination Scheme:

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</table>

Text & References:

**Text:**
- Ecology & Environment, P.D. Sharma, Rastogi Publications.

**References:**
- Anatomy of Seed Plants, K. Esau, John Wiley & Sons.
- Plant Physiology and Biochemistry, Prof. H. Srivastava, Rastogi Publications.
- Plant Anatomy A. Fahn, Aditya Books Pvt. Ltd.
CHEMISTRY - III

Course Code: UMS 305 Credit Units: 03

Course Objective:
The students will learn about the various laws and conditions which govern the behaviour of liquid and solution and the phases in which they exist under different conditions.

Course Contents:

INORGANIC CHEMISTRY

Module I: Acid and Bases
Elementary idea of Bronsted -Lowry and Lewis concept of acids and bases (Proton-donor acceptor and electron-donor acceptor systems), Relative strengths of Lewis acids bases and the effect of substituent and the solvent on them.

Module II: General properties of 3rd elements & Co-ordination Compounds
Molecular compounds, Werners coordination theory, IUPAC system of nomenclature of coordination compounds. Discussion of outer and inner orbit complexes.

Module III
Preparation, properties, uses and structure of the following compounds - Tin Chlorides, hydrazine, hydroxylamine and acides, Oxides, Oxyacids and halides of phosphorus, tartaremetic, hydrogen sulphide (analytical applications), Oxides and Oxyacids of sulphur, Oxyacids of chlorine.

PHYSICAL CHEMISTRY

Module IV: Liquids
Vapor pressure, variation of vapour pressure of liquids with temperature (Clausious – Claperon Equation). Surface tension, viscosity, their experimental determination and applications. Parachor, Rheochor and their applications.

Module V: Solutions

Module VI: Heterogenous equilibria
Phase rule, phase diagrams of water and sulphur system. Nernst’s distribution law, solvent extraction.

Examination Scheme:

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Text & References:

Text:
- Test book of Inorganic Chemistry, P.L. Soni, Sultan Chand & Sons

References:
- Simplified Course in Inorganic Chemistry, Madan & Tuli, S. Chand & Co. Ltd.
- Concise Inorganic Chemistry, J.D. Lee, Black Well Sciences
- Essentials of Physical Chemistry, Bahl & Tuli, S. Chand & Co. Ltd.
- Simplified course in Physical Chemistry, Madan & Tuli, S. Chand & Co. Ltd.
- Atkin’s Physical Chemistry, Atkin, Oxford Press.
- Physical Chemistry, Vemulapalli, Printice Hall of India
Course Code: UMS 320  Credit Units: 03

Course Contents:

Module I
Study of gene interaction
Study of chromosome structure & size
Study of Genetics disorder in human

Module II
Aseptic techniques:
Cleaning of glassware
Preparation of media, cotton plugging and sterilization.

Module III
Isolation of microorganisms from air, water and soil samples: dilution, pour plating and colony purification.
Enumeration of microorganisms: total vs. viable counts.

Examination Scheme:

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Note: Minor variation could be there depending on the examiner.
CHEMISTRY LAB - III

Course Code: UMS 321  Credit Units: 02

Course Contents:

INORGANIC CHEMISTRY

Module I
Gravimetric estimation of barium and SO$_4^{2-}$ as BaSO$_4$, iron as Fe$_3$O$_4$ and copper as CuCNS.

ORGANIC CHEMISTRY

Module II
Detection of functional groups in mono-functional Organic Compounds. (aldehyde, ester, phenol, amine, amides, alcohols.)

Examination Scheme:

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Note: Minor variation could be there depending on the examiner.
BOTANY LAB - III

Course Code: UMS 322       Credit Units: 02

Course Contents:

Module I: Physiology
Water, Soil, and Plant relations Demonstration - Permanent and temporary wilting, seeding growth in clay.
Experimentation - determination: iso-hypo-and-hyper tonic solution by plasmolytic methods, stomatal frequency by cobalt chloride method, Ganongs Potometer.
Photosynthesis: Demonstration- CO₂ factor, light factors (red, blue, green and yellow light.)
Experimentation- Separations of photosynthetic pigments by thin layer chromatography.
Respiration – Determination of R.Q.

Module II: Ecology
Study of communities by quadrat method to work out frequency and density.
Measurement of temperature (Soil).
Demonstration of Soil texture, carbonate, sulphate, pH.
Biomass estimation, soil moisture percentage.
A comparative study of plants (with external and internal characters) to water availability.

Module III: Plant Anatomy
Anatomy of normal dicot and monocot roots, stems & leaves
Anatomy of anomalous structure of stems of Bignonia, Nyctanthes, Achryanthes, Boerhaavia and Dracaena.

Examination Scheme:

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Note: Minor variation could be there depending on the examiner.
COMMUNICATION SKILLS - I

Course Code: UMS 341      Credit Units: 01

Course Objective:
To form written communication strategies necessary in the workplace

Course Contents:

**Module I: Introduction to Writing Skills**
- Effective Writing Skills
- Avoiding Common Errors
- Paragraph Writing
- Note Taking
- Writing Assignments

**Module II: Letter Writing**
- Types
- Formats

**Module III**
- Memo
- Agenda and Minutes
- Notice and Circulars

**Module IV: Report Writing**
- Purpose and Scope of a Report
- Fundamental Principles of Report Writing
- Project Report Writing
- Summer Internship Reports

Examination Scheme:

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</table>

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Business Communication, Raman – Prakash, Oxford
- Creative English for Communication, Krishnaswamy N, Macmillan
- Textbook of Business Communication, Ramaswami S, Macmillan
- Working in English, Jones, Cambridge
- Effective Writing, Withrow, Cambridge
- Writing Skills, Coe/Rycroft/Ernest, Cambridge
- Welcome!, Jones, Cambridge
Course Objective:
This course provides practical guidance on
• Enhancing personal effectiveness and performance through effective interpersonal communication
• Enhancing their conflict management and negotiation skills

Course Contents:

Module I: Interpersonal Communication: An Introduction
Importance of Interpersonal Communication
Types – Self and Other Oriented
Rapport Building – NLP, Communication Mode
Steps to improve Interpersonal Communication

Module II: Behavioural Communication
Meaning and Nature of behavioural communication
Persuasion, Influence, Listening and Questioning
Guidelines for developing Human Communication skills
Relevance of Behavioural Communication for personal and professional development

Module III: Interpersonal Styles
Transactional Analysis
Life Position/Script Analysis
Games Analysis
Interactional and Transactional Styles

Module IV: Conflict Management
Meaning and nature of conflicts
Styles and techniques of conflict management
Conflict management and interpersonal communication

Module V: Negotiation Skills
Meaning and Negotiation approaches (Traditional and Contemporary)
Process and strategies of negotiations
Negotiation and interpersonal communication

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Text & References:
• Vangelist L. Anita, Mark N. Knapp, Inter Personal Communication and Human Relationships: Third Edition, Allyn and Bacon
• Julia T. Wood. Interpersonal Communication everyday encounter
• Simons, Christine, Naylor, Belinda: Effective Communication for Managers, 1997 1st Edition Cassel
• Harvard Business School, Effective Communication: United States of America
• Foster John, Effective Writing Skills: Volume-7, First Edition 2000, Institute of Public Relations (IPR)
• Beebe, Beebe and Redmond; Interpersonal Communication, 1996; Allyn and Bacon Publishers.
Course Objective:
To provide the students with the know-how
- To master the current social communication skills in oral and written.
- To enrich the formulations, the linguistic tools and vary the sentence construction without repetition.

Course Contents:
Module B: pp. 76 – 88 Unité 6
Module C: pp. 89 to103 Unité 7

Contenu lexical:

Unité 6: se faire plaisir
1. acheter: exprimer ses choix, décrire un objet (forme, dimension, poids et matières) payer
2. parler de la nourriture, deux façons d’exprimer la quantité, commander un repas au restaurant
3. parler des différentes occasions de faire la fête

Unité 7: Cultiver ses relations
1. maîtriser les actes de la communication sociale courante (Salutations, présentations, invitations, remerciements)
2. annoncer un événement, exprimer un souhait, remercier, s’excuser par écrit.
3. caractériser une personne (aspect physique et caractère)

Contenu grammatical:

1. accord des adjectifs qualificatifs
2. articles partitifs
3. Négations avec de, ne…rien/personne/plus
4. Questions avec combien, quel…
5. expressions de la quantité
6. ne…plus/toujours - encore
7. pronoms compléments directs et indirects
8. accord du participe passé (auxiliaire « avoir ») avec l’objet direct
9. Impératif avec un pronom complément direct ou indirect
10. construction avec « que » - Je crois que/ Je pense que/ Je sais que

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre : Campus: Tome 1
GERMAN - III

Course Code: UMS 345  Credit Units: 02

Course Objective:
To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany

Course Contents:

Module I: Modal verbs
Modal verbs with conjugations and usage
Imparting the finer nuances of the language

Module II: Information about Germany (ongoing)
Information about Germany in the form of presentations or “Referat”– neighbors, states and capitals, important cities and towns and characteristic features of the same, and also a few other topics related to Germany.

Module III: Dative case
Dative case, comparison with accusative case
Dative case with the relevant articles
Introduction to 3 different kinds of sentences – nominative, accusative and dative

Module IV: Dative personal pronouns
Nominative, accusative and dative pronouns in comparison

Module V: Dative prepositions
Dative preposition with their usage both theoretical and figurative use

Module VI: Dialogues
In the Restaurant,
At the Tourist Information Office,
A telephone conversation

Module VII: Directions
Names of the directions
Asking and telling the directions with the help of a roadmap

Module VIII: Conjunctions
To assimilate the knowledge of the conjunctions learnt indirectly so far

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs
SPANISH – III

Course Code: UMS 346
Credit Units: 02

Course Objective:
To enable students acquire knowledge of the Set/definite expressions (idiomatic expressions) in Spanish language and to handle some Spanish situations with ease.

Course Contents:

Module I
Revision of earlier semester modules
Set expressions (idiomatic expressions) with the verb Tener, Poner, Ir….
Weather

Module II
Introduction to Gustar…and all its forms. Revision of Gustar and usage of it

Module III
Translation of Spanish-English; English-Spanish. Practice sentences.
How to ask for directions (using estar)
Introduction to IR + A + INFINITIVE FORM OF A VERB

Module IV
Simple conversation with help of texts and vocabulary
En el restaurante
En el instituto
En el aeropuerto

Module V
Reflexives

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, En Directo I A
- Español Sin Fronteras -Nivel Elemental
JAPANESE - III

Course Code: UMS 347 Credit Units: 02

Course Objective:
To enable the students to converse in the language with the help of basic verbs and to express themselves effectively and narrate their everyday short encounters. Students are also given projects on Japan and Japanese culture to widen their horizon further.

Note: The Japanese script is introduced in this semester.

Course Contents:

Module I: Verbs
Different forms of verbs: present continuos verbs etc

Module II
More Adverbs and adverbial expressions

Module III: Counters
Learning to count different shaped objects,

Module IV: Tenses
Past tense, Past continuous tense.

Module V: Comparison
Comparative and Superlative degree

Module VI: Wishes and desires
Expressing desire to buy, hold, possess. Usage in negative sentences as well. Comparative degree, Superlative degree.

Module VII: Appointment
Over phone, formal and informal etc.

Learning Outcome
➢ Students can speak the language and can describe themselves and situations effectively
➢ They also gain great knowledge in terms of Japanese lifestyle and culture, which help them at the time of placements.

Methods of Private study /Self help
➢ Handouts, audio-aids, and self-do assignments.
➢ Use of library, visiting and watching movies in Japan and culture center every Friday at 6pm.

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

Text:
➢ Teach yourself Japanese

References:
➢ Shin Nihongo no kiso 1
Course Objective:
Foreign words are usually imported by translating the concept into Chinese, the emphasis is on the meaning rather than the sound. But the system runs into a problem because the underlying name of personal name is often obscure so they are almost always transcribed according to their pronunciation alone. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Drills
Dialogue practice
Observe picture and answer the question.
Introduction of written characters.
Practice reading aloud
Practice using the language both by speaking and by taking notes.
Character writing and stroke order

Module II
Measure words
Position words e.g. inside, outside, middle, in front, behind, top, bottom, side, left, right, straight.
Directional words – beibian, xibian, nanbian, dongbian, zhongjian.
Our school and its different building locations.
What game do you like?
Difference between “hii” and “neng”, “keyi”.

Module III
Changing affirmative sentences to negative ones and vice versa
Human body parts.
Not feeling well words e.g. ; fever, cold, stomach ache, head ache.
Use of the modal particle “le”
Making a telephone call
Use of “jiu” and “cal” (Grammar portion)
Automobiles e.g. Bus, train, boat, car, bike etc.
Traveling, by train, by airplane, by bus, on the bike, by boat etc.

Module IV
The ordinal number “di”
“Mei” the demonstrative pronoun e.g. mei tian, mei nian etc.
use of to enter to exit
Structural particle “de” (Compliment of degree).
Going to the Park.
Description about class schedule during a week in school.
Grammar use of “li” and “cong”.
Comprehension reading followed by questions.

Module V
Persuasion-Please don’t smoke.
Please speak slowly
Praise – This pictorial is very beautiful
Opposites e.g. Clean-Dirty, Little-More, Old-New, Young-Old, Easy-Difficult, Boy-Girl, Black-White, Big-Small, Slow-Fast … etc.
Talking about studies and classmates
Use of “it doesn’t matter”
Enquiring about a student, description about study method.
Grammar: Negation of a sentence with a verbal predicate.
Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- “Elementary Chinese Reader Part I, Part-2” Lesson 21-30
A term (or research) paper is primarily a record of intelligent reading in several sources on a particular subject. The students will choose the topic at the beginning of the session in consultation with the faculty assigned. The progress of the paper will be monitored regularly by the faculty. At the end of the semester the detailed paper on the topic will be submitted to the faculty assigned. The evaluation will be done by Board of examiners comprising of the faculties.

GUIDELINES FOR TERM PAPER

The procedure for writing a term paper may consists of the following steps:
1. Choosing a subject
2. Finding sources of materials
3. Collecting the notes
4. Outlining the paper
5. Writing the first draft
6. Editing & preparing the final paper

1. Choosing a Subject
The subject chosen should not be too general.

2. Finding Sources of materials
   a) The material sources should be not more than 10 years old unless the nature of the paper is such that it involves examining older writings from a historical point of view.
   b) Begin by making a list of subject-headings under which you might expect the subject to be listed.
   c) The sources could be books and magazines articles, news stories, periodicals, scientific journals etc.

3. Collecting the notes
   skim through sources, locating the useful material, then make good notes of it, including quotes and information for footnotes.
   a) Get facts, not just opinions. Compare the facts with author's conclusion.
   b) In research studies, notice the methods and procedures, results & conclusions.
   c) Check cross references.

4. Outlining the paper
   a) Review notes to find main sub-divisions of the subject.
   b) Sort the collected material again under each main division to find sub-sections for outline so that it begins to look more coherent and takes on a definite structure. If it does not, try going back and sorting again for main divisions, to see if another general pattern is possible.

5. Writing the first draft
   Write the paper around the outline, being sure that you indicate in the first part of the paper what its purpose is. You may follow the following:
   a) statement of purpose
   b) main body of the paper
   c) statement of summary and conclusion
   Avoid short, bumpy sentences and long straggling sentences with more than one main ideas.

6. Editing & Preparing the final Paper
   a) Before writing a term paper, you should ensure you have a question which you attempt to answer in your paper. This question should be kept in mind throughout the paper. Include only information/ details/ analyses of relevance to the question at hand. Sometimes, the relevance of a particular section may be clear to you but not to your readers. To avoid this, ensure you briefly explain the relevance of every section.
   b) Read the paper to ensure that the language is not awkward, and that it "flows" properly.
   c) Check for proper spelling, phrasing and sentence construction.
   d) Check for proper form on footnotes, quotes, and punctuation.
   e) Check to see that quotations serve one of the following purposes:
   f) Show evidence of what an author has said.
   g) Avoid misrepresentation through restatement.
   h) Save unnecessary writing when ideas have been well expressed by the original author.
i) Check for proper form on tables and graphs. Be certain that any table or graph is self-explanatory.

Term papers should be composed of the following sections:
1) Title page
2) Table of contents
3) Introduction
4) Review
5) Discussion & Conclusion
6) References
7) Appendix

Generally, the introduction, discussion, conclusion and bibliography part should account for a third of the paper and the review part should be two thirds of the paper.

**Discussion**
The discussion section either follows the results or may alternatively be integrated in the results section. The section should consist of a discussion of the results of the study focusing on the question posed in the research paper.

**Conclusion**
The conclusion is often thought of as the easiest part of the paper but should by no means be disregarded. There are a number of key components which should not be omitted. These include:
a) summary of question posed
b) summary of findings
c) summary of main limitations of the study at hand
d) details of possibilities for related future research

**References**
From the very beginning of a research project, you should be careful to note all details of articles gathered. The bibliography should contain ALL references included in the paper. References not included in the text in any form should NOT be included in the bibliography.
The key to a good bibliography is consistency. Choose a particular convention and stick to this.

**Conventions**
**Monographs**

**Edited volumes**
[eds.] is used when there is more than one editor; and (ed.) where there is only one editor. In German the abbreviation used is (Hrsg.) for Herausgeber.

**Edited articles**

**Journal articles**

**Electronic book**

**Electronic journal articles**

**Other websites**
Unpublished papers

Unpublished theses/ dissertations

Appendix
The appendix should be used for data collected (e.g. questionnaires, transcripts, ...) and for tables and graphs not included in the main text due to their subsidiary nature or to space constraints in the main text.

Assessment Scheme:

Continuous Evaluation: 40%
(Based on abstract writing, interim draft, general approach, research orientation, readings undertaken etc.)

Final Evaluation: 60%
(Based on the organization of the paper, objectives/problem profile/ issue outlining, comprehensiveness of the research, flow of the idea/ ideas, relevance of material used/presented, outcomes vs. objectives, presentation/ viva etc.)
RECOMBINANT DNA TECHNOLOGY

Course Code: UMS 401      Credit Units: 03

Course Objective:
A complete understanding of molecular techniques like DNA sequencing, restriction mapping, PCR for the cloning and expression of genes can be obtained through the course.

Course Contents:

Module I
Purification of DNA from bacterial, plant and animal cells, manipulation of purified DNA.

Module II
Introduction of DNA into living cells.

Module III
Introduction to gene cloning and its uses, tools and techniques: plasmids and other vectors, DNA, RNA, cDNA.

Module IV
Production of proteins from cloned genes: gene cloning in medicine (Pharmaceutical agents such as insulin, growth hormones, recombinant vaccines), gene therapy for genetic diseases.

Module V
Analysis of DNA by Southern blotting, Analysis of RNA by Northern blotting, Analysis of proteins by Western blot techniques, Dot blots and slot blots, RFLP, AFLP.
PCR: Basic principles and its modification, application and uses.

Examination Scheme:

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</table>

Text & References:

Text:
- Gene cloning and DNA analysis by T.A. Brown

References:
- Recombinant DNA, J.D. Watson et al, W.H. Freeman and Company
- Molecular Biology of gene, Watson, Baker, Bell, Gann, Levine, Losick
- DNA Science, Micklos Freyer
- Principles of Gene manipulation and Genomics, Primrose and Twyman
The course imparts the knowledge of different types of microorganisms that are invisible to our naked eyes. Discovery, origin and evaluation of different forms of bacteria, fungi, protozoa and viruses constitute the basics of biotechnology.

Course Contents:

**Module I: History and development of microbiology**
Introduction, contribution of Scientists (Leeuwenhoek, Pasteur, Koch etc.), role of microorganisms in transformation of organic matter and in the causation of diseases. Pasteur’s experiments, concept of sterilization, microscopy (optical, TEM and SEM), concept of microbial species and strains; general outline of various forms of micro-organisms.

