AMITY UNIVERSITY MADHYA PRADESH

AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MECHANICAL ENGINEERING

Programme Educational Objectives (PEOs)

B.Tech (Mechanical Engineering)

Academic Year – 2021-2022

B.