**Module II: Ultra Structure of Prokaryotic cell**
Nature of the microbial cell surface, Prokaryotic structure and function - cell envelope, cell wall, cytoplasmic membrane, capsule, surface appendages, cytoplasm and cytoplasmic inclusions, gram positive and gram negative bacteria and endospores.

**Module III**
Nutritional classification of microorganisms, isolation of auxotrophs (replica plating), analysis of mutations in biochemical pathways, microbial assays for vitamins and antibiotics, strain improvement by selection.

**Module IV: Control of microorganisms**
Methods of sterilization & disinfection (Physical agents & chemical agents) Antibiotics with special reference to antibacterial & antifungal antibiotics, mode of actions, drug resistance.

**Module V: Microbial agents of diseases**
Clinically important Bacterial & fungal diseases.

Examination Scheme:

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Text & References:

**Text:**
- The Microbial World, Roger Y. Stanier, Prentice Hall
- Microbiology, Prescott and Dunn, C.B.S. Publishers

**References:**
- General Microbiology, R.Y. Stanier, J.L. Ingraham, M.L. Wheelis and P.R. Painter, Macmillian
- Principles of Microbiology, R.M. Atlas, Wm C. Brown Publisher.
- The microbes – An Introduction to their Nature and Importance, P.V. Vandenmark and B.L. Batzing, Benjamin Cummings.
- Microbiology, Tortora, Funke and Chase, Benzamin & Cummings.
- Principles of Fermentation Technology, Salisbury, Whitaker and Hall, Aditya Books Pvt. Ltd.
- Industrial Microbiology, Casida, New Age International.
MOLECULAR CELL BIOLOGY - II

Course Code: UMS 403  Credit Units: 03

Course Objective:
The aim is to extend understanding of the molecular mechanisms via which genetic informations are stored, expressed and transmitted among generations.

Course Contents:

Module I: Transcription
Transcription mechanism in prokaryotes and eukaryotes.

Module II: Translation
Translation mechanisms in prokaryotes and eukaryotes.

Module III: Gene Expression in prokaryotes
Lac operon; regulation- positive and negative control, Trp operon.

Module IV: Eukaryotic gene Expression
Overview of gene expression, polyadenylation, cap formation, splicing, RNA degradation.

Module V: Oncogenes and Tumor Suppressor genes
Oncogenes, tumor suppressor genes in humans.

Examination Scheme:

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Text & References:

Text:
- Gene VIII, Benjamin Lewin 2005, Oxford University Press

References:
- Concepts of Genetics, W.S. Klug, and M.R. Cummings 2004, Pearson Education
- Genome, T.A. Brown, John Willey & Sons Inc.
- Intoduction to Practical Molecular Biology, P.D. Dabre, John Wiley and Sons Inc.
IMMUNOLOGY

Course Code: UMS 404  Credit Units: 03

Course Objective:
Role of antibody engineering in biomedical applications and the importance of immuno genetics in disease processes, tissue transplantation and immune regulation are some of the areas of attributes of this course which can help the students to understand the biotechnology related to human kind.

Course Contents:

Module I
Historical perspective of immune system and immunity; Innate and specific immunity.

Module II
Humoral immunity and Clonal selection theory;

Module III
Cell-mediated immunity.

Module IV
The organs and cells of the immune system.

Module V
Histocompatibility: structure of MHC class I, II & III molcules & their mode of antigen processing and presentation, MHC restriction, Antigens & antigenicity.

Module VI
Antibody structure in relation to function and antigen-binding, Types of antibodies and their structures, isotypes, allotypes, idiotypes.

Examination Scheme:

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Text & References:

Text:
- Kuby Immunology, R.A. Goldsby, T.J. Kindt, and B.A. Osborne, Freeman

References:
- Immunology, Roitt, Mosby – Yearbook Inc.
- Basic Immunology, A.K. Abbas and A.H. Lichtman, Saunders W.B. Company
- Fundamentals of Immunology, W. Paul, Lippincott Williams and Wilkins
- Immunology, W.L. Anderson, Fence Creek Publishing (Blackwell).
- Immunology: A Short Course, E. Benjamin, R. Coico and G. Sunshine, Wiley-Leiss Inc.
BOTANY - IV

Course Code: UMS 405  Credit Units: 03

Course Objective:
To familiarize the students, with basics of Plant embryology and pathology with details of phyto diseases. They will also be acquainted with economic importance of Timber, food, fiber and medicinal plants, current trends in Plant breeding programmes will also be explained. These studies will support them for understanding the various aspects of biotechnology.

Course Contents:

Module I
Structure of anther, microsporogenesis and development of the male gametophyte. Structure of Ovule, megasporogenesis and development of the female gametophyte with particular reference to Polygonum type. Fertilisation, Endosperm and embryo onagrad type.

Module II
General symptoms of fungal, bacterial and viral diseases and their control. Systematic position, morphology of the causal organisms, parasite relationship, disease cycles in the following diseases, Loose smut of wheat, Rust of wheat, Citrus canker and yellow vein disease of Bhindi.

Module III

Module IV
Economic importance with special reference to plants yielding:
Food: Cereals (Wheat, Maize), Sugarcane, Legumes – (Pigeon pea,). Oil yielding plants (sarson), Common fibre yielding plants - Cotton, Jute.
Medicinal Plants – (Papaver somniferum and Atropa beladona.)
Common timber yielding plants – Dalbergia sisso, Tectona grandis.

Examination Scheme:

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Text & References:

Text:
- Economic Botany in the Tropics, S.L. Kochhar, Macmillian
- Plant Pathology – Pathogen and Plant Disease, B.P. Pandey, S.Chand & Company Ltd.

References:
- Embryology of Angiosperm, Singh, Pandey and Jain, Rastogi Publication
- Introduction to Embryology of Angiosperm, A.K. Pandey, CBS Publishers and Distributors
- Principles and Practice of Plant Breeding, J.R. Sharma, Tata McGraw Hill Publishing Company Limited
- Economic Botany of Crop Plants, A.V.S.S. Sambamurty, N.S. Subramanyam, Asiatech Publishers
- Plant Breeding: Theory & Techniques, S.K. Gupta, Agrobios (India)
Course Objective:
The objective of this course is to educate the students about the laws of thermodynamics and its applications, tendency of carbon element to form aromatic & non aromatic compounds and their uses.

Course Contents:

ORGANIC CHEMISTRY

Module I

Module II
General study of aromatic compounds; Orientation in aromatic compounds. Toluene, Halogen substituted aromatic compounds; Chlorobenzene, benzene diazonium chloride, Phenols, nitrobenzene, aniline, Aromatic and aliphatic aldehydes and ketones, phenolic aldehydes & ketones, Aromatic carboxylic acids (mono and di), phthalic acid and salicylic acid. Benzene sulphonic acid, sulphanilic acid

PHYSICAL CHEMICAL

Module III: Chemical Thermodynamics

Module IV: Electrochemistry
Galvanic cells, standard electrode potential, types of electrodes, measurement of pH.

Module V: Photochemistry

Examination Scheme:

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Text & References:

Text:

References:
- Advanced Organic Chemistry, Bahl & Bahl, S. Chand & Co. Ltd.
- Essentials of Physical Chemistry, Bahl & Tuli, S. Chand & Co. Ltd.
- Simplified course in Physical Chemistry, Madan & Tuli, S. Chand & Co. Ltd.
BIOTECHNOLOGY LAB – IV (BASED ON RECOMBINANT DNA TECHNOLOGY, MICROBIAL TECHNOLOGY, IMMUNOLOGY AND EXPERIMENTAL BOTANY)

Course Code: UMS 420  Credit Units: 05

Course Contents:

Module I: Identification of isolated bacteria
Gram staining methods, metabolic characterisation (IMVIC) test.
Growth curve of microorganisms
Antibiotic sensitivity of microbes, use of antibiotic discs.
Testing water quality (BOD, COD & E. coli count)

Module II
Isolation of nuclear DNA (genomic & plasmid DNA)

Module III
Blood film preparation & identification of blood cells
Study of blood groups
Study of ELISA.

Module IV: Embryology
Study of permanent slides of the:
T.S. anther, pollen, germinating pollen
L.S. ovule types
Endosperm
Embryos
L.S. caryopsis
Dissection of embryo

Module V: Plant Pathology
Examination of local diseased plants representing bacterial, viral, fungal parasites. Study of symptoms caused by parasites, study of selected diseased specimen (mentioned under theory) through specimens, temporary presentations.

Module VI: Economic Botany
Identification and comment on the plants and plant products belonging to cereals, pulses, sugarcane, fibre plants, timbers and medicinal plants

Examination Scheme:

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Note: Minor variation could be there depending on the examiner.
COMMUNICATION SKILLS - II

Course Code: UMS 441      Credit Units: 01

Course Objective:
To teach the participants strategies for improving academic reading and writing. Emphasis is placed on increasing fluency, deepening vocabulary, and refining academic language proficiency.

Course Contents:

Module I: Social Communication Skills
Small Talk
Logic of conversation
Appropriateness
Building rapport

Module II: Context Based Speaking
In general situations
In specific professional situations
Discussion and associated vocabulary
Simulations/Role Play

Module III: Professional Skills
Presentations
Negotiations
Meetings
Basic Telephony Skills

Examination Scheme:

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</table>

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Essential Telephoning in English, Garside/Garside, Cambridge
- Working in English, Jones, Cambridge
- Business Communication, Raman – Prakash, Oxford
- Speaking Personally, Porter-Ladousse, Cambridge
- Speaking Effectively, Jermy Comfort, et.al, Cambridge
- Business Communication, Raman – Prakash, Oxford
Course Code: UMS 443 Credit Units: 01

Course Objective:
To understand the basis of interpersonal relationship
To understand various communication style
To learn the strategies for effective interpersonal relationship

Course Contents:

Module I: Understanding Relationships
Importance of relationships
Role and relationships
Maintaining healthy relationships

Module II: Bridging Individual Differences
Understanding individual differences
Bridging differences in Interpersonal Relationship – TA
Communication Styles

Module III: Interpersonal Relationship Development
Importance of Interpersonal Relationships
Interpersonal Relationships Skills
Types of Interpersonal Relationships

Module IV: Theories of Interpersonal Relationships
Theories: Social Exchange, Uncertainty Reduction Theory
Factors Affecting Interpersonal Relationships
Improving Interpersonal Relationships

Module V: Impression Management
Meaning & Components of Impression Management
Impression Management Techniques
Impression Management Training-Self help and Formal approaches

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Text & References:

- Julia T. Wood. Interpersonal Communication everyday encounter
- Harvard Business School, Effective Communication: United States of America
- Foster John, Effective Writing Skills: Volume-7, First Edition 2000, Institute of Public Relations (IPR)
- Beebe, Beebe and Redmond; Interpersonal Communication, 1996; Allyn and Bacon Publishers.
Course Code: UMS 444
Credit Units: 02

Course Objective:
To enable students:
- To develop strategies of comprehension of texts of different origin
- To present facts, projects, plans with precision

Course Contents:

Module C: pp. 104 – 139: Unités 8, 9

Contenu lexical:

Unité 8: Découvrir le passé
1. parler du passé, des habitudes et des changements.
2. parler de la famille, raconter une suite d’événements/préciser leur date et leur durée.
3. connaître quelques moments de l’histoire

Unité 9: Entreprendre
1. faire un projet de la réalisation: (exprimer un besoin, préciser les étapes d’une réalisation)
2. parler d’une entreprise
3. parler du futur

Contenu grammatical:
1. Imparfait
2. Pronom « en »
3. Futur
4. Discours rapporté au présent
5. Passé récent
6. Présent progressif

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:
- le livre à suivre : Campus: Tome 1
GERMAN - IV

Course Code: UMS 445 Credit Units: 02

Course Objective:
To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany.
Introduction to Advanced Grammar Language and Professional Jargon

Course Contents:

Module I: Present perfect tense
Present perfect tense, usage and applicability
Usage of this tense to indicate near past
Universal applicability of this tense in German

Module II: Letter writing
To acquaint the students with the form of writing informal letters.

Module III: Interchanging prepositions
Usage of prepositions with both accusative and dative cases
Usage of verbs fixed with prepositions
Emphasizing on the action and position factor

Module IV: Past tense
Introduction to simple past tense
Learning the verb forms in past tense
Making a list of all verbs in the past tense and the participle forms

Module V: Reading a Fairy Tale
Comprehension and narration
- Rotkäppchen
- Froschprinzessin
- Die Fremdsprache

Module VI: Genitive case
Genitive case – Explain the concept of possession in genitive
Mentioning the structure of weak nouns

Module VII: Genitive prepositions
Discuss the genitive propositions and their usage: (während, wegen, statt, trotz)

Module VIII: Picture Description
Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;
Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:
- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
• Rosa-Maria Dallapiazza et al., Tangram Aktuell A1/1.2
• Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs
SPANISH - IV

Course Code: UMS 446 Credit Units: 02

Course Objective:
To enable students acquire working knowledge of the language; to give them vocabulary, grammar, voice modulations/intonations to handle everyday Spanish situations with ease.

Course Contents:

Module I
Revision of earlier semester modules
Introduction to Present Continuous Tense (Gerunds)

Module II
Translation with Present Continuous Tense
Introduction to Gustar, Parecer, Apetecer, doler

Module III
Imperatives (positive and negative commands of regular verbs)

Module IV
Commercial/business vocabulary

Module VI
Simple conversation with help of texts and vocabulary
En la recepcion del hotel
En el restaurante
En la agencia de viajes
En la tienda/supermercado

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español Sin Fronteras (Nivel – Elemental)
JAPANESE - IV

Course Code: UMS 447
Credit Units: 02

Course Objective:
To enable the students to comfortably interact using basic Japanese.
Note: Teaching is done in roman as well as Japanese script, students will be taught katankana (another form of script) in this semester i.e. to be able to write all the foreign words in Japanese.

Course Contents:

Module I
Comparison using adjectives, Making requests

Module II
Seeking permission

Module III
Practice of conversations on:
Visiting people, Party, Meetings, After work, At a ticket vending machine etc

Module IV
Essays, writing formal letters

Learning Outcome
➢ Students can speak the language describing above-mentioned topics.

Methods of Private study /Self help
➢ Handouts, audio-aids, and self-do assignments, role-plays.
➢ Students are also encouraged to attend Japanese film festival and other such fairs and workshops organized in the capital from time to time.

Examination Scheme:

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C – Project + Presentation  
I – Interaction/Conversation Practice

Text & References:

Text:
• Teach yourself Japanese

References:
• Shin Nihongo no kiso 1
Course Code: UMS 448
Credit Units: 02

Course Objective:
How many characters are there? The early Qing dynasty dictionary included nearly 50,000 characters the vast majority of which were rare accumulated characters over the centuries. An educate person in China can probably recognize around 6000 characters. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Dialogue Practice
Observe picture and answer the question
Pronunciation and intonation
Character writing and stroke order.
Electronic items

Module II
Traveling – The Scenery is very beautiful
Weather and climate
Grammar question with – “bu shi …. Ma?”
The construction ”yao … le” (Used to indicate that an action is going to take place)
Time words “yiqian”, “yiwei” (Before and after).
The adverb “geng”.

Module III
Going to a friend house for a visit meeting his family and talking about their customs.
Fallen sick and going to the Doctor, the doctor examines, takes temperature and writes prescription.
Aspect particle “guo” shows that an action has happened some time in the past.
Progressive aspect of an actin “zhengzai” Also the use if “zhe” with it.
To welcome someone and to see off someone …. I cant go the airport to see you off… etc.

Module IV
Shipment. Is this the place to checking luggage?
Basic dialogue on – Where do u work?
Basic dialogue on – This is my address
Basic dialogue on – I understand Chinese
Basic dialogue on – What job do u do?
Basic dialogue on – What time is it now?

Module V
Basic dialogue on – What day (date) is it today?
Basic dialogue on – What is the weather like here.
Basic dialogue on – Do u like Chinese food?
Basic dialogue on – I am planning to go to China.

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- “Elementary Chinese Reader, Part-2” Lesson 31-38
PLANT BIOTECHNOLOGY

Course Code: UMS 501 Credit Units: 03

Course Objective:
The course aims to make the students understand the basic techniques of plant tissue culture. The application of Plant Biotechnology covers major areas related to commercial applications. Regeneration of plants through in vitro techniques offers a practical strategy for micropropagation.

Course Contents:

Module I: Introduction to in vitro methods
Terms and definitions. Beginning of in vitro cultures in our country (ovary and ovule culture, in vitro pollination and fertilization. Embryo culture, embryo rescue after wide hybridization, and its applications. Endosperm culture and production of triploids.

Module II: Introduction to the processes of embryogenesis and organogenesis and their practical applications
Micropropagation, axillary bud, shoot-tip and meristem culture. Haploids and their applications. Somaclonal variations and applications (Treasure your exceptions).

Module III: Introduction to protoplast isolation

Module IV: Use of plant cell, protoplasts and tissue culture for genetic manipulation of plants
Introduction to A. tumefaciens. Tumor formation on plants using A.tumefaciens (Monocots vs. Dicots). Practical application of genetic transformation.

Examination Scheme:

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Text & References:

Text:
- An Introduction to Plant Tissue Culture, M.K. Razdan, Oxford and IBH Publishing

References:
- Plant Biotechnology and Transgenic Plants, K.M.O. Caldenty, W.H. Barz and H.L. Wills, Marcel Dekker
- Plant Tissue Culture: Theory & Practice, S.S. Bhojwani and M.K. Razdan, Elsevier Health Sciences
Course Objective:
The aim of the course is to provide equal importance to areas like *in vitro* fertilization, animal cell and tissue culture, hormone vaccine and important enzyme production through animal biotechnology.

Course Contents:

**Module I**
Introduction of animal cell culture substrate, culture media, preservation and maintenance of cell lines.

**Module II**
Production of monoclonal antibodies. Bioreactors for large scale culture of cells.

**Module III**
Growth factors promoting proliferation of animal cells (EGF, FGF, PDGF, IL-1, IL-2, NGF, Erythropoietin).

**Module IV**
Transgenic animals. *In vitro* fertilization and embryo transfer.

Examination Scheme:

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Text & References:

**Text:**

**References:**
- Animal Cell Culture Techniques, M. Clynes, Springer Verlag.
- Cell Culture Lab Fax, M. Butler and M. Dawson, Bios scientific Publications Ltd.
- Cell Growth and Division – A Practical approach, R. Basega, IRL Press.
- Comprehensive Biotechnology, Moo-Young, Alan T. Bullm Howard Dalton, Panima Publication.
IMMUNOTECHNOLOGY

Course Code: UMS 503  Credit Units: 02

Course Objective:
Role of antibody engineering in biomedical applications and the importance of immuno genetics in disease processes, tissue transplantation and immune regulation are some of the areas of attributes of this course which can help the students to understand the biotechnology related to mankind.

Course Contents:

Module I
Immunoglobulin gene: genetic basis of creation of antibody diversity; Effect of T cell functions.

Module II
Measurement of antigen – antibody interaction: agglutination, immunodiffusion, immuno-electrophoresis, ELISA, RIA.

Module III
Hybridoma Technology: production of monoclonal antibodies and Antibodies in targeting therapeutic agents and their applications.

Module IV
Tissue and organ transplant

Module V
Immunity to infections of diseases; vaccines (attenuated and recombinant) and vaccination.
Autoimmunity and autoimmune diseases: Hashimoto’s thyroiditis; Myasthenia gravis; Rheumatoid Arthritis, Pernicious anemia.

Examination Scheme:

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</table>

Text & References:

Text:
- Kuby Immunology, R.A. Goldsby, T.J. Kindt, and B.A. Osborne, Freeman.

References:
- Immunology, Roitt, Mosby – Yearbook Inc.
- Basic Immunology, A.K. Abbas and A.H. Lichtman, Saunders W.B. Company.
- Fundamentals of Immunology, W. Paul, Lippincott Williams and Wilkins.
- Immunology, W.L. Anderson, Fence Creek Publishing (Blackwell).
- Immunology: A Short Course, E. Benjamin, R. Coico and G. Sunshine, Wiley-Leiss Inc.
GENOMICS

Course Code: UMS 504 Credit Units: 02

Course Objective:
The course helps in developing a detailed understanding of eukaryotic genome complexity and organization. The students will be familiarised with the techniques in Genomics.

Course Contents:

GENOMICS

Module I
The origin of genomes.
Acquisition of new Genes.

Module II
DNA sequencing-chemical and enzymatic methods.
The origins of introns.
Restriction mapping.

Module III
DNA & RNA fingerprinting.
The Human Genome.

Module IV
Phylogeny.
SAGE, ESTs, AFLP & RFLP analysis.

Examination Scheme:

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Text & References:

Text:
- Genes & Genomes, Maxine Singer and Paul Berg

References:
- Bioinformatics: Sequence and Genome Analysis, D.W. Mount, Cold Spring Harbor Laboratory Press
- Genomes II, T.A. Brown
- A Primer of Genome Science, Greg Gibson and Spencer V. Muse
- Database Annotation in Molecular Biology : Principles and Practice, Arthur M. Lesk
- DNA : Structure and Function, Richard R. Sinden
- Recombinant DNA (Second Edition), James D. Watson and Mark Zoller
- Gene Cloning and DNA Analysis – An introduction (Fourth Edition), T.A. Brown
- Essential of Genomics and Bioinformatics, C.W. Sensen, John Wiley and Sons Inc.
- Functional Genomics – A Practical Approach, S.P. Hunt and R. Livesey, Oxford University Press
- Statistical Genomics: Linkage, Mapping and QTL Analysis, B. Liu, CRC Press.
PROTEOMICS

Course Code: UMS 505  Credit Units: 02

Course Objective:
The course helps in developing a detailed understanding of the analysis of Proteome. The major techniques and methods used will be dealt with in detail.

Course Contents:

PROTEOMICS

Module I
Basic principles of protein structure.

Module II: Analysis of Proteome
2D – gel electrophoresis, mass spectroscopy.

Module III
Modeling of three-dimensional structure of a protein from amino acid sequence.
Modeling mutants.
Designing proteins.
Analysis of nucleic acid / protein sequence and structure data, genome and proteome data using web-based tools.

Module IV: Protein – protein interactions
Yeast- two hybrid method, GFP Tags, Proteome- wide interaction maps.

Examination Scheme:

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Text & References:

Text:
- Genes & Genomes, Maxine Singer and Paul Berg
- Genomes & proteomics From protein sequence to function - S R Pennington & M. J. Dunn

References:
- Bioinformatics: From Genomes to Drugs, T. Lengauer, John Wiley and Sons Inc.
- Bioinformatics: Sequence and Genome Analysis, D.W. Mount, Cold Spring Harbor Laboratory Press
- Genomes II, T.A. Brown
- A Primer of Genome Science, Greg Gibson and Spencer V. Muse
- DNA : Structure and Function, Richard R. Sinden
- Recombinant DNA (Second Edition), James D. Watson and Mark Zoller
- Gene Cloning and DNA Analysis – An introduction (Fourth Edition), T.A. Brown
- Essential of Genomics and Bioinformatics, C.W. Sensen, John Wiley and Sons Inc.
- Proteomics, T. Palzkill, Kluwer Academic Publishers
- Statistical Genomics: Linkage, Mapping and QTL Analysis, B. Liu, CRC Press.
Course Code: UMS 520
Credit Units: 02

Course Contents:

Module I
Sterilization techniques of glass wares & equipments.
Preparation of cotton plugs & culture media.
Preparation and sterilization, different explants.
Inoculation of explants on culture media.

Module II
Culture of plant embryos/seeds.
Callus culture.
Testing of seed viability.

Module III
Culture of animal cell line.
Preparation of competent cells by calcium chloride method.

Examination Scheme:

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Note: Minor variation could be there depending on the examiner.
Course Code: UMS 521
Credit Units: 02

Course Contents:

Module I
Electrophoretic separation of plasmid DNA.
Restriction, digestion & ligation of DNA.

Module II
Gene finding tools and genome annotation- Gen Scan, Net Gene, HMM gene.

Module III
Comparison of two given genomes- Mummer.

Module IV
Homology modeling of 3-D structure from amino acid sequence: SWISS- MODELLER

Examination Scheme:

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Note: Minor variation could be there depending on the examiner.
COMMUNICATION SKILLS - III

Course Code: UMS 541      Credit Units: 01

Course Objective:
To enrich the understanding of English language and communication, structure, style, usage, and vocabulary for global business purposes.

Course Contents:

Module I: Fundamentals of Communication
Role and purpose of communication: 7 C’s of Communication
Barriers to effective communication
Enhancing listening
Forms of Communication: one-to-one, informal and formal

Module II: Verbal Communication (Written)
Business Letter
Social correspondence
Writing resume and Job applications

Module III: Introduction to Phonetics
Vowels
Consonants
Accent and Rhythm
Accent Neutralization
Spoken English and Listening Practice

Module IV: Speaking skills
Conversational English
Guidelines to give an effective presentation
Activities to include:
Presentations by students
Just a minute

Examination Scheme:

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</table>

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Business Communication, Raman – Prakash, Oxford
- Textbook of Business Communication, Ramaswami S, Macmillan
- Speaking Personally, Porter-Ladousse, Cambridge
Course Objective:
To inculcate in the students an elementary level of understanding of group/team functions
To develop team spirit and to know the importance of working in teams

Course Contents:
Module I: Group formation
Definition and Characteristics
Importance of groups
Classification of groups
Stages of group formation
Benefits of group formation

Module II: Group Functions
External Conditions affecting group functioning: Authority, Structure, Org. Resources, Organizational policies etc.
Internal conditions affecting group functioning: Roles, Norms, Conformity, Status, Cohesiveness, Size, Inter group conflict.
Group Cohesiveness and Group Conflict
Adjustment in Groups

Module III: Teams
Meaning and nature of teams
External and internal factors effecting team
Building Effective Teams
Consensus Building
Collaboration

Module IV: Leadership
Meaning, Nature and Functions
Self leadership
Leadership styles in organization
Leadership in Teams

Module V: Power to empower: Individual and Teams
Meaning and Nature
Types of power
Relevance in organization and Society

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Text & References:
- Organizational Behaviour, Davis, K.
- Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour
- Dressers, David and Cans, Donald: The Study of Human Interaction
- LaFasto and Larson: When Teams Work Best, 2001, Response Books (Sage), New Delhi
Course Objective:
To furnish some basic knowledge of French culture and civilization for understanding an authentic document and information relating to political and administrative life

Course Contents:

Module D: pp. 131 – 156 Unités 10, 11

Contenu lexical:

Unité 10: Prendre des décisions
1. Faire des comparaisons
2. décrire un lieu, le temps, les gens, l'ambiance
3. rédiger une carte postale

Unité 11: faire face aux problèmes
1. Exposer un problème.
2. parler de la santé, de la maladie
3. interdire/demander/donner une autorisation
4. connaître la vie politique française

Contenu grammatical:

1. comparatif - comparer des qualités/quantités/actions
2. supposition : Si + présent, futur
3. adverbe - caractériser une action
4. pronom "Y"

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre : Campus: Tome 1
Course Objective:
To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany
Introduction to Advanced Grammar and Business Language and Professional Jargon

Course Contents:

Module I: Genitive case
Genitive case – Explain the concept of possession in genitive
Mentioning the structure of weak nouns

Module II: Genitive prepositions
Discuss the genitive propositions and their usage: (während, wegen, statt, trotz)

Module III: Reflexive verbs
Verbs with accusative case
Verbs with dative case
Difference in usage in the two cases

Module IV: Verbs with fixed prepositions
Verbs with accusative case
Verbs with dative case
Difference in the usage of the two cases

Module V: Texts
A poem ‘Maxi’
A text Rocko

Module VI: Picture Description
Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;
Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessan- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1, 2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs
SPANISH - V

Course Code:     UMS 546     Credit Units: 02

Course Objective:
To enable students acquire working knowledge of the language; to give them vocabulary, grammar, voice modulations/intonations to handle everyday Spanish situations with ease.

Course Contents:

Module I
Revision of earlier semester modules

Module II
Future Tense

Module III
Presentations in English on
Spanish speaking countries’
Culture
Sports
Food
People
Politics
Society
Geography

Module IV
Situations:
En el hospital
En la comisaria
En la estacion de autobus/tren
En el banco/cambio

Module V
General revision of Spanish language learnt so far.

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:
- Español Sin Fronteras, Greenfield
Course Objective:
To enable the students to converse, read and write language comfortably and be able to converse using different patterns and forms taught through out. Students are taught and trained enough to get placed themselves in Japanese companies.

Note: Teaching is done in roman as well as Japanese script.

Course Contents:

Module I
- Dictionary form of the verbs, Joining of verbs
- Negative form of verbs
- Potential form

Module II
- Joining of many actions together
- Usage of dictionary form of the verbs in sentences
- Introducing colloquial language.

Module III
- Direct form of the speech, quotations,
- Expressing thoughts
- Actions and reasoning

Module IV
- Conclusion
- Receiving and giving things, favour etc.
- Different forms like ‘tara’ form.

Module V
- Revision of the whole syllabus

Learning Outcome
- Students can speak and use different patterns, ways to describe a particular situation and can converse comfortably in mentioned situations through out.
- Students can appear in the interviews for placements in Japanese companies.

Methods of Private study /Self help
- Teaching will be supported by handouts, audio-aids, and self-do assignments and role plays.
- Use of library, visiting and watching movies in Japan and culture center every Friday at 6pm.

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

Text:
- Teach yourself Japanese

References:
- Shin Nihongo no kiso 1
Course Objective:
What English words come from Chinese? Some of the more common English words with Chinese roots are ginseng, silk, dim sum, fengshui, typhoon, yin and yang, T’ai chi, kung-fu. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Drills
Dialogue practice
Observe picture and answer the question.
Pronunciation and intonation.
Character writing and stroke order

Module II
Intonation
Chinese foods and tastes – tofu, chowmian, noodle, Beijing duck, rice, sweet, sour….etc. Learning to say phrases like – Chinese food, Western food, delicious, hot and spicy, sour, salty, tasteless, tender, nutritious, god for health, fish, shrimps, vegetables, cholesterol is not high, pizza, milk, vitamins, to be able to cook, to be used to, cook well, once a week, once a month, once a year, twice a week……
Repetition of the grammar and verbs taught in the previous module and making dialogues using it.
Compliment of degree “de”.

Module III
Grammar the complex sentence “suiran … danshi…..”
Comparison – It is colder today than it was yesterday…..etc.
The Expression “chule….yiwai”. (Besides)
Names of different animals.
Talking about Great Wall of China
Short stories

Module IV
Use of “huozhe” and “haishi”
Is he/she married?
Going for a film with a friend.
Having a meal at the restaurant and ordering a meal.

Module V
Shopping – Talking abut a thing you have bought, how much money you spent on it? How many kinds were there? What did you think of others?
Talking about a day in your life using compliment of degree “de”. When you get up? When do you go for class? Do you sleep early or late? How is Chinese? Do you enjoy your life in the hostel?
Making up a dialogue by asking question on the year, month, day and the days of the week and answer them.

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

• “Elementary Chinese Reader ” Part-II Lesson 39-46
GUIDELINES FOR SUMMER TRAINING

The main objective of summer training is to familiarize students to laboratory environment and make them learn to handle equipments and softwares, design experiments and analyze the results. The student will be supervised by one or more faculty members and he or she will be required to submit a synopsis. While writing a synopsis emphasis should be given to make it publishable. But whether or not the results of a research project are publishable, the project should be communicated in the form of a research report written by the student. Initial drafts should be critiqued by the faculty guide and corrected by the student at each stage. The File is the principal means by which the work carried out will be assessed and therefore great care should be taken in its preparation.

In general, the File should be comprehensive and include
- A short account of the activities that were undertaken as part of the project;
- A statement about the extent to which the project has achieved its stated goals.
- A statement about the outcomes of the evaluation and dissemination processes engaged in as part of the project;
- Any activities planned but not yet completed as part of the project, or as a future initiative directly resulting from the project;
- Any problems that have arisen that may be useful to document for future reference.

Report Layout
The report should contain the following components:
- Title page
- Certificate
- Acknowledgement
- Abbreviations
- Contents with page numbers
- Chapter –
  a. Introduction
  b. Review of literature
  c. Materials & methods
  d. Results & discussion
  e. Summary and conclusion
  f. References
  g. Appendix (optional)
- 1 inch Margin on left side & 1” each on other sides.
- Single side of the paper to be used.
- Times New Roman.

Font Size
- 12 (Bold for headings)
- 12 (Normal for Matter)
- 14 (for Chapter Names)
- 1.5 line spacing
- Numbering on the right hand Top of the page
- Numbers on pages before chapters to be done in Roman at the bottom of the page

References
This should include papers and books referred to in the body of the report. These should be ordered alphabetically on the author's surname. The titles of journals preferably should not be abbreviated; if they are, abbreviations must comply with an internationally recognised system.

Examples
For research article
For Book

- Scientific names in Italics
- Cover Page containing - Title, Students Name, Supervisors Name, University, Name (along with logo), Course name & year of Submission in the prescribed format
- 2 copies to be submitted

**ASSESSMENT OF THE PROJECT FILE**

Essentially, marking will be based on the following criteria: the quality of the report, the technical merit of the project and the project execution. Evaluation will compose of two components - Project report assessment and Viva - voce. Project report assessment will be done by the two internal faculty members in respective fields. A committee of three faculty members will conduct Viva-voce. Technical merit attempts to assess the quality and depth of the intellectual efforts put into the project will be assessed as per evaluation format.

**Examination Scheme:**

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<td><strong>Total:</strong></td>
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Course Objective:
The objective of this course is to familiarize the students with different processes and use of microbial technology that can be employed for a cleaner environment. The course also aims to make the students aware of legislation and rules prevalent to control the degradation of our environment.

Course Contents:

Module I
Environmental components, Environmental pollution and its types, Non-renewable and renewable energy resources.

Module II
Conventional fuels and their major impacts: Global warming and greenhouse effect, Global Ozone Problem, Acid rain, Eutrophication, Biomagnification, Concept of clean fuel technology: Biomass energy and biofuels

Module III
Biodegradation and bioremediation of major pollutants
Biomineralisation: Use of microbial technology for mining

Module IV
Treatment of municipal solid and liquid wastes
Environmental impact assessment and Environmental audit

Module V
Bioassessment of Environmental Quality,
Biofertilizers and Biopesticides

Examination Scheme:

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</table>

Text & References:

Text:
- Environmental Science, S.C. Santra
- Environmental Biotechnology, Pradipta Kumar Mohapatra

References:
- Environmental Biotechnology – Concepts and Applications, Hans-Joachim Jordening and Jesef Winter
- Waste Water Engineering, Metcalf and Eddy, Tata McGraw hill
- Agricultural Biotechnology, S.S. Purohit
- Environmental Microbiology : Methods and Protocols, Alicia L. Ragout De Spencer, John F.T. Spencer
- Introduction to Environmental Biotechnology, Milton Wainwright
- Principles of Environmental Engineering, Gilbert Masters
- Agricultural Biotechnology – S.S. Purohit
- Wastewater Engineering – Metcalf & Eddy.
INDUSTRIAL BIOTECHNOLOGY

Course Code: UMS 602      Credit Units: 04

Course Objective:
The objective of this course is to use microorganism to produce various compounds of commercial interest. The student will be exposed to various techniques available for large scale cultivation of microorganisms.

Course Contents:

Module I
Introduction to fermentation, the fermentation industry, Production process batch and Continuous system of cultivation, Solid-state fermentation

Module II
Selection of industrial microorganisms, media for fermentation, aeration, pH, temperature and other requirements during fermentation, downstream processing and product recovery, food industry waste as fermentation substrate.

Module III
Production of compounds like antibiotics, enzymes, organic acids, solvents, beverages, SCP.

Module IV
Production of fermented dairy products

Module V
Immobilized enzymes systems, production and applications.

Examination Scheme:

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</table>

Text & References:

**Text:**
- Industrial Microbiology – Cassida

**References:**
- Principles of fermentation Technology, Salisbury, Whitaker and Hall
- Industrial microbiology – Prescot & Duhn.
ENTREPRENEURSHIP DEVELOPMENT

Course Code: UMS 603  Credit Units: 04

Course Objective:
The aim of this course is to develop the understanding of management of entrepreneurship. The objective is to acquaint the students with various aspects of entrepreneurship business.

Course Contents:

Module I
Need, scope and characteristics of entrepreneurship management of self and understanding human behaviour, business ethics, performance appraisal, and (SWOT) analysis.

Module II
Market survey techniques, Criteria for the principles of product selection and development, Elements of Marketing & Sales Management- (a) Nature of product and market strategy (b) Packaging and advertising (c) After Sales Service (d) Pricing techniques.

Module III
Financial institutions, financial incentives, books of accounts and financial statements.

Module IV
Technical feasibility of the project, plant layout & process planning for the product, Quality Control, Critical Path Method (CPM) and Project Evaluation Review Techniques (PERT) as planning tools for establishing SSI

Examination Scheme:

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</table>

Text & References:

Text:
- Entrepreneurship: New Venture Creation, David H. Holt

References:
- Patterns of Entrepreneurship : Jack M. Kaplan
ECO-SOCIAL EVOLUTION AND BIOTECHNOLOGY

Course Code: UMS 604  Credit Units: 02

Course Objective:
Society has undergone an enormous change during the course of anthropogenic evolution. So has also the lifestyle of humans in an ecosystem. Such changes are reflected through the altered functioning of the human genome. The role of biotechnology in finding solution to such vexed problems needs special emphasis. Biotechnology has revolutionized the trends in defining some of the important applications in relation to changing global scenario of gene – environment interactions and the advances in human therapy.

Course Contents:

Module I: Eco system dynamics
Introduction to eco system dynamics and changes in response to socio ecological processes, concept of limiting factors and its implication in defining a system, effect of global warming in relation to population dynamics

Module II: Bioresource mining & conservation
Eco social dimensions in response to changing genetic profile of life system, microbial biosensors, biotechnology & conservation of biodiversity, genetic engineering & crop productivity

Module III
Structural – functional abnormalities of proteins and their effects on causation of diseases, structure based drug designing; biotechnology in healthcare.

Examination Scheme:

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</table>

Text & References:

Text:
- Principles of Internal Medicine; Harrisons 15th edition
- Text Book of physiology; Ganong.W, 9th edition
- Text Book of Biotechnology; Stryr

References:
- Environmental Science by Kevin Byrne (2001)
- Invasive Species in a changing world by Harold A. Mooney, Richard J. Hobbs (2000)
- Environmental Ecology: The Ecological Effects of Pollution, Disturbances and other Stresses by Bill Freedman (2005)
- J. Am Diet Assoc. 2006; 106 : 285-293
ENVIRONMENTAL AND INDUSTRIAL BIOTECHNOLOGY LAB

Course Code: UMS 620      Credit Units: 02

Course Contents:

ENVIRONMENTAL BIOTECHNOLOGY

Module I
Symptomological studies of the impacts of conventional fuel
Comparative and statistical analysis of the pigment content due to air pollution.

Module II
Comparative and statistical analysis of the sugar content as an impact of air pollution
NR activity estimation and its statistical analysis under pollution stress conditions.

INDUSTRIAL BIOTECHNOLOGY

Module III
Production & downstream processing of alcoholic fermentation.

Examination Scheme:

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Note: Minor variation could be there depending on the examiner.
COMMUNICATION SKILLS - IV

Course Code: UMS 641      Credit Units: 01

Course Objective:
To enhance the skills needed to work in an English-speaking global business environment.

Course Contents:

Module I: Business/Technical Language Development
Advanced Grammar: Syntax, Tenses, Voices
Advanced Vocabulary skills: Jargons, Terminology, Colloquialism
Individualised pronunciation practice

Module II: Social Communication
Building Relationships through Communication
Communication within and between Groups
Entertainment and Communication
Informal Business/ Technical Communication

Module III: Business Communication
Reading Business/ Technical press
Listening to Business/ Technical reports (TV, radio)
Researching for Business /Technology

Module IV: Presentations
Planning and getting started
Design and layout of presentation
Information Packaging
Making the Presentation

Examination Scheme:

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</table>

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Business Vocabulary in Use: Advanced Mascull, Cambridge
- Business Communication, Raman – Prakash, Oxford
- Business Communications, Rodgers, Cambridge
- Working in English, Jones, Cambridge
- New International Business English, Jones/Alexander, Cambridge
Course Objective:
- To develop an understanding the concept of stress its causes, symptoms and consequences.
- To develop an understanding the consequences of the stress on one’s wellness, health, and work performance.

Course Contents:

Module I: Stress
Meaning & Nature
Characteristics
Types of stress

Module II: Stages and Models of Stress
Stages of stress
The physiology of stress
Stimulus-oriented approach.
Response-oriented approach.
The transactional and interactive model.
Pressure – environment fit model of stress.

Module III: Causes and symptoms of stress
Personal
Organizational
Environmental

Module IV: Consequences of stress
Effect on behaviour and personality
Effect of stress on performance
Individual and Organizational consequences with special focus on health

Module V: Strategies for stress management
Importance of stress management
Healthy and Unhealthy strategies
Peer group and social support
Happiness and well-being

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Text & References:
- Blonna, Richard; Coping with Stress in a Changing World: Second edition
- Pestonjee, D.M, Pareek, Udaï, Agarwal Rita; Studies in Stress And its Management
- Pestonjee, D.M.; Stress and Coping: The Indian Experience
- Clegg, Brian; Instant Stress Management – Bring calm to your life now
FRENCH - VI

Course Code: UMS 644      Credit Units: 02

Course Objective:
To strengthen the language of the students both in oral and written so that they can:
i) express their sentiments, emotions and opinions, reacting to information, situations;
ii) narrate incidents, events;
iii) perform certain simple communicative tasks.

Course Contents:

Module D: pp. 157 – 168 – Unité 12

Unité 12 : s'évader
1. présenter, caractériser, définir
2. parler de livres, de lectures
3. préparer et organiser un voyage
4. exprimer des sentiments et des opinions
5. téléphoner
6. faire une réservation

Contenu grammatical:
1. proposition relative avec pronom relatif "qui", "que", "où" - pour caractériser
2. faire + verbe

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre : Campus: Tome 1
GERMAN - VI

Course Code: UMS 645
Credit Units: 02

Course Objective:
To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany
Introduction to Advanced Grammar and Business Language and Professional Jargon

Course Contents:

Module I: Adjective endings
Adjective endings in all the four cases discussed so far
Definite and indefinite articles
Cases without article

Module II: Comparative adverbs
Comparative adverbs as and like

Module III: Compound words
To learn the structure of compound words and the correct article which they take
Exploring the possibility of compound words in German

Module IV: Infinitive sentence
Special usage of ‘to’ sentences called zu+ infinitive sentences

Module V: Texts
A Dialogue: ‘Ein schwieriger Gast’
A text: ‘Abgeschlossene Vergangenheit’

Module VI: Comprehension texts
Reading and comprehending various texts to consolidate the usage of the constructions learnt so far in this semester.

Module VII: Picture Description
Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;
Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs
Course Code: UMS 646
Credit Units: 02

Course Objective:
To enable students acquire working knowledge of the language; to give them vocabulary, grammar, voice modulations/intonations to handle everyday Spanish situations in Present as well as in Present Perfect Tense with ease.

Course Contents:

Module I
Revision of the earlier modules

Module II
Present Perfect Tense

Module III
Commands of irregular verbs

Module IV
Expressions with Tener que and Hay que

Module V
En la embajada
Emergency situations like fire, illness, accident, theft

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, En Directo I A
- Español Sin Fronteras
Course Objective:
To enable the students to converse in the language with the help of verbs and the usage of different sentence patterns, which help them to strengthen the language.
Students are taught and trained enough to get placed in Japanese companies.
Note: The teaching is done in roman as well as Japanese script. 10 more kanjis are introduced in this semester.

Course Contents:

Module I: Polite form of verbs
Expressing feelings with the polite forms of verb.

Module II: Potential form
Ability of doing or not doing something

Module III: Conjunctions
Joining two sentences with the help of shi and mo

Module IV: Intransitive Verbs
Sentence patterns of indirect speech

Module V: Feelings and expressions
Regret, existence etc.

Learning Outcome
➢ Students can speak the language with the use of different forms of verb.

Methods of Private study/ Self help
➢ Hand-outs, audio -aids, assignments and role-plays will support classroom teaching.
➢ Students are encouraged to watch Japanese movies at Japan Cultural and information center.

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:
• Shin Nihon-go no Kiso Lesson No. 26 to 30.
• All vocabulary and topics taught are from the above-mentioned book.
Course Code: UMS 648    Credit Units: 02

Course Objective:
Chinese emperor Qin Shi Huang – Ti who built the great wall of China also built a network of 270 palaces, linked by tunnels, and was so afraid of assassination that he slept in a different palace each night. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Drills
Dialogue practice
Observe picture and answer the question.
Pronunciation and intonation.
Character writing and stroke order.

Module II
Going out to see a science exhibition
Going to the theatre.
Train or Plane is behind schedule.
Indian Economy-Chinese Economy
Talking about different Seasons of the Year and Weather conditions. Learning to say phrases like-spring, summer, fall, winter, fairly hot, very cold, very humid, very stuffy, neither hot nor cold, most comfortable, pleasant …. etc.

Module III
Temperature – how to say – What is the temperature in May here?
- How is the weather in summer in your area?
- Around 30 degrees
- Heating, air-conditioning
- Is winter in Shanghai very cold?
Talking about birthdays and where you were born?
The verb “shuo” (speak) saying useful phrases like speak very well, do not speak very well, if speak slowly then understand if speak fast then don’t understand, difficult to speak, difficult to write, speak too fast, speak too slow, listen and can understand, listen and cannot understand … etc.
Tell the following in Chinese – My name is …. I was born in … (year). My birthday is ……. Today is … (date and day of the week). I go to work (school) everyday. I usually leave home at . (O’clock). In the evening, I usually ……. (do what)? At week end, I ………. On Sundays I usually ……………… It is today….. It will soon be my younger sisters birthday. She was born in ….. (year). She lives in ………. (where). She is working (or studying)…… where… She lives in …….. (where.)

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</table>

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:
- Elementary Chinese Reader Part-2, 3; Lesson 47-54
GUIDELINES FOR PROJECT FILE

Research experience is as close to a professional problem-solving activity as anything in the curriculum. It provides exposure to research methodology and an opportunity to work closely with a faculty guide. It usually requires the use of advanced concepts, a variety of experimental techniques, and state-of-the-art instrumentation. Research is genuine exploration of the unknown that leads to new knowledge which often warrants publication. But whether or not the results of a research project are publishable, the project should be communicated in the form of a research report written by the student.

Sufficient time should be allowed for satisfactory completion of reports, taking into account that initial drafts should be critiqued by the faculty guide and corrected by the student at each stage.

The File is the principal means by which the work carried out will be assessed and therefore great care should be taken in its preparation.

In general, the File should be comprehensive and include:

- A short account of the activities that were undertaken as part of the project;
- A statement about the extent to which the project has achieved its stated goals.
- A statement about the outcomes of the evaluation and dissemination processes engaged in as part of the project;
- Any activities planned but not yet completed as part of the project, or as a future initiative directly resulting from the project;
- Any problems that have arisen that may be useful to document for future reference.

Report Layout
The report should contain the following components:

- Title or Cover Page.
  The title page should contain the following information: Project Title; Student’s Name; Course; Year; Supervisor’s Name.

- Acknowledgements (optional)
  Acknowledgment to any advisory or financial assistance received in the course of work may be given.

- Abstract
  A good "Abstract" should be straight to the point; not too descriptive but fully informative. First paragraph should state what was accomplished with regard to the objectives. The abstract does not have to be an entire summary of the project, but rather a concise summary of the scope and results of the project.

- Table of Contents
  Titles and subtitles are to correspond exactly with those in the text.

- Introduction
  Here a brief introduction to the problem that is central to the project and an outline of the structure of the rest of the report should be provided. The introduction should aim to catch the imagination of the reader, so excessive details should be avoided.

-Materials and Methods
  This section should aim at experimental designs, materials used. Methodology should be mentioned in details including modifications if any.

- Results and Discussion
  Present results, discuss and compare these with those from other workers, etc. In writing these section, emphasis should be given on what has been performed and achieved in the course of the work, rather than discuss in detail what is readily available in text books. Avoid abrupt changes in contents from section to section and maintain a lucid flow throughout the thesis. An opening and closing paragraph in every chapter could be included to aid in smooth flow.
Note that in writing the various sections, all figures and tables should as far as possible be next to the associated text, in the same orientation as the main text, numbered, and given appropriate titles or captions. All major equations should also be numbered and unless it is really necessary never write in “point” form.

➢ **Conclusion**
A conclusion should be the final section in which the outcome of the work is mentioned briefly.

➢ **Future prospects**

➢ **Appendices**
The Appendix contains material which is of interest to the reader but not an integral part of the thesis and any problem that have arisen that may be useful to document for future reference.

➢ **References / Bibliography**
This should include papers and books referred to in the body of the report. These should be ordered alphabetically on the author's surname. The titles of journals preferably should not be abbreviated; if they are, abbreviations must comply with an internationally recognised system.

**Examples**
**For research article**

**For book**

**ASSESSMENT OF THE PROJECT FILE**
Essentially, marking will be based on the following criteria: the quality of the report, the technical merit of the project and the project execution.
Technical merit attempts to assess the quality and depth of the intellectual efforts put into the project.
Project execution is concerned with assessing how much work has been put in.
The File should fulfill the following *assessment objectives*:

**Range of Research Methods used to obtain information**

**Execution of Research**

**Data Analysis**
Analyse Quantitative/ Qualitative information
Control Quality

**Draw Conclusions**

**Examination Scheme:**

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ADVANCED BIOCHEMISTRY

Course Code: UMS 701 Credit Units: 05

Course Objective:
Objective of this course is to help students navigate the discipline of biochemistry that explains how the collection of inanimate molecules that constitute the living systems interact, to maintain and perpetuate life. This knowledge has its roots in medicine, nutrition, agriculture, fermentation and natural products chemistry. It also aims to provide an understanding of the principles and application of primary and secondary metabolites.

Course Contents:

Module I
Metabolic pathways of Carbohydrates, Lipids, Amino acids, Nucleic acids.

Module II
Integration of cellular metabolism and Hormonal regulation.

Module III
Biochemistry of secondary metabolites in plants

Module IV
Molecular motors

Examination Scheme:

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Text & References:

Text:

References:
- Principles of Physical Biochemistry, K.E. Van Holde, W.C. Johnson, Prentice Hall
- Biochemistry (Fifth Edition), Lubert Stryer
Course Objective:
Cell Biology and genetics plays a central role to connect the different fields of biotechnology, which is highly interdisciplinary. They incorporates elements of biology, maths, physics and chemistry with combination of computers and electronics. The objective of the present course is to understand the structure and function of the cellular and subcellular components of cells and tissues with the help of these recent techniques. Students are also exposed to phenomenon that regulates cell death and etiology of cancerous cells.

Course Contents:

Module I
Mendelian principles on inheritance; Chromosome theory of inheritance, linkage and chromosome mapping, interference and coincidence, cytological basis of crossing over.
Extrachromosomal inheritance; Mitochondrial genetic code
Chromosomal aberration and polyplody
Concept of gene – classical and modern, pseudoallelism, position effect, intragenic crossing over & complementation (cistron, recon & nutron) Benzer’s work on r II locus in T2 bacteriophage

Module II: Cell Organelles
Structure of nuclear envelope, nuclear pore, complex, transport across envelope; regulation of nuclear import,
Targeting proteins to endoplasmic reticulum, signal recognition practical, signal recognition practical receptor, protein folding and processing in ER protein export from ER; Protein sorting and export from Golgi Apparatus; SNARE hypothesis; Protein import into Mitochondria, mitochondrial genome; Import and sorting of chloroplast protein, photorespiration; Transport across cell membranes; cell-cell interaction.

Module III
Structure and organization of actins filaments; Actins, myosin muscle contraction, Microtubule-structure and assembly, cilia, flagella-structure.

Module IV
Modes of cell signaling, steroid hormone receptors, peptide hormones and growth factor, plant hormones, G-protein coupled receptors; receptor –protein tyrosine kinase , c- AMP pathway of signal transduction ; c GMP, phospholipids and calcium ions , Ras, Raf , MAP kinase pathway , JAK –STAT pathway , Integrin signaling , Hedgehog and Wnt pathways, Apoptosis –role of caspases.

Module V: Cancer biology
Types of cancer; development of cancer, cells; Oncogenes, protooncogenes , function of oncogene products , tumor suppressor genes , function of tumor suppression gene products, role of oncogene and tumor suppressor gene in development, molecular diagnosis of cancer.

Module VI: Cell Cycle
Phases of eukaryotic cell cycle; Cell cycle regulation, checkpoints in cell cycle; regulators of cell cycle inhibitors of cell cycle, stem cells – properties and medical application.

Examination Scheme:

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Text & References:

Text:
- Cell and Molecular Biology, DeRobertis, B. I. Publication Pvt. Ltd
- Principles of Genetics, E J Gardner, John Wiley & Sons Inc.

References:
- Cell in Development and Inheritance, E.B. Wilson, Macmillan
- Developmental Biology, S.F. Gilbert, Sinauer Associates Inc.
- Cell and Molecular Biology, Gerald Karp, John Wiley and Sons Inc.
- Principles of Genetics, D.P. Snustad & M.J. Simmons, John Wiley and Sons Inc
Course Code: UMS 703
Credit Units: 04

Course Objective:
The course aims to develop competency and expertise in the application of statistical methods applied to biological data obtained in experimental techniques.

Course Contents:

Module I
Functions, limit, continuity, differentiation and integration, Matrices, Binomial theorem of integer, Series

Module II
Probability mass function, Expectation, Variance and Moments of Bernoulli, Binomial, Poisson distribution.

Module III
Mean, median, mode, variance, standard deviation, covariance, correlation, regression and handling of data sets.

Module IV
Density Function, Mean, variance, moments of Normal distribution, Chi-square test, students T-Test, F-test and ANOVA, Central limit theorem and of Law of large numbers.

Examination Scheme:

<table>
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</table>

Text & References:

Text:

References:
- Introduction to Biostatistics, Ronald N. Forthfer and Eun Sun Lee. Publisher: Elsevier.
- Biostatistics: A foundation for analysis in the Health Sciences, W.W Daniel. Publisher: John Wiley and Sons.
- Statistical Methodology, S.P Gupta. Publisher: S.Chand & Co.
- Statistical Analysis, Kaushal, T.L. Publisher: Kalyani Publishers.
- Statistical Methods, Potri, D. Kalyani Publishers.
Biophysics and Bioanalytical Techniques

Course Code: UMS 704 Credit Units: 04

Course Objective:
Biophysics aims at investigating the structure and operations of living systems with the aim of the concepts theory and methodology of both experimental and theoretical physics, which is utmost, required for connecting the fundamental principles and their applications with life sciences. The students will be exposed to different instruments in order to develop competency and expertise in experimental techniques methodology and safe laboratory practice.

Course Contents:

Module I: Membrane Biophysics
Genesis of membrane potential in nerve & membrane, Nerst & Goldman equation, Patch Clamp and Voltage – Clamp techniques for measuring membrane potential.

Module II: Radiation Biophysics
Tracer Technology, Dose response relationship, Radioisotopes in Diagnostics and Biotechnology, Geiger-Mueller Counter, Scintillation Counters

Module III: Non-Radioactive tracer Technology
Metabolic and physiological tracer techniques, non-radioactive labels, labeling and detection methods using fluorescent molecules.

Module IV: Spectroscopy and X-ray crystallography
Atomic Absorption spectrophotometry, Mass spectrometry, NMR, ESR, X-Ray Crystallography.

Module V: Electrophoresis
Paper and gel electrophoresis, Immuno-electrophoresis, Isoelectric Focusing, Capillary electrophoresis

Module VI: Chromatography and Cetrifugation
Thin layer, Affinity, gel permeation, ion exchange chromatography, GLC, HPLC, Ultracentrifugation.

Examination Scheme:

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Text & References:

Text:
- Practical Biochemistry, Principles & Techniques, Keith Wilson and John Walker

References:
- Bioinstrumentation, Webster
- Principles of Fermentation Technology, P.F. Stanbury, A. Whitaker & S.J. Hall
- Microscopic Techniques in Biotechnology, Michael Hoppert
- Principles & Practice of Bioanalysis, Richard F. Venn
CELL BIOLOGY AND GENETICS LAB

Course Code: UMS 720      Credit Units: 03

Course Contents:

Module I
Cell fractionation and separation of cell organelles by density gradient centrifugation.

Module II
Isolation of chloroplast from spinach and study of electron transport chain.

Module III
Isolation of mitochondria and study of electron transport chain.
Study of meiosis in anthers
Effect of colchicine on cell division in root tips.

Module IV
Study of karyotypes of genetic disorders.
Effect of UV radiation on morphological characters of Drosophila Species
PTC Test
Gene Expression

Examination Scheme:

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<td>Mid Term Viva</td>
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<td>Attendance</td>
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<td>Major Experiment</td>
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<td>Minor Experiment/Spotting</td>
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<td>Practical Record</td>
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<td>Viva</td>
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Note: Minor variation could be there depending on the examiner.
Course Contents:

Module I: Proteins
Identification of protein by Biuret test.
Quantitation of protein by Bradford method
Separation of proteins by SDS-PAGE

Module II: Enzyme
Enzyme activity study of serum alkaline phosphatase

Module III: Nucleic Acid
Biochemical estimation of DNA
Biochemical estimation of RNA
Separation of DNA on Agrose gel.

Module IV: Carbohydrate
Biochemical estimation of blood sugar

Module V
Lipids
Blood Cholesterol estimation.

Examination Scheme:

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Note: Minor variation could be there depending on the examiner.
TERM PAPER- I

Course Code: UMS 730 Credit Units: 03

A term (or research) paper is primarily a record of intelligent reading in several sources on a particular subject. The students will choose the topic at the beginning of the session in consultation with the faculty assigned. The progress of the paper will be monitored regularly by the faculty. At the end of the semester the detailed paper on the topic will be submitted to the faculty assigned. The evaluation will be done by Board of examiners comprising of the faculties.

GUIDELINES FOR TERM PAPER
The procedure for writing a term paper may consist of the following steps:
1. Choosing a subject
2. Finding sources of materials
3. Collecting the notes
4. Outlining the paper
5. Writing the first draft
6. Editing & preparing the final paper

1. Choosing a Subject
The subject chosen should not be too general.

2. Finding Sources of materials
a) The material sources should be not more than 10 years old unless the nature of the paper is such that it involves examining older writings from a historical point of view.
b) Begin by making a list of subject-headings under which you might expect the subject to be listed.
c) The sources could be books and magazine articles, news stories, periodicals, scientific journals etc.

3. Collecting the notes
Skim through sources, locating the useful material, then make good notes of it, including quotes and information for footnotes.
a) Get facts, not just opinions. Compare the facts with author's conclusion.
b) In research studies, notice the methods and procedures, results & conclusions.
c) Check cross references.

4. Outlining the paper
a) Review notes to find main sub-divisions of the subject.
b) Sort the collected material again under each main division to find sub-sections for outline so that it begins to look more coherent and takes on a definite structure. If it does not, try going back and sorting again for main divisions, to see if another general pattern is possible.

5. Writing the first draft
Write the paper around the outline, being sure that you indicate in the first part of the paper what its purpose is. You may follow the following:
a) statement of purpose
b) main body of the paper
c) statement of summary and conclusion
Avoid short, bumpy sentences and long straggling sentences with more than one main idea.

6. Editing & Preparing the final Paper
a) Before writing a term paper, you should ensure you have a question which you attempt to answer in your paper. This question should be kept in mind throughout the paper. Include only information/ details/ analyses of relevance to the question at hand. Sometimes, the relevance of a particular section may be clear to you but not to your readers. To avoid this, ensure you briefly explain the relevance of every section.
b) Read the paper to ensure that the language is not awkward, and that it "flows" properly.
c) Check for proper spelling, phrasing and sentence construction.
d) Check for proper form on footnotes, quotes, and punctuation.
e) Check to see that quotations serve one of the following purposes:
   (i) Show evidence of what an author has said.
(ii) Avoid misrepresentation through restatement.
(iii) Save unnecessary writing when ideas have been well expressed by the original author.
f) Check for proper form on tables and graphs. Be certain that any table or graph is self-explanatory.

Term papers should be composed of the following sections:
1. Title page
2. Table of contents
3. Introduction
4. Review
5. Discussion & Conclusion
6. References
7. Appendix

Generally, the introduction, discussion, conclusion and bibliography part should account for a third of the paper and the review part should be two thirds of the paper.

Discussion
The discussion section either follows the results or may alternatively be integrated in the results section. The section should consist of a discussion of the results of the study focusing on the question posed in the research paper.

Conclusion
The conclusion is often thought of as the easiest part of the paper but should by no means be disregarded. There are a number of key components which should not be omitted. These include:
e) summary of question posed
f) summary of findings
g) summary of main limitations of the study at hand
h) details of possibilities for related future research

References
From the very beginning of a research project, you should be careful to note all details of articles gathered. The bibliography should contain ALL references included in the paper. References not included in the text in any form should NOT be included in the bibliography.
The key to a good bibliography is consistency. Choose a particular convention and stick to this.

Conventions
Monographs

Edited volumes
[eds.] is used when there is more than one editor; and (ed.) where there is only one editor. In German the abbreviation used is (Hrsg.) for Herausgeber].

Edited articles

Journal articles

Electronic book

Electronic journal articles

Other websites
Verterhus, S.A. (n.y.), Anglicisms in German car advertising. The problem of gender assignment [HTML
Unpublished papers

Unpublished theses/ dissertations

Appendix
The appendix should be used for data collected (e.g. questionnaires, transcripts, ...) and for tables and graphs not included in the main text due to their subsidiary nature or to space constraints in the main text.

Assessment Scheme:

Continuous Evaluation: 40%
(Based on abstract writing, interim draft, general approach, research orientation, readings undertaken etc.)

Final Evaluation: 60%
(Based on the organization of the paper, objectives/ problem profile/ issue outlining, comprehensiveness of the research, flow of the idea/ ideas, relevance of material used/ presented, outcomes vs. objectives, presentation/ viva etc.)
COMMUNICATION SKILLS - V

Course Code: UMS 741  Credit Units: 01

Course Objective:
To facilitate the learner with Academic Language Proficiency and make them effective users of functional language to excel in their profession.

Course Contents:

Module I: Introduction to Speaking Skills
Business Conversation
Effective Public Speaking
Art of Persuasion

Module II: Speaking for Employment
Types of Interview
Styles of Interview
Facing Interviews- Fundamentals and Practice Session
Conducting Interviews- Fundamentals and Practice Session
Question Answer on Various Dimensions

Module III: Telephony Skills
Guidelines for Making a Call
Guidelines for Answering a Call
Telephone Word Groups
Answering Systems and Voice-Mail

Module IV: Work Place Speaking
Team Briefing
Conflict Management
Negotiations
Participation in Meetings
Keynote Speeches

 Examination Scheme:

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<th>Components</th>
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</table>

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Jermy Comfort, Speaking Effectively, et.al, Cambridge
- Krishnaswamy, N, Creative English for Communication, Macmillan
- Taylor, Conversation in Practice.
Course Objective:
This course aims at enabling students towards:

- Understand the importance of individual differences
- Better understanding of self in relation to society and nation
- Facilitation for a meaningful existence and adjustment in society
- Inculcating patriotism and national pride

Course Contents:

Module I: Individual differences & Personality
Personality: Definition & Relevance
Importance of nature & nurture in Personality Development
Importance and Recognition of Individual differences in Personality
Accepting and Managing Individual differences
Intuition, Judgment, Perception & Sensation (MBTI)
BIG5 Factors

Module II: Managing Diversity
Defining Diversity
Affirmation Action and Managing Diversity
Increasing Diversity in Work Force
Barriers and Challenges in Managing Diversity

Module III: Socialization
Nature of Socialization
Social Interaction
Interaction of Socialization Process
Contributions to Society and Nation

Module IV: Patriotism and National Pride
Sense of pride and patriotism
Importance of discipline and hard work
Integrity and accountability

Module V: Human Rights, Values and Ethics
Meaning and Importance of human rights
Human rights awareness
Values and Ethics- Learning based on project work on Scriptures like Ramayana, Mahabharata, Gita etc.

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Text & References:

- Davis, K. Organizational Behaviour,
- Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour
- Dressler, David and Cans, Donald: The Study of Human Interaction
- Robbins O.B. Stephen; Organizational Behaviour
Course Objective:
Revise the portion covered in the first volume, give proper orientation in communication and culture.

Course Contents:

Module A: Unités 1 – 3 : pp. 06 - 46

Contenu lexical :

Unité 1: Rédiger et présenter son curriculum vitae
- Exprimer une opinion
- Caractériser, mettre en valeur
- Parler des rencontres, des lieux, des gens

Unité 2: Imaginer - Faire des projets
- Proposer - conseiller
- Parler des qualités et des défauts
- Faire une demande écrite
- Raconter une anecdote
- Améliorer son image

Unité 3: Exprimer la volonté et l’obligation
- Formuler des souhaits
- Exprimer un manque/un besoin
- Parler de l’environnement, des animaux, des catastrophes naturelles

Contenu grammatical :

1. Le passé : passé composé/imparfait
2. Pronoms compléments directs/indirects, y/en (idées/chooses)
3. Propositions relatives introduites par qui, que, où
4. Comparatif et superlatif
5. Le conditionnel présent
6. Situer dans le temps
7. Féminin des adjectifs
8. La prise de paroles : expressions
9. Le subjonctif : volonté, obligation

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & Références:

- le livre à suivre : Campus: Tome 2
Course Objective:
To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany
Introduction to Advanced Grammar and Business Language and Professional Jargon

Course Contents:

**Module I: Dass- Sätze**
Explain the use of the conjunction “-that”, where verb comes at the end of the sentence

**Module II: Indirekte Fragesätze**
To explain the usage of the “Question Pronoun” as the Relative Pronoun in a Relative Sentence, where again the verb falls in the last place in that sentence.

**Module III: Wenn- Sätze**
Equivalent to the conditional “If-” sentence in English. Explain that the verb comes at the end of the sentence.

**Module IV: Weil- Sätze**
Explain the use of the conjunction “because-” and also tell that the verb falls in the last place in the sentence.

**Module V: Comprehension texts**
Reading and comprehending various texts to consolidate the usage of the constructions learnt so far in this semester.

**Module VI: Picture Description**
Firstly recognize the persons or things in the picture and identify the situation depicted in the picture; Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs
Course Objective:
To enable students acquire working knowledge of the language; to give them vocabulary, grammar, expressions used on telephonic conversation and other situations to handle everyday Spanish situations with ease.

Course Contents:

Module I
Revision of earlier semester modules

Module II
Zodiac signs. More adjectives…to describe situations, state of minds, surroundings, people and places.

Module III
Various expressions used on telephonic conversation (formal and informal)

Module IV
Being able to read newspaper headlines and extracts (Material to be provided by teacher)

Module V
Negative commands (AR ending verbs)

Module VI
Revision of earlier sessions and introduction to negative ER ending commands, introduction to negative IR ending verbs

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español En Directo I A, 1B
- Español Sin Fronteras
- Material provided by the teacher from various sources
Course Objective:
To enable the students to converse in the language with the help of different speech, possibilities, probabilities etc.
Note: The teaching is done in roman as well as Japanese script. 10 more kanjis (Japanese characters) are taught in this semester.

Course Contents:

Module I: Thought
Expressing one’s thought and intentions on different situations.

Module II: Advice
Giving advice, probability, possibility and suggestions.

Module III: Informal Speech
Addressing friends and close people using informal ways.

Module IV: Simultaneous Verbs
Describing two situations simultaneously.

Module V: Possibility
Explaining the probability and possibility of any situation.

Learning Outcome
➢ Students can interact in a formal as well as informal way on above-mentioned topics.

Methods of Private study/ Self help:
➢ Hand-outs, audio-aids, assignments and role-plays will support classroom teaching.

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Shin Nihon-go no Kiso Lesson No.-31 to 35.
- All vocabulary and topics taught to the students are from the above mentioned book.
Course Objective:
The story of Cinderella first appears in a Chinese book written between 850 and 860 A.D. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Drills
Dialogue practice
Observe picture and answer the question.
About china part –I Lesson 1,2.

Module II
Pronunciation and intonation
Character Writing and stroke order.

Module III
Ask someone what he/she usually does on weekends?
Visiting people, Party, Meeting, After work….etc.

Module IV
Conversation practice
Translation from English to Chinese and vise-versa.
Short fables.

Module V
A brief summary of grammar.
The optative verb “yuanyi”.
The pronoun “ziji”.

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- “Kan tu shuo hua” Part-I Lesson 1-7
ADVANCED MOLECULAR BIOLOGY

Course Code: UMS 801  Credit Units: 04

Course Objective:
The objective of the course is to provide a clear understanding of DNA (genetic material) so that they can manipulate it and understand basic tools and techniques involved in its manipulation. Strong foundation in molecular biology enables the students to familiarize themselves with Genetic engineering technology.

Course Contents:

Module I: DNA replication and repair
DNA polymerases in prokaryotes and eukaryotes; replication protein, replication fork; termination of replication DNA repair, photo reaction, base excision repair, nucleotide excision repair, transcription coupled repair, mismatch repair, error prone repair recombinational repair.

Module II: Transcription of DNA
Transcription in prokaryotes and eukaryotes, RNA polymerase – Composition and function; transcription mechanism; transcription factor and their role, inhibition of RNA synthesis.

Module III: Processing of RNA
Procession of ribosomal and transfer RNA’s processing of mRNA-5’cap formation; 3’ polyadenylation; RNA splicing, RNA editing, RNA degradation.

Module IV: Translation
Translation mechanism in prokaryotes and eukaryotes; ribosomes, initiation of translation, elongation, termination, amino acid activation; inhibitors, post translation modification of protein.

Module V: Regulation of gene expression
Regulation in prokaryotes – repressors and negative control, positive control, role of c AMP, Ampreceptor protein, lac, tryp, His and ara operons, Regulation in Eukaryotes=promoters and enhancers, transcriptional regulatory protein, transcriptional activators, eukaryotic repressor.

Module VI: Gene Silencing
Antisense molecules; Biochemistry of ribozyme, Hammer head, hairpin ribozymes. Application of antisense and ribozymes in genetic engineering.

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</table>

Text & References:

Text:
- Concepts of Genetics, W.S. Klug, and M.R. Cummings 2004, Pearson Education

References:
- Genome, T.A. Brown, John Willey & Sons Inc.
- Molecular Biology of the Cell by Alberts Bruce, Bray Demos, and Watson James D.
- Gene VIII, Benjamin Lewin 2005, Oxford University Press
- Introduction to Practical Molecular Biology, P.D. Dabre, John Wiley and Sons Inc.
Course Code: UMS 802      Credit Units: 04

Course Objective:
To acquaint the students about the microbiology and role of various microorganisms in different biotechnological applications, various techniques for their cultivation and control.

Course Contents:

Module I: Introduction to microbiology
Bacteria – Morphology and classification. Abnormal forms of bacteria, archaebacteria, mycoplasma and PPLO, cultivation of bacteria – nutritional requirements of micro organism, physical requirements, different types of media & their preparations. Isolation of pure cultures, maintenance and preservation of the pure cultures. Culture characteristics – Bacterial growth – Growth curve, batch and continuous cultures di auxic and synchronous growth Eneumeration of cells by direct and indirect methods,

Module II: Control of micro-organisms
Concept of sterilization and disinfection. Physical and chemical methods of control.Chemotherapeutics – mode of action of antibiotics, Penicillin, ampicillin, sulfonamide, vancomycin, streptomycine, tetracycline, chloramphenicol, antifungals, antiviral etc.

Module III: Microbial genetics

Module IV: Medical microbiology
Normal microflora of host, host parasite interactions, mechanisms of pathogenesis, and clinical manifestations associated with medically-important pathogenic microorganisms (bacteria, fungi, parasites, and viruses), applications of the basic principles of microbiology in effective diagnosis, treatment and prevention of infectious disease

Examination Scheme:

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Text & References:

Text:
- General Microbiology, R.Y. Stanier, J.L. Ingraham, M. L. Wheelis and P.R. Painter, Macmillian

References:
- Principles of Microbiology, R.M. Atlas, Wm C. Brown Publisher.
- The microbes – An Introduction to their Nature and Importance, P.V. Vandenmark and B.L. Batzing Benjamin Cummings.
- The Microbial World, Roger Y. Stanier, Prentice Hall
- Microbiology, Tortora, Funke and Chase, Benjamin & Cummings
ADVANCED PLANT BIOTECHNOLOGY

Course Code: UMS 803  Credit Units: 04

Course Objective:
The plant biotechnology course basically meant for understanding the genomic organization, molecular & biochemical mechanism, Genetic engineering in plants and basic techniques of plant tissue culture in plants along with the latest ongoing research on the different aspects of plants.

Course Contents:

Module I: Plant Cell and Tissue Culture Techniques
Terms & definitions, History of Plant tissue culture, Culture of various ex plants, principles and methods, possible in vitro responses, organogenesis embryogenesis and Micropropagation. Tissue Culture as a source of genetic variability- haploids and triploids plants and their utilization. Somaclonal variation, Embryo rescue and Endosperm culture with their practical applications.

Module II: Transformation of plant cells and protoplasts

Module III
Plant genome organization, structural features of representative plant gene, gene families in plants. Organization of chloroplast and mitochondrial genomes, chloroplast & mitochondrial encoded genes for their proteins, Cytoplasmic male sterility.

Module IV
Genetic engineering in plants, selectable markers, reporter genes and promoters used in plant vectors. Mechanism of T-DNA transfer to plants, Ti plasmic vector for plant transformation, biochemistry and molecular biology of plant stress response, virus resistance, pest resistance, herbicide tolerance, sterility, delay of fruit ripening, resistance to fungi and bacteria. Gene silencing in transgenic plants.

Examination Scheme:

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<th>Components</th>
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</table>

Text & References:

Text:
- An Introduction to Plant Tissue Culture, M.K. Razdan, Oxford and IBH Publishing

References:
- Plant Biotechnology and Transgenic Plants, K.M.O. Caldenty, W.H. Barz and H.L. Wills, Marcel Dekker
- Plant Tissue Culture: Theory & Practice, S.S. Bhojwani and M.K. Razdan, Elsevier Health Sciences
ADVANCED ANIMAL BIOTECHNOLOGY

Course Code: UMS 804      Credit Units: 04

Course Objective:
It aims to promote an understanding and knowledge of animal cell structure and function with particular emphasis on in vitro proliferation and differentiation.

Course Contents:

Module I
Introduction of animal cell culture—culture substrate, culture media, maintenance of cell lines.

Module II
Transformation of animal cells lines used today.

Module III
Biology of viral factors-SV40, adeno-viruses, vaccinia virus, herpes virus, adenoassociated virus and baculo virus. Construction of animal viral vectors for gene transfer into cell lines.

Module IV
Animal Biotechnology for production of regulatory proteins, blood products, vaccines, hormone and other therapeutic proteins.

Module V
Gene therapy—SCID, cystic fibrosis, familial by hypercholestremia, prospects and problem, Biotechnological applications for HIV diagnostics and therapy.

Module VI
Transgenic animal production and application in production of therapeutic proteins, gene Knock out and mice model for human genetic disorder, baculo virus for expression of foreign gene mapping of human genome

Module VII
Human Genome Project

Examination Scheme:

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</table>

Text & References:

- Culture of Animal Cells, R.I Freshney, Wiley-Leiss
- Animal Cell Culture – A Practical approach, J.R.W. Masters, Oxford
- Animal Cell Culture Techniques, M. Clynes, Springer Verlag
- Cell Culture LabFax, M. Butler and M. Dawson, Bios scientific Publications Ltd.
- Cell Growth and Division – A Practical approach, R. Basega, IRL Press
- Comprehensive Biotechnology, Moo-Young, Alan T. Bullm Howard Dalton, Panima Publication
Course Contents:

**Module I**
Induction of mutagenesis in microbes, fungi and eukaryotic cells

**Module II**
Isolation of plasmid DNA and chromosomal DNA
Restriction digestion of DNA, Ligation

**Module III**
Preparation of competent cells
Transformation of competent cells by CaCl$_2$ method.

**Module IV**
DNA amplification by PCR method

**Examination Scheme:**

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*Note: Minor variation could be there depending on the examiner.*
ADVANCED MICROBIAL TECHNOLOGY LAB

Course Code: UMS 821      Credit Units: 02

Course Contents:

Module I
Aseptic techniques: preparation of culture media for cultivation of specific microorganism.
Staining techniques – simple staining, acid fast and endospore staining, differential Gram staining, lactophenol cotton blue staining for fungi

Module II
Biochemical test – Indole test, methyl red test, voges proskaeur test, citrate utilization, starch hydrolysis, protease, catalase test and oxidase test.

Module III
Isolation of special microbes from environment by isolation and enrichment techniques
Water microbiology: standard plate count, presumptive and confirmed coliform test, BOD and COD
Soil microbiology: Isolation of rhizosphere microflora (actinomycetes, azotobacter, bacteria and fungi)

Module IV
Antibiotic sensitivity test by disc diffusion assay

Module V
Biochemical and molecular characterization of micro organisms
Determination of growth curve of bacteria and fungi and determination of substrate degradation profile
Determination of KLa.

Examination Scheme:

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Note: Minor variation could be there depending on the examiner.
PLANT AND ANIMAL BIOTECHNOLOGY LAB

Course Code: UMS 822 Credit Units: 02

Course Contents:

Module I
Preparation of media, Surface sterilization

Module II
Organ culture, Callus propagation, Anther culture, Embryo culture

Module III
Protoplast isolation and culture

Module IV
Histological study of some important tissue through permanent slides

Module V
Estimation of protein/ enzyme from animal cell tissue/ cell lines

Module VI
Cell viability/ toxicity study invivo/invitromodel, Cancer histopathology by microtomy,
Apoptosis study Hela cell line through kit

Examination Scheme:

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Note: Minor variation could be there depending on the examiner.
TERM PAPER - II

Course Code: UMS 830 Credit Units: 03

A term (or research) paper is primarily a record of intelligent reading in several sources on a particular subject. The students will choose the topic at the beginning of the session in consultation with the faculty assigned. The progress of the paper will be monitored regularly by the faculty. At the end of the semester the detailed paper on the topic will be submitted to the faculty assigned. The evaluation will be done by Board of examiners comprising of the faculties.

GUIDELINES FOR TERM PAPER
The procedure for writing a term paper may consist of the following steps:
1. Choosing a subject
2. Finding sources of materials
3. Collecting the notes
4. Outlining the paper
5. Writing the first draft
6. Editing & preparing the final paper

1. Choosing a Subject
The subject chosen should not be too general.

2. Finding Sources of materials
a) The material sources should be not more than 10 years old unless the nature of the paper is such that it involves examining older writings from a historical point of view.
   b) Begin by making a list of subject-headings under which you might expect the subject to be listed.
   c) The sources could be books and magazine articles, news stories, periodicals, scientific journals etc.

3. Collecting the notes
Skim through sources, locating the useful material, then make good notes of it, including quotes and information for footnotes.
   a) Get facts, not just opinions. Compare the facts with author's conclusion.
   b) In research studies, notice the methods and procedures, results & conclusions.
   c) Check cross references.

4. Outlining the paper
   a) Review notes to find main sub-divisions of the subject.
   b) Sort the collected material again under each main division to find sub-sections for outline so that it begins to look more coherent and takes on a definite structure. If it does not, try going back and sorting again for main divisions, to see if another general pattern is possible.

5. Writing the first draft
Write the paper around the outline, being sure that you indicate in the first part of the paper what its purpose is. You may follow the following:
   a) statement of purpose
   b) main body of the paper
   c) statement of summary and conclusion
Avoid short, bumpy sentences and long straggling sentences with more than one main idea.

6. Editing & Preparing the final Paper
   a) Before writing a term paper, you should ensure you have a question which you attempt to answer in your paper. This question should be kept in mind throughout the paper. Include only information/ details/ analyses of relevance to the question at hand. Sometimes, the relevance of a particular section may be clear to you but not to your readers. To avoid this, ensure you briefly explain the relevance of every section.
   b) Read the paper to ensure that the language is not awkward, and that it "flows" properly.
   c) Check for proper spelling, phrasing and sentence construction.
   d) Check for proper form on footnotes, quotes, and punctuation.
   e) Check to see that quotations serve one of the following purposes:
      (i) Show evidence of what an author has said.
      (ii) Avoid misrepresentation through restatement.
      (iii) Save unnecessary writing when ideas have been well expressed by the original author.
   f) Check for proper form on tables and graphs. Be certain that any table or graph is self-explanatory.
Term papers should be composed of the following sections:
Generally, the introduction, discussion, conclusion and bibliography part should account for a third of the paper and the review part should be two thirds of the paper.

**Discussion**
The discussion section either follows the results or may alternatively be integrated in the results section. The section should consist of a discussion of the results of the study focusing on the question posed in the research paper.

**Conclusion**
The conclusion is often thought of as the easiest part of the paper but should by no means be disregarded. There are a number of key components which should not be omitted. These include:

i) summary of question posed  
ii) summary of findings 
iii) summary of main limitations of the study at hand  
iv) details of possibilities for related future research

**References**
From the very beginning of a research project, you should be careful to note all details of articles gathered. The bibliography should contain ALL references included in the paper. References not included in the text in any form should NOT be included in the bibliography. The key to a good bibliography is consistency. Choose a particular convention and stick to this.

**Conventions**
Monographs  

**Edited volumes**
[(eds.) is used when there is more than one editor; and (ed.) where there is only one editor. In German the abbreviation used is (Hrsg.) for Herausgeber].

**Edited articles**

**Journal articles**

**Electronic book**

**Electronic journal articles**

**Other websites**

**Unpublished papers**
Unpublished theses/dissertations

Appendix
The appendix should be used for data collected (e.g. questionnaires, transcripts, ...) and for tables and graphs not included in the main text due to their subsidiary nature or to space constraints in the main text.

Assessment Scheme:

Continuous Evaluation: 40%
(Based on abstract writing, interim draft, general approach, research orientation, readings undertaken etc.)

Final Evaluation: 60%
(Based on the organization of the paper, objectives/problem profile/issue outlining, comprehensiveness of the research, flow of the idea/ideas, relevance of material used/presented, outcomes vs. objectives, presentation/viva etc.)
COMMUNICATION SKILLS - VI

Course Code: UMS 841      Credit Units: 01

Course Objective:
The modules are designed to enhance the communicative competence of the learners to equip them with efficient interpersonal communication.

Course Contents:

Module I: Essentials of Workplace Conversation
Language: registers (formal vs. informal) and usage
Job description and evaluation;
Relations with superiors, peers, and subordinates
Team building
Conversation Management
Non Verbal Aids

Module II: Dynamics of Group Discussion
Introduction,
Methodology
Role Functions
Mannerism
Guidelines

Module III: Communication through Electronic Channels
Introduction
Technology based Communication Tools
Video Conferencing
Web Conferencing
Selection of the Effective Tool
E-mails, Fax etc.

Examination Scheme:

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<th>Components</th>
<th>CT1</th>
<th>CT2</th>
<th>CAF</th>
<th>V</th>
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</table>

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Jermy Comfort, Speaking Effectively, et.al, Cambridge
- Krishnaswamy, N, Creative English for Communication, Macmillan
- Taylor, Conversation in Practice
Course Objective:
- To have a great deal of insight into one’s character.
- Understanding of positive emotions
- To explore the dimensions of happiness, well-being, Optimism and hope
- Quick understanding of different situations and grasp new concepts.

Course Contents:

Module I: Positivity in personality
Importance of Positivity in personality
Positivity Vs. Negativity
Introspection and personal growth

Module II: Positive Emotions
Understanding positive emotions
Importance of Positive emotion
Types and identification of positive emotions (Love, happiness, Contentment, Resilience, etc.)

Module III: Hope, Optimism and Resilience
Positive approach towards future
Benefits of Positive approach
Resilience during challenge and loss

Module IV: Application of Positive Emotions
Application of positive emotions in relationships, and organizations
Creating healthy organizational climate
Positive emotions enhances performance

Module V: Happiness and Well Being
Concept of Happiness & Well-Being
Secret of happy mind and healthy life
Work life balance

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Text & References:
Course Objective:
Provide students with the necessary linguistic tools
• to face up to different situations of communication
• to enhance their capacity in oral/written comprehension/expressions

Course Contents:

Module B: Unités 4, 5, 6: PP. 48 - 86

Contenu lexical :

Unité 4: 1. Présenter une information/les circonstances d’un événement
          2. Exprimer la possibilité/la probabilité
          3. Exprimer une quantité indéfinie
          4. Comprendre et raconter un fait div

Unité 5: 1. Parler d’une passion, d’une aventure
          2. Choisir/créer
          3. Exprimer la surprise/des sentiments

Unité 6: 1. Exprimer la cause et la conséquence
          2. Exprimer la crainte et rassurer
          3. Faire une démonstration

Contenu grammatical:

1. la construction passive
2. la forme impersonnelle
3. l’interrogation
4. les adjectifs et les pronoms indéfinis
5. les pronoms interrogatifs et démonstratifs
6. la construction avec deux pronoms
7. le subjonctif dans l’expression des sentiments, de la crainte, du but
8. constructions permettant l’expression de la cause et de la conséquence
9. l’enchaînement des idées : succession et opposition

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & Références:

• le livre à suivre : Campus: Tome 2
Course Objective:
To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany
Introduction to Advanced Grammar and Business Language and Professional Jargon

Course Contents:

Module I: Reading and comprehension
Reading texts and comprehending them

Module II: Information about German History
Acquiring information about German History through appropriate texts and stories

Module III: Bio data/Curriculam vitae
Writing a bio-data in the proper format with all essential components

Module IV: Informal letters
Reading and writing informal letters

Module V: Business etiquette
Business etiquette in Germany and types of companies

Module VI: Interview skills
To learn to face interviews
Read a text ‘Interviewspiel’

Module VII: Picture Description
Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;
Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs
Course Objective:
To enable students to deal with Spanish situations putting things in perspective, using Past Tense. Enabling them to comprehend and form slightly complex sentences. Give students vocabulary of various situations.

Course Contents:

Module I
Situational exercises/Picture Description:
At the cine
At the Chemist’s/Hospital

Module II
At a corporate client’s informal/formal meeting/gathering
Looking for accommodation

Module III
Past Tense (Indefinido) of regular verbs
Past Tense (Indefinido) of irregular verbs
Exercises related to the above

Module IV
Past Tense (Imperfecto)

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español En Directo I A, 1B
- Español Sin Fronteras
- Material provided by the teacher from various sources
Course Objective:
To enable the students to converse in the language with the help of different forms as volitional forms, active and passive voice and decision making etc.

Note: The course and teaching in Roman as well as Japanese script. Also introducing next 10 to 20 kanjis.

Course Contents:

Module I: Volitional forms
Explaining the situation when one is thinking of doing something.

Module II: Active and Passive voice
Direct and indirect ways of speech.

Module III: Plain Forms
Sentence patterns using plain forms of verb.

Module IV: Causes and effects
Explaining causes and effects with different forms of verb.

Module V: Decision making
Expressing different occupations and how to make decision.

Learning Outcome
➢ Students can speak the language and will be able to express their views and opinions comfortably.

Methods of Private study/ Self help
➢ Hand-outs, audio-aids, assignments and role-plays will support classroom teaching.

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:
• Shin Nihon-go no Kiso Lesson No.-36 to 40.
• All vocabulary and topics taught to the students are from the above mentioned book.
Course Code: UMS 848  Credit Units: 02

Course Objective:
Paper was first invented in China in 105 AD. It was a closely guarded secret and didn’t reach Europe until the 8th Century. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Drills
Dialogue practice
Observe picture and answer the question.
The aspect particle “le” and the modal particle “le”.

Module II
Optative verbs
Texts based on different topics
Enriching vocabulary by dealing with various daily scenarios and situations.

Module III
Sentences with subject predicate construction as its predicate
Pronunciation and intonation
Character writing and stroke order

Module IV
About China Part I Lesson 2,3
Chinese to English and English to Chinese translations from the newspaper.

Module V
Questions with an interrogative pronoun
Essays, writing formal letters.
Conversation practice.

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- “Kan tu shuo hua” Part-I Lesson 8-13
Course Objective:
The above course will be aimed to identify and design drugs that could be potentially useful in the identification of the candidate drugs, which have efficacy in cell culture or animal models, and thus the most effective compounds could be employed based on the above results for being moved through preclinical studies to clinical trials.

Course Contents:

Module I: Drug targets classification
DNA, RNA, post-translational, processing enzymes, metabolic enzymes involved in nucleic acid synthesis, G-protein coupled receptors (monomeric transmembrane proteins), small molecule receptors, neuropeptide receptors, ion channels (monomeric multi-transmembrane) proteins, ligand-gated ion channels (oligomeric transmembrane proteins), transporters (multi-transmembrane proteins)

Module II: Target discovery and validation strategies
Genomics (new target discovery), biological activity directed and other types of screening, natural products, combinatorial chemistry; General overview of validation techniques.

Module III: Structure-based design
Drug design to discovery and development, drug metabolism, toxicity and pharmacokinetics, toxicology considerations, problems and drawbacks on drug discovery and development.
‘de novo’ design methodologies : indirect drug design, pharmacophore development and receptor mapping, combinatorial libraries and new strategies and recent technologies in drug design.

Module IV: Basic concepts of Drug Delivery
Basic terminologies in drug delivery and drug targeting, Drug release, Drug targeting, Doses forms, Various routes of administration of drugs (just introduction), Strategies for enhanced therapeutic efficacies (Basic principles)

Module V: Delivery of Genetic material
Basic principles of gene expression, Viral and nonviral vectors in gene delivery, Clinical applications of gene therapy and antisense therapy
New generation technologies in Drug delivery and targeting
Nanotechnology / Nanobiotechnology, Use of biosensors and challenge of chronopharmacology, Microchips and controlled drug delivery, Genetically engineered cell implants in drug deliver.

Examination Scheme:

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Text & References:

Text:
- Drug Delivery and Targeting, A.M. Hillery, A.W. Lloyd and J. Swarbrick, Harwood Academic Publisher
- Pharmaceutical Dosage Forms and Drug Delivery Systems, H.C. Ansel, L.V. allen and N.G. Popovich, Lippincott Williams and Wilkins Publisher

References:
- Introduction to Biophysical Methods for Protein and Nucleic Acid Research, J.A. Glasel and M.P. Deutscher, Academic Press
- Principles of Medicinal Chemistry, W.O. Foye, T.L. Lemke, and D.A. Williams, Williams and Wilkins
- Side Effects and Drug Design, E.J. Lien, Marcel Dekker
• Drug Delivery: Engineering Principles for Drug Therapy (Topics in Chemical Engineering), W.M. Saltzman, Oxford University Press
• Handbook of Biodegradable Polymers (Drug Targeting and Delivery), A.J. Domb, J. Kost and D.M. Wiseman, Dunitz Martin Ltd.
Course Objective:
The objective of this course to apply the basic concepts in the specific field of Pharmaceutical Biotechnology Industry. The student will gain insight into the working of a pharma industry, various classes of biotech products and the regulations governing production and marketing of pharmaceutical products.

Course Contents:

Module I
Introduction and History, Drug Discovery Process, Methods of Drug Discovery and development

Module II
Physicochemical Properties in Relation to Biological Action – Effects of route of administration, Drug Targets, Validation techniques of Pharmaceutical targets, Pharmacokinetics and pharmacodynamics of drugs, Drug Toxicity.

Module III
DNA vaccines, Vaccines & Monoclonal antibody based pharmaceuticals, Antibiotics, Characterisation and Bioanalytical aspects of Recombinant proteins as pharmaceutical drugs.

Module IV
Formulation of Biotechnological Products, Drug Delivery, Examples of some Biotechnological products in clinical development

Module V: Regulations
Role of FDA, ICH Guidelines, cGMP, The Regulation of Pharmaceutical Biotechnological Products and Ethical Issues.

Examination Scheme:

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</table>

Text & References:

Text:
- Pharmaceutical Biotechnology - by Oliver. Kayser, Rainer Helmut Müller Series: Pharmaceutical Biotechnology, Vol. 9 Pearlman, Rodney; Wang, Y. John (Eds.) 1996,

References:
IPR, BIOSAFETY AND BIOETHICS

Course Code: UMS 903      Credit Units: 04

Course Objective:
The aim of this course is to develop the understanding of relevance, business impact and protection of
Intellectual property along with the types of Intellectual Property Rights; Patents, Copyrights, Trademarks,
Industrial Designs, Geographical Indications and International Conventions, Biosafety and Bioethics

Course Contents:

Module I

Module II
Patent- Basic requirements of Patentability, Patentable Subject Matter, Procedure for Obtaining Patent,
Provisional and Complete Specification

Module III
Copyright-Objectives of copyright, Rights conferred by registration of copyright, Infringement of copyright

Module IV
Trademarks-Basic Principles of Trademark, Rights conferred by Registration of Trademark, Infringement of
Trademark

Module V
Geographical Indications-Objectives of Geographical Indications, Rights conferred, Infringement of
Geographical Indications, International Position, Indian Position, Bioprospecting and Biopiracy.

Module VI
Biosafety and Bioethics Management-Key to environmentally responsible use of biotechnology. Cartagena
Protocol on Biosafety, Ethical implications of Biotechnological products and techniques.

Examination Scheme:

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</table>

Text & References:

Text:
- Intellectual Property Rights by Brigitte Anderson, Edward Elgar Publishing
- Intellectual Property Rights and the Life Sciences Industries by Graham Dutfield, Ashgate Publishing

References:
- WIPO Intellectual Property Handbook
- Intellectual Property Rights by William Rodelph Cornish, David Clewelyn
- Journals and Current magazines
CLINICAL BIOTECHNOLOGY

Course Objective:
To develop an understanding of role of biochemistry and molecular biology in the diagnosis and clinical management of disease.

Course Contents:

Module I
Clinical significance of biochemical tests and their role in the diagnosis and monitoring of disease, Clinical characteristic of disease. Role of pharmacological testing in clinical management of disease. Role of clinical biochemistry in detection, diagnosis and therapy of genetically inherited diseases and cancer.

Module II
Genetic disease, type of inheritance, single-gene and multifactorial inheritance, example of genetic diseases. Therapeutic intervention in blood disorder by stem cell transplantation/gene therapy.

Module III

Module IV
Current topics in animal and cellular and molecular biology- cellular and molecular mechanism of human diseases, transgenesis-animal models of human diseases, animals for pharmaceutical protein production.

Module V
Manipulation of reproduction and development for application in medicine, agriculture, aquaculture and conservation.

Module VI
Management of Clinical Data.

Examination Scheme:

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</table>

Text & References:

Text:

References:
- Principles of Physical Biochemistry, K.E. Van Holde, W.C. Johnson, Prentice Hall
- Tools of Biochemistry, T.G. Cooper, John Wiley and Sons Inc.
- Enzymes Biochemistry, Biotechnology, Clinical Chemistry, Trevor Palner
- Biochemistry (Fifth Edition), Lubert Stryer
- Physical Biochemistry, David Freifeider
- Industrial Enzymes & their applications, H. Uhlig., John Wiley and Sons Inc.
NANOBIO TECHNOLOGY

Course Code: UMS 905  Credit Units: 04

Course Objective:
Nanotechnology is one of the most important emerging fields in today’s scenario and holds tremendous potential in the field of Biotechnology. The objective of this course is to introduce this emerging field to the students so that they can apply this to develop new drug delivery systems and biomarkers.

Course Contents:

Module I: Introduction to Nanotechnology
Overview of nanotechnology developments, different nanostructured materials, properties related to nanostructured surfaces, the rules governing the health and safety standards related to the use of chemicals and nanomaterials and the physical environment required for working with nanomaterials. Laws and principles governing the functions of numerous instruments found in nanobiotechnology, atomic theory and bonding, quantum theory, electromagnetic properties of matter, molecular structure and macromolecules, intramolecular and intermolecular forces, solubility and solvation, thermodynamics and fluid behaviour.

Module II: Nanostructured Materials
The choice of nanomaterials to be used in the context of a bionanostructured system for either development or production. carbon nanotubes and nanowires, the physical characteristics of nanomaterials and nanostructured surfaces, quantum dots, nanostructured thin films, pattern surfaces, composites, magnetic nanoparticles, scaffolds, gels and drug delivery systems.

Module III: Nanobiostucture Systems – Drug Delivery
The assembly of drug delivery systems, preparation and assembly of pharmaceutical molecule into nanometric material within the parameters of GLP and health and safety standards.

Module IV: Nanobiostucture Systems - Biosensor
The functional assembling of the components of a nanostructured biosensor, putting together a bioreceptor and putting together nanometric support and a signal transduction system. Assembly and production of a nanobiosensor.

Examination Scheme:

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Text & References:

- Molecular Engineering of Nanosystems by Edward A. Rietman.
- Nanobiotech- Concepts, Applications and Perspectives, Christot, Chad Mirkin.
- Nanoscale Science and technology, Robert W Kelsall, Mark Geoghegan, Ian W Hamley.
- Nano surface chemistry, Morton Rosoff.
ENZYME TECHNOLOGY

Course Code: UMS 906  Credit Units: 04

Course Objective:
The course aims to provide an understanding of the principles and application of proteins, secondary metabolites and enzyme biochemistry in therapeutic applications and clinical diagnosis. The theoretical understanding of biochemical systems would certainly help to interpret the results of laboratory experiments.

Course Contents:

Module I: Enzymes
Introduction and scope, Nomenclature, Mechanism of Catalysis, Industrial applications.

Module II: Enzyme Kinetics
Single substrate steady state kinetics; King-Altman's method; Inhibitors and activators; Multi-substrate systems; Effect of pH and temperature; Allosteric enzymes.

Module III: Immobilization of Enzymes
Advantages, Carriers, adsorption, covalent coupling, cross-linking and entrapment methods, Micro-environmental effects

Module IV: Enzyme Reactors
Reactors for batch/continuous enzymatic processing, Choice of reactor type: idealized enzyme reactor systems; Mass Transfer in Enzyme Reactors: Steady state analysis of mass transfer and biochemical reaction in enzyme reactors.

Module V: Bio-process Design
Physical parameters, reactor operational stability; Immobilized cells.

Module VI: Challenges and future trends
Enzyme catalysis in organic media; Catalytic antibodies and Non-protein biomolecules as catalysts, Biocatalysts from Extreme Thermophilic and Hyperthermophilic Archaea and Bacteria.

Examination Scheme:

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Text & References:

Text:

References:
- Enzymes: A Practical Introduction to Structure, Mechanism and Data Analysis, R.A. Copeland, John Wiley and Sons Inc.
- Enzymes Biochemistry, Biotechnology, Clinical Chemistry, Trevor Palner
- Industrial Enzymes & their applications, H. Uhlig, John Wiley and Sons Inc
ADVANCED IMMUNOLOGY

Course Code: UMS 907  Credit Units: 03

Course Objective:
The aim to teach immunology and immuno technology to the students for their better understanding of immune system, types and mechanism of immunity, immune responses, their tolerance and suppression as well as tools and techniques involved in diagnosis and identification of immune related diseases.

Course Contents:

Module I
Types of immunity - innate, acquired, passive and active physiology of immune response – MI and CMI specificity and memory. Antigen, antibody reactions. Antigens types Hapten, immunoglobulin structure, distribution and function

Module II

Module III

Module IV
Introduction to tumor immunology, autoimmune disorders and immunology of infectious diseases. Antigen antibody reactions in vitro methods agglutination precipitation, complement fixation, immunofluorescence, immunoelectrophoresis, ELISA, Radio immuno assays, In vitro methods, skin tests and immune complex tissue demonstrations. Applications of these methods in diagnosis of microbial infections, Vaccines

Examination Scheme:

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Text & References:

Text:
- Kuby Immunology, R.A. Goldsby, T.J. Kindt and B.A. Obsorne, Freeman
- Basic Immunology, A.K. Abbas and A.H. Lichtman, Saunders W.B. Company

References:
- Immunology (Sixth Edition), Roitt, Brostoff, Male, Panima Publication
- Fundamentals of Immunology, W. Paul, Lippincot Williams and Wilkins
- Immunology, W.L. Anderson, Frence Creek Publishing (Blackwell)
- Immunology: A Short Course, E. Benjamin, R. Coico and G. Sunshine, Wiley-Leiss Inc.
- Immunology, Poitt, Mosby – Yearbook Inc.
- Perkin Elmer Antibody Manual
- Production of Monoclonal Antibodies – Detailed Protocol, G.K. Lewis, University of Maryland
Course Objective:
The objective of the course is to apply the principles of biochemical engineering in large scale cultivation of microorganism for production of important products.

Course Contents:

Module I
Isolation and screening of industrially important microbes. Improvement of strains for increased yield and other desirable characteristics. Advantage of bioprocess over chemical process. Basic principle in bioprocess technology. Media formulation sterilization, thermal death kinetics, batch and continuous sterilization system. Sterilization of air, fibrous filters, bioreactor design, parts and their functions, types of reactors, CSTR, tower, jet loops, air lift bubble column, packed bed reactor.

Module II
Transport phenomena in bioprocess – Mass transfer, mass transfer co-efficient for gases and liquids. Rate of oxygen transfer. Determination of oxygen transfer coefficient. Rheological properties of intermedium. Biological heat transfer, Heat transfer coefficients. Bioprocess control and monitoring variables such as temperature, agitation, pressure p4. On line measurement. On/off control. PID control computers in bio process control systems and down stream processing.

Module III
Isolation and screening of industrially important microbes, Advantage of bioprocess over chemical process, Basic principle of bioprocess technology, Media formulation, sterilization, thermal death kinetics, bioreactor design, parts and their functions.

Module IV
Types of Bioreactors and Fermentation Processes: Batch, Fed-batch, CSTR, tower, jet loops, fluidized bed, immobilized cell, air-lift and packed bed reactor, liquid-state, solid-state and submerged fermentation, Control and monitoring, on-line and off-line control, Computers in bioprocess control systems.

Module V
Down stream processing: Cell disruption, Filtration, Precipitation, Centrifugation, Extraction, Membrane Separation, Chromatography, Crystallization and Drying.

Module VI
Industrial production of enzymes: cellulase, amylase, protease; organic acids: citric acid, acetic acid, lactic acid; ethanol, biomass, antibiotics: classification, penicillins, tetracyclins, chloramphenicol; vitamins: B_{12}, riboflavin, -carotene; fermented dairy products.

Examination Scheme:

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Text & References:

Text:
- Principles of Fermentation Technology, Salisbury, Whitaker and Hall, Aditya Text Pvt. Ltd.
- Industrial Microbiology, Casida, New Age International
- Industrial Microbiology, Prescott and Dunn, C.B.S. Publishers

References:
- Biochemical Engineering, Bailley and Ollis.
- Principles of Biochemical Engineering, Humphrey.
ADVANCES IN GENETIC ENGINEERING AND STEM CELL RESEARCH

Course Code: UMS 909  Credit Units: 04

Course Objective:
A complete understanding of molecular techniques like DNA sequencing, restriction mapping, PCR, etc. for the cloning and expression of genes can be obtained by undertaking the present course. The implication and successful application of biotechnology largely depend on these advanced molecular techniques. Thus, the objective of this course is to familiarize the students with all practical tools and techniques required for creating a recombinant DNA molecule and transforming the appropriate host cell to check the expression of recombinant DNA. The aim of this course is also to enlighten the students with the recent advancement in stem cell research.

Course Contents:

Module I
Basic gene cloning experiment Vector biology (Plasmids, cosmids, phagemids, viral vectors, BACs and YACs), Expression vector

Module II
Obtaining foreign gene of interest, use of restriction endo nucleases, restriction modification systems, difference between type I, II and III restriction in endo nucleases and restriction mapping, construction of cDNA, chemical synthesis of DNA, DNA modifying enzymes and their applications. Gene libraries: Genomic DNA and cDNA libraries. Blotting techniques and probe construction

Module III
Transformation protocol, electroporation, electrofusion, microinjection, particle gun method, direct uptake of DNA (CaCl2 method), Agrobacterium mediated transformation liposomes as transforming vehicle.

Module IV
DNA sequencing - Sanger method of DNA sequencing (Manual and automated), Maxam Gilbert method
PCR: Discovery, basic methodology, types and uses of PCR technology, chemical synthesis of DNA
Gene mapping techniques RFLP, advantages over genetic mapping, uses, RAPD, LCR.

Module V: Stem cell therapy

Module VI: Hemopoietic Stem Cell Disorders
Classification and manifestations Hemopoietic Stem Cell Disorders, A plastic Hemopoietic Stem Cell Disorders, Myleo dysplastic Myleo proliplastic Clinical applications of Colony Stems Complications of Germs therapy Replacement Therapy and Marrow Transplantation. Immunological principles, Preservation and Clinical use of blood and blood components, hemapheresis procedures and varies to oxiplantation

Examination Scheme:

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Text & References:

- Developmental Biology, 6th Edition, Scott F. Gilbert
- References:
- Recombinant DNA, J.D. Watson et al, W.H. Freeman and Company
Course Contents:

Module I
Isolation of industrially important micro organisms for microbial processes.
Determination of Thermal Death Point and Thermal death time of micro organisms for design of a sterilizer
Determination of growth curve of a supplied micro organism and also determine substrate degradation profile
and to compute specific growth rate and growth yield from the data obtained.

Module II
Comparative studied of ethanol production using different substrates.
Microbial production of antibiotics (Penicillin)
Production and estimation of alkaline protease
Sauer Krant fermentation

Module III: Downstream processing
Conventional filtration
Protein precipitation and recovery
Aqueous two-phase separation
Ion exchange chromatography
Gel filtration
Membrane based filtration i.e. Micro filtration and cross filtration in cross flow Modules.

Module IV
Isolation of Enzymes from plant and microbial sources.
Enzyme assay; activity and specific activity – determination of amylase, nitrate reductase, cellulose, protease.
Purification of Enzyme by ammonium sulphate fractionation.
Enzyme Kinetics: Effect of varying substrate concentration on enzyme activity
Effect of Temperature and pH on enzyme activity.

Module V
Production of enzyme on industrial scale using solid and state fermentation
Enzyme immobilization

Examination Scheme:

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Note: Minor variation could be there depending on the examiner.
GENETIC ENGINEERING AND IMMUNOLOGY LAB

Course Code: UMS 921      Credit Units: 02

Course Contents:

Module I
Study of Southern hybridization

Module II
Cloning in plasmid vectors, and analysis of gene product. Blotting and Hybridization techniques.

Module III
PCR Amplification

Module IV
Gene Expression in E.coli.

Module V
Study of Blood Groups
Study of Antigen- Antibody pattern-ODD
Immunoglobulin Y purification
Immunoglobulin G purification

Module VI
Study of immunohistochemistry
Study of Latex agglutination
Study of haem agglutination
Study of antibody-FITC conjugation

Examination Scheme:

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Note: Minor variation could be there depending on the examiner.
A term (or research) paper is primarily a record of intelligent reading in several sources on a particular subject. The students will choose the topic at the beginning of the session in consultation with the faculty assigned. The progress of the paper will be monitored regularly by the faculty. At the end of the semester the detailed paper on the topic will be submitted to the faculty assigned. The evaluation will be done by Board of examiners comprising of the faculties.

**GUIDELINES FOR TERM PAPER**

The procedure for writing a term paper may consist of the following steps:

1. Choosing a subject
2. Finding sources of materials
3. Collecting the notes
4. Outlining the paper
5. Writing the first draft
6. Editing & preparing the final paper

1. **Choosing a Subject**
   The subject chosen should not be too general.

2. **Finding Sources of materials**
   a) The material sources should be not more than 10 years old unless the nature of the paper is such that it involves examining older writings from a historical point of view.
   b) Begin by making a list of subject-headings under which you might expect the subject to be listed.
   c) The sources could be books and magazine articles, news stories, periodicals, scientific journals etc.

3. **Collecting the notes**
   Skim through sources, locating the useful material, then make good notes of it, including quotes and information for footnotes.
   a) Get facts, not just opinions. Compare the facts with author's conclusion.
   b) In research studies, notice the methods and procedures, results & conclusions.
   c) Check cross references.

4. **Outlining the paper**
   a) Review notes to find main sub-divisions of the subject.
   b) Sort the collected material again under each main division to find sub-sections for outline so that it begins to look more coherent and takes on a definite structure. If it does not, try going back and sorting again for main divisions, to see if another general pattern is possible.

5. **Writing the first draft**
   Write the paper around the outline, being sure that you indicate in the first part of the paper what its purpose is. You may follow the following:
   a) statement of purpose
   b) main body of the paper
   c) statement of summary and conclusion
   Avoid short, bumpy sentences and long straggling sentences with more than one main idea.

6. **Editing & Preparing the final Paper**
   a) Before writing a term paper, you should ensure you have a question which you attempt to answer in your paper. This question should be kept in mind throughout the paper. Include only information/details/analyses of relevance to the question at hand. Sometimes, the relevance of a particular section may be clear to you but not to your readers. To avoid this, ensure you briefly explain the relevance of every section.
   b) Read the paper to ensure that the language is not awkward, and that it "flows" properly.
   c) Check for proper spelling, phrasing and sentence construction.
   d) Check for proper form on footnotes, quotes, and punctuation.
   e) Check to see that quotations serve one of the following purposes:
      i) Show evidence of what an author has said.
      ii) Avoid misrepresentation through restatement.
      iii) Save unnecessary writing when ideas have been well expressed by the original author.
   f) Check for proper form on tables and graphs. Be certain that any table or graph is self-explanatory.
Term papers should be composed of the following sections:
1. Title page
2. Table of contents
3. Introduction
4. Review
5. Discussion & Conclusion
6. References
7. Appendix

Generally, the introduction, discussion, conclusion and bibliography part should account for a third of the paper
and the review part should be two thirds of the paper.

Discussion
The discussion section either follows the results or may alternatively be integrated in the results section. The
section should consist of a discussion of the results of the study focusing on the question posed in the research
paper.

Conclusion
The conclusion is often thought of as the easiest part of the paper but should by no means be disregarded. There
are a number of key components which should not be omitted. These include:

m) summary of question posed
n) summary of findings
o) summary of main limitations of the study at hand
p) details of possibilities for related future research

References:
From the very beginning of a research project, you should be careful to note all details of articles gathered.
The bibliography should contain ALL references included in the paper. References not included in the text in
any form should NOT be included in the bibliography.
The key to a good bibliography is consistency. Choose a particular convention and stick to this.

Conventions:
Monographs

Edited volumes
Berlin/ NY: Mouton de Gruyter.
[eds.] is used when there is more than one editor; and (ed.) where there is only one editor. In German the
abbreviation used is (Hrsg.) for Herausgeber.

Edited articles

Journal articles:
Journal of consumer research 19, 180-197.

Electronic book:
Web, http://www.aber.ac.uk/media/Documents/54B/.

Electronic journal articles:
Watts, S. (2000) Teaching talk: Should students learn 'real German'? [HTML document]. German as a Foreign

Other websites:
Verterhus, S.A. (n.y.), Anglicisms in German car advertising. The problem of gender assignment [HTML

Unpublished papers:
performed by native Japanese speakers. Unpublished paper, Department of English as a Second Language,
University of Hawai'i at Manoa, Honolulu.

**Unpublished theses/dissertations:**

**Appendix**
The appendix should be used for data collected (e.g. questionnaires, transcripts, ...) and for tables and graphs not included in the main text due to their subsidiary nature or to space constraints in the main text.

**Assessment Scheme:**

**Continuous Evaluation:**
40%
(Based on abstract writing, interim draft, general approach, research orientation, readings undertaken etc.)

**Final Evaluation:**
60%
(Based on the organization of the paper, objectives/problem profile/issue outlining, comprehensiveness of the research, flow of the idea/ideas, relevance of material used/presented, outcomes vs. objectives, presentation/viva etc.)
Course Objective:
The influx of multinationals, FDIs and Retail Management makes global communication a harsh reality and offers cultural communication challenges. This course is designed to inculcate transcultural PROFESSIONAL COMMUNICATION among the young Amitians.

Course Contents:

Module I: Importance of Culture in Communication
Principles of effective cross cultural communication
Developing Communication Competence

Module II: Cross Cultural Communication
Characteristics of culture
Social differences
Contextual differences
Nonverbal differences
Ethnocentrism

Module III: Corporate Communication
Fundamental Principles of Corporate Communication
Corporate Communication Planning
Case Study

Examination Scheme:

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CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

Course Objective:
This course will help the students to:
- Explore interests and attitude
- Explore career opportunities
- Set career goals
- Developing attributes that employers value

Course Contents:

Module I: Exploring one’s interest and aptitude
Meaning: Interest and Aptitude
Knowing and assessing one’s Interest
Knowing and assessing one’s Aptitude

Module II: Explore Career
Selecting from available resources
Career selection (Jobs)
Career planning and development

Module III: Self Reliance Skills
Self awareness, Self promotion, Self confidence
Action planning, Networking, Negotiation
Political awareness, Coping with uncertainty,
Development focus, Transfer skills

Module IV: Employability skills
Developing positive attributes at work place (personal and professional)
Continued reflection of Self (Placements, events, Seminars, Conferences, Projects, Extracurricular Activities etc.)

Module V: Goal Setting for Career Development
Goal setting and career planning
Sustaining and maintaining career excellence
Assessment of career graph (introduction, growth, maturity, stagnation and decline)

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer
Course Code: UMS 944  Credit Units: 02

Course Objective:
Provide more exposure to day to day real life in France through dialogues, written documents and projects

Course Contents:

Module C: Unités 7, 8: PP. 89 - 116

Contenu lexical :

Unité 7:
1. Exprimer l’appartenance
2. Dire le droit, réclamer, donner les directions à l’oral et à l’écrit
3. Gérer l’argent
4. Décrire, définir un objet. Donner sa fonction
5. Parler de la vie professionnelle

Unité 8:
1. Exprimer les rapports de temps. Faire une chronologie
2. Rapporter des paroles
3. Indiquer les circonstances d’une action
4. Parler d’éducation, de recherche, d’histoire
5. Réfléchir à l’apprentissage du vocabulaire

Contenu grammatical:

1. Les pronoms possessifs
2. Les constructions relatives avec auquel, dont, préposition + lequel
3. Le subjonctif - possibilité, impossibilité, doute
4. Le participe présent et le gérondif
5. Le plus-que-parfait
6. Situation dans le temps (ce jour-là, la veille)
7. Le discours indirect au passé

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre : Campus: Tome 2
Course Code: UMS 945 Credit Units: 02

Course Objective:
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany, and thereby enhance the capacity of the students to comprehend literary and business texts and hence increase their vocabulary of relative terminology.

Course Contents:

Module I
Comprehension of Business text

Module II
Comprehension of Literary text

Module III
Translation of Business text

Module IV
Translation of Literary text

Module V: Picture Description
Firstly recognize the persons or things in the picture and identify the situation depicted in the picture; Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs
Course Objective:
To enable students to deal with Spanish situations, writing formal/informal letters, using Past Tense, juxtaposing it with *preterito imperfecto*. Enabling them to comprehend and form complex sentences. Give students vocabulary of various situations.

Module I
Name of food items, cuisines, vegetables, fruits.
Polite conversation, informal chats, in a restaurant… more useful vocabulary like at a stationery, books in a library, consumer items in shops.

Module II
Letter Writing (Formal/Informal) how to invite, how to accept or refuse invitation e concept of gerund.

Module III
At the post office
At a business appointment
At an official interview etc

Module IV
Conditional
Exercises related to the above

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español En Directo 1 B, Español Sin Fronteras, Ven
- Material provided by the teacher from various sources
JAPANESE - IX

Course Code: UMS 947      Credit Units: 02

Course Objective:
To enable the students to converse in the language with the help of different sentence patterns and forms of verbs as polite form, request form etc.
Note: The teaching is done in Roman as well as Japanese script. Students will learn 40 to 50 kanjis by this semester.

Course Contents:

Module I: Polite and Humble forms
Polite and humble forms of addressing people.

Module II: Purpose
Explaining the purpose of doing some work.

Module III: Probability
The situation when one is not sure whether any action will take place or not.

Module IV: Different situations
Explaining the situations, as they seem to be.

Module V: Request
Requesting in formal and informal ways.

Learning Outcome:
➢ Students can speak the language with the help of

Methods of Private study/ Self-help:
➢ Handouts, audio-aids, assignments and role-plays will support classroom teaching.

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

• Shin Nihon-go no Kiso Lesson No.-41 to 45.
• Vocabulary and topics taught are from the above-mentioned book.
Course Objective:
The Great Wall of China is NOT visible from outer space. Its too thin. Its just myth that it can be seen. The only man-made structures visible from space are: The Pyramids of Giza and the Hoover Dam. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Drills.
Dialogue practice
Observe picture and answer the question.

Module II
Enriching vocabulary by dealing with various daily scenarios and situations.
Pronunciation and intonation.

Module III
Character writing and stroke order

Module IV
About china Part I Lesson 3, 4
Short stories

Module V
Text based on –
Literature
History
Economy
Culture
Politics

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- “Kan tu shuo hua” Part-II Lesson 14-19
SUMMER INTERNSHIP

Course Code: UMS 950 Credit Units: 09

GUIDELINES FOR SUMMER TRAINING

The main objective of summer training is to familiarize students to laboratory environment and make them learn to handle equipments and softwares, design experiments and analyze the results. The student will be supervised by one or more faculty members and he or she will be required to submit a synopsis. While writing a synopsis emphasis should be given to make it publishable. But whether or not the results of a research project are publishable, the project should be communicated in the form of a research report written by the student. Initial drafts should be critiqued by the faculty guide and corrected by the student at each stage.

The File is the principal means by which the work carried out will be assessed and therefore great care should be taken in its preparation.

In general, the File should be comprehensive and include:
- A short account of the activities that were undertaken as part of the project;
- A statement about the extent to which the project has achieved its stated goals.
- A statement about the outcomes of the evaluation and dissemination processes engaged in as part of the project;
- Any activities planned but not yet completed as part of the project, or as a future initiative directly resulting from the project;
- Any problems that have arisen that may be useful to document for future reference.

Report Layout:
The report should contain the following components:
- Title Page
- Certificate
- Acknowledgement
- Abbreviations
- Contents with page numbers
- Chapter –
  a) Introduction
  b) Review of Literature
  c) Materials & Methods
  d) Results & Discussion
  e) Summary and Conclusion
  f) References
  g) Appendix (Optional)

- 1 inch Margin on left side & 1”each on other sides.
- Single side of the paper to be used.
- Times New Roman.

Font Size:
- 12 (Bold for headings)
- 12 (Normal for Matter)
- 14 (for Chapter Names)
- 1.5 line spacing
- Numbering on the right hand Top of the page
- Numbers on pages before chapters to be done in Roman at the bottom of the page

References:
This should include papers and books referred to in the body of the report. These should be ordered alphabetically on the author's surname. The titles of journals preferably should not be abbreviated; if they are, abbreviations must comply with an internationally recognised system.
Examples:

For research article

For Book

- Scientific names in Italics
- Cover Page containing - Title, Students Name, Supervisors Name, University, Name (along with logo), Course name & year of Submission in the prescribed format
- 2 copies to be submitted

**ASSESSMENT OF THE PROJECT /DISSERTATION FILE**

Essentially, marking will be based on the following criteria: the quality of the report, the technical merit of the project and the project execution. Evaluation will compose of two components - Project report assessment and Viva-voce. Project report assessment will be done by the two internal faculty members in respective fields. A committee of three faculty members will conduct Viva-voce.

Technical merit attempts to assess the quality and depth of the intellectual efforts put into the project will be assessed as per evaluation format.

**Examination Scheme:**

- Project Report : 50
- Viva Voca : 50

**Total** : **100**
COMPUTATIONAL BIOLOGY

Course Code: UMS 001      Credit Units: 04

Course Objective:
The objective is to describe how molecular data can be used to construct a phylogenetic tree and characterize the rates and causes of nucleotide substitutions. The aim is also to explain how a gene/protein family arises and the mechanisms, which underlie evolution at the molecular level.

Course Contents:

Module I: Introduction and overview
The NCBI data model, sequence databases, sequence retrieval, sequence file formats, submitting DNA and protein sequences.
Complexity of gene structure and function; Restriction maps and multiple maps -introduction, double digest problem, classifying multiple solutions; Cloning and clone libraries -libraries by complete and partial digestion; Physical genome maps - mapping by fingerprinting and mapping by anchoring, clone overlap and sequence assembly; Shotgun sequencing, sequencing by hybridization.

Module II: Database
Databases and rapid sequence analysis -Tree representation of a sequence, hashing a sequence repeats in a sequence, sequence comparison by hashing, sequence comparison by at most I mismatches, sequence comparison by statistical content; PDB and MMDB, structure file formats, visualizing structural information, advance structure modeling, Internal and external co-ordinate system, cartesian and cylindrical polar co-ordinate system, Potential energy calculations using semiempirical potential energy function, Electrostatic energy surface generation, three dimensional structure using dynamic programming methods, Molecular mechanics and dynamics, Docking of Molecules, Knowledge base structure prediction, Molecular mechanics and dynamics, Docking of Molecules, Knowledge base structure prediction, Molecular Design, structure similarity searching; Secondary structure prediction in proteins, prediction of buried residues in proteins;

Module III: Multiple sequence alignment
Global and local alignments, statistical significance of alignments, database searching algorithms and artifacts, scoring matrices and gap penalties, filtering, position specific scoring matrices, internet resources, uses of multiple sequence alignment, programs and methods for multiple sequence alignment, pattern searching programs, family and superfamily representation, structural inference, dynamic programming in r-dimensions, weighted average sequences, profile analysis, alignment by hidden Markov models, consensus word analysis, more complex scoring.

Module IV
Phylogenetic prediction,Trees-splits and metrices on trees, tree interpretation, Distance – additive, ultrameric and nonadditive distances, tree building methods, phylogenetic analysis, parsimony, tree evaluation, maximum likelihood trees – continuous time markov chains, estimating the rate of change, likelihood and trees; analysis software.

Module V
Predictive methods using DNA sequences, Annotation, comparison of different methods; ESTs – databases, clustering, gene discovery and identification, and functional classification.Predictive methods using protein sequences –protein identification, physical properties, motifs and patterns, structure, folding classes, structure classification

Examination Scheme:

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Text & References:

Text:
- Bioinformatics: Sequence and Genome Analysis, D.W. Mount, Cold Spring Harbor Laboratory Press
References:

- Biocomputing hypertext coursebook at http://www.techfak.unibielefeld.de/bcd/currie/welcome.html/
- Computational Modeling of Genetic and Biochemical Networks, J.M. Bower and H. Bolouri, MIT Press
- Essentials of Genomics and Bioinformatics, C.W. Sensen, John Wiley and Sons Inc.
- Introduction to Bioinformatics, T. Attwood and D. Parry-Smith, Prentice Hall
- Introduction to Computational Biology: Maps, Sequences and Genomes, M. Waterman, Chapman and Hall
- Sequence Analysis in Molecular Biology: Treasure Trove or Trivial Pursuit, G. V. Heijne and G.V. Heijne, Academic Press
Course Code: UMS 002  Credit Units: 02

Course Objective:
To develop understanding of information and library science research issues in the domain of bioinformatics through review of journal articles, invited talks, and critical group discussions of methods. The main objectives for this course are to develop: familiarity with information and library science-oriented problems in the biomedical sciences, an understanding of research methods in the biomedical domain, critical thinking and evaluation skills and presentation and summarization skills.

Course Contents:

Module I: Introduction
Science, Scientific Field and Biological research. Role of a researcher in different stages of a project, Routes to research funding (academic and commercial)

Module II

Module III: Sampling Techniques

Module IV
Type of Articles (review, letters etc). Scientific paper format (Abstract, Introduction, Materials and Methods, Results, Discussion). Writing, evaluating, presenting and publishing the results of scientific research in the academic press (journals, conferences etc). Choosing the appropriate journal (Sources, Information, Instructions to authors, peer review system, journal evaluation)

Module V
Case studies of areas of current research. Formulating a research plan and its presentation

Examination Scheme:

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Text & References:

Text:
- Statistical Methods By S.P. Gupta

References:
- Research Methodology Methods and Techniques By C.R. Kothari
- Statistics(Theory and Practice) By B.N. Gupta
- Research Methodology Methods and statistical Techniques By Santosh Gupta
- Scientific journals and magazines
ADVANCED GENOMICS AND PROTEOMICS

Course Code: UMS 003 Credit Units: 03

Course Objective:
The course helps in developing a detailed understanding of eukaryotic genome complexity and organization. Current research on the molecular basis of the control of gene expression in eukaryotic has developed a detailed understanding of techniques of gene diagnostics and DNA profile to acquire the fundamental of genomics and bioinformatics, it is desirable to have in depth study on these lines.

Course Contents:

PART I: GENOMICS

Module I: Introduction to Genomics
The human genome project “Anatomy of prokaryotic and eucaryotic genome: repetitive DNA Contents of genoms

Module II: Transcriptoms
Genome expression; RNA Contents, genetic mapping,

Module III
Microsatellite DNA markers, RFLP, DNA sequencing, polygemy, PCR

Module IV: Micro array
DNA micro array marker, random primers, computational methods, transcriptomes

PART-II: PROTEOMICS

Module V
Introduction to proteomics
Fundamental methods used in proteomics. 2-D gel electrophoresis mass spectroscopy.

Module VI
Post translational protein modification

Module VII
Protein – protein interactions some examples

Examination Scheme:

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Text & References:

Text:
- Genes & Genomes, Maxine Singer and Paul Berg
- Genomes II, T.A. Brown

References:
- A Primer of Genome Science, Greg Gibson and Spencer V. Muse
- Database Annotation in Molecular Biology: Principles and Practice, Arthur M. Lesk
- DNA : Structure and Function, Richard R. Sinden
- Recombinant DNA (Second Edition), James D. Watson and Mark Zoller
- Gene Cloning and DNA Analysis – An introduction (Fourth Edition), T.A. Brown
- www.panimatext.com
ENVIRONMENTAL BIOTECHNOLOGY

Course Code: UMS 004  Credit Units: 03

Course Objective:
The objective of this course is to familiarize the students with the processes and microorganisms that can be employed for a cleaner environment. The students will be applying basic knowledge of microbiology for developing the practices for a cleaner environment, water, fuel, fertilizer, pesticides etc. The course also aims to make the students aware of legislation and acts prevalent to control the degradation of our ecosystem.

Course Contents:

Module I
Treatment of municipal wastes and industrial effluents (Physico-Chemical, biological analysis of waste water), Pr. Sec and tert waste water treatment, sludge treatment and disposal treatment of wastes from paper, textile, dairy, petrochemical and pharmaceutical industry.

Module II
Bioremediation and phytoremediation of toxic compounds like pesticides, hydrocarbons, polymers, surfactants, biotransformation and bioaccumulation

Module III
Renewable and non-renewable energy resources, clean fuel technology, biofuels.

Module IV
Biofertilizers and biopesticides – a cleaner agricultural practice, concept of N$_2$ - fixation, azolla, cyanobacteria, Rhizobium and VAM as biofertilizers.

Module V
Biomining – microbe assisted microbial leaching, bioaccumulation and biosorptions
Biosensors and biomarkers for ecotoxicity measurement, EIA and Environmental audit.

Module VI
Principles in ecotoxicology; animal toxicity tests; statistical concepts of LD$_{50}$; dose-effect and dose response relationship; frequency response and cumulative response; Biological and chemical factors and influence toxicity; global dispersion of toxic substance; dispersion and circulating mechanisms of pollutants; Aquatic toxicity testes; statistical tests; response of planktons to toxicants; EC$_{50}$.

Examination Scheme:

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Text & References:

Text:
- Environmental Biotechnology – Concepts and Applications, Hans-Joachim Jordening and Jesef Winter
- Introduction to Environmental Biotechnology, Milton Wainwright

References:
- Waste Water Engineering, Metcalf and Eddy. Publisher: Tata McGraw hill
- Agricultural Biotechnology, S.S. Purohit
- Environmental Microbiology: Methods and Protocols, Alicia L. Ragout De Spencer, Jonh F.T. Spencer
- Principles of Environmental Engineering, Gilbert Masters
COMPUTATIONAL BIOLOGY LAB

Course Code: UMS 020
Credit Units: 02

Course Contents:

Module I
Three dimensional Structures – In silico study – large molecular complexes RNA polymerase II, ribosome, unstructured proteins

Module II
DNA sequencing methods

Module III
Gene finding tools and Genome annotation

Module IV
Comparison of two given genomes

Module V
Analysis of 2D – IEF data

Module VI
Microarray and Microarray data analysis

Module VII
Inference of protein function from structure

Examination Scheme:

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Note: Minor variation could be there depending on the examiner.
COMMUNICATION SKILLS - VIII

Course Code: UMS 041      Credit Units: 01

Course Objective:
The objective of reading as suggested by Francis Bacon is to develop a wholesome personality; the aim of this program is to enhance the emotional intelligence and soft skills of students through creative writing and reading motivational and inspirational literature.

Course Contents:

Module I: Creative Writing
- Writing Short stories
- Writing articles for magazines/dailies
- Writing blogs

Module II: Essay Writing
- Types of Essays
- Writing about current topics

Module III: Motivational/ Inspirational Reading

Examination Scheme:

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CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Ronald B. R. Adler, Understanding Human Communication, Oxford, 2005
- Working in English, Jones, Cambridge
Course Objective:
This course aims at enabling students to:

• Facilitate students to learn about achievement-motivation
• Facilitate students to understand types of behaviour & relevance of assertive behaviour
• Facilitate students to handle negative behaviour in personal & professional life
• To deal with crisis management
• Facilitate students to understand the concept & steps to enhance commitment

Course Contents:

Module I: Achievement-Motivation
What makes achiever tick?
What achievers do
How to analyze your own behaviour

Module II: Building Assertiveness
Types of behaviour
Assertion and Aggression
Handling aggression
Influencing styles

Module III: Handling Negative Behaviour
Causes of negative behaviour
Effects of negative behaviour
Approaches to manage negative behaviour

Module IV: Crisis Management
Meaning & causes of crisis management
Qualities of crisis manager
Crisis management technique

Module V: Enhancing Commitment
Components of commitment
Steps to enhance commitment
Enhancers & Reducers of organizational commitment

Module VI: End-Of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level rating by Self and Observer
Course Code: UMS 044 Credit Units: 02

Course Objective:
To enable the students to master the current social communication skills in oral and written and to introduce the genre “récits”, press, literature

Course Contents:

Module C: Unité 9

Module D: Unité 10 PP. 118 - 143

Contenu lexical:

Unité 9: 1. Décrire des mouvements et des déplacements
2. Se plaire
3. Parler des sports, de la musique, de la chanson, des voyages, des jeux

Unité 10: 1. Anticiper – situer dans le futur
2. Exprimer l’opposition et la concession
3. Décrire une évolution
4. Parler de la ville, des sciences, de la science-fiction et de la nourriture

Contenu grammatical:

1. La double négation
2. Prépositions et adverbes exprimant l’espace
3. Le futur antérieur
4. L’expression de la durée dans le futur
5. L’expression de la concession (bien que, quand même)

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre : Campus: Tome 2
GERMAN - X

Course Code: UMS 045      Credit Units: 02

Course Objective:
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany, and thereby enhance the ability of the students to comprehend and translate technical as well as literary texts from English to German and vice versa.

Course Contents:

Module I
Comprehension of Technical text

Module II
Comprehension of Literary text

Module III
Translation of Technical text

Module IV
Translation of Literary text

Module V: Picture Description
Firstly recognize the persons or things in the picture and identify the situation depicted in the picture; Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

• Wolfgang Hieber, Lernziel Deutsch
• Hans-Heinrich Wangler, Sprachkurs Deutsch
• Schulz Griesbach, Deutsche Sprachlehre für Ausländer
• P.L Aneja, Deutsch Interessant- 1, 2 & 3
• Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
• Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs
SPANISH –X

Course Code: UMS 046  Credit Units: 02

Course Objective:
Objective: To enable students to deal with Spanish situations, writing formal/informal letters, using Past Tense, juxtaposing it with *preterito imperfecto*. Enabling them to comprehend and form complex sentences as well as technical vocabulary.

Course Contents:

Module I
Revision in (brief) of earlier modules
Situational Spanish (Presentations on topics covered in earlier semesters)

Module II
Past Continuous
Exercises related to the above

Module III
Introduction to technical translation
Business/bank/scientific/finance/travel

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español Sin Fronteras, Ven
- Material provided by the teacher from various sources
JAPANESE - X

Course Code: UMS 047 Credit Units: 02

Course Objective:
To train the students in a way to converse, read, write and speak fluently.
Note: Teaching is done in roman as well as Japanese script. 10 more kanjis are introduced in this semester.

Course Contents:

Module: I
Different sentence patterns like just about to, it seems, according to etc.

Module: II
More sentence patterns and their practice.

Module: III
Practice of conversations on:
Preparing for a presentation, news of an earthquake, New Year celebration etc.

Module: IV
Practice of more Essays, writing formal and informal letters to seniors, friends and relatives

Learning Outcome
➢ Students can speak the language describing above-mentioned topics.

Methods of Private study /Self help
➢ Handouts, audio-aids, and self-do assignments, role-plays
➢ Students are also encouraged to attend Japanese film festival and other such fairs and workshops organized in the capital from time to time.

Examination Scheme:

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C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

Text:
➢ Teach yourself Japanese.

References:
➢ Shin Nihongo no kiso 1
**Course Objective:**
With Chinese, Context is everything. Chinese does not have a grammatical distinction between singular and plural nor does it have verbs that indicate tense. These are indicated by syntax. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

**Course Contents:**

**Module I**
- Drills
- Dialogue practice
- Pronunciation and intonation
- Character writing and stroke order.

**Module II**
- Short stories and telling the moral of the stories.
- Enriching vocabulary by dealing with various daily scenarios and situations.

**Module III**
- Students will have to write short compositions each week, in order to clearly see the Chinese that they use themselves. In class, incorrect expressions from the compositions or other issues will be selected and related grammar and ways to rewrite the expressions will be explained and compared with sample expressions.
- Comparisons of two different characters of the stories.

**Module IV**
- Seeing pictures and making short stories or having a conversation based on it.
- Text based on – Literature

**Module V**
- History
- Economy
- Culture
- Politics
- Translations

**Examination Scheme:**

<table>
<thead>
<tr>
<th>Components</th>
<th>CT1</th>
<th>CT2</th>
<th>C</th>
<th>I</th>
<th>V</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weightage (%)</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>15</td>
<td>5</td>
</tr>
</tbody>
</table>

C – Project + Presentation  
I – Interaction/Conversation Practice

**Text & References:**
- “kan tu shuo hua Part II” Lesson 20-24
GUIDELINES FOR PROJECT FILE

Research experience is as close to a professional problem-solving activity as anything in the curriculum. It provides exposure to research methodology and an opportunity to work closely with a faculty guide. It usually requires the use of advanced concepts, a variety of experimental techniques, and state-of-the-art instrumentation. Research is genuine exploration of the unknown that leads to new knowledge which often warrants publication. But whether or not the results of a research project are publishable, the project should be communicated in the form of a research report written by the student.

Sufficient time should be allowed for satisfactory completion of reports, taking into account that initial drafts should be critiqued by the faculty guide and corrected by the student at each stage.

The File is the principal means by which the work carried out will be assessed and therefore great care should be taken in its preparation.

In general, the File should be comprehensive and include:

- A short account of the activities that were undertaken as part of the project;
- A statement about the extent to which the project has achieved its stated goals.
- A statement about the outcomes of the evaluation and dissemination processes engaged in as part of the project;
- Any activities planned but not yet completed as part of the project, or as a future initiative directly resulting from the project;
- Any problems that have arisen that may be useful to document for future reference.

Report Layout
The report should contain the following components:

- **Title or Cover Page.**
  The title page should contain the following information: Project Title; Student’s Name; Course; Year; Supervisor’s Name.

- **Acknowledgements** (optional)
  Acknowledgment to any advisory or financial assistance received in the course of work may be given.

- **Abstract**
  A good "Abstract" should be straight to the point; not too descriptive but fully informative. First paragraph should state what was accomplished with regard to the objectives. The abstract does not have to be an entire summary of the project, but rather a concise summary of the scope and results of the project.

- **Table of Contents**
  Titles and subtitles are to correspond exactly with those in the text.

- **Introduction**
  Here a brief introduction to the problem that is central to the project and an outline of the structure of the rest of the report should be provided. The introduction should aim to catch the imagination of the reader, so excessive details should be avoided.

- **Materials and Methods**
  This section should aim at experimental designs, materials used. Methodology should be mentioned in details including modifications if any.

- **Results and Discussion**
  Present results, discuss and compare these with those from other workers, etc. In writing these section, emphasis should be given on what has been performed and achieved in the course of the work, rather than discuss in detail what is readily available in text books. Avoid abrupt changes in contents from section to section and maintain a lucid flow throughout the thesis. An opening and closing paragraph in every chapter could be included to aid in smooth flow.

Note that in writing the various sections, all figures and tables should as far as possible be next to the associated text, in the same orientation as the main text, numbered, and given appropriate titles or captions. All major equations should also be numbered and unless it is really necessary never write in "point" form.
➢ Conclusion
A conclusion should be the final section in which the outcome of the work is mentioned briefly.

➢ Future prospects

➢ Appendices
The Appendix contains material which is of interest to the reader but not an integral part of the thesis and any problem that have arisen that may be useful to document for future reference.

➢ References / Bibliography
This should include papers and books referred to in the body of the report. These should be ordered alphabetically on the author's surname. The titles of journals preferably should not be abbreviated; if they are, abbreviations must comply with an internationally recognised system.

Examples
For research article

For book

ASSESSMENT OF THE PROJECT FILE
Essentially, marking will be based on the following criteria: the quality of the report, the technical merit of the project and the project execution.
Technical merit attempts to assess the quality and depth of the intellectual efforts put into the project.
Project execution is concerned with assessing how much work has been put in.
The File should fulfill the following assessment objectives:

Range of Research Methods used to obtain information

Execution of Research

Data Analysis
Analyse Quantitative/ Qualitative information
Control Quality

Draw Conclusions

Examination Scheme:

Project Report:  50
Viva Voce:  50
Total:   100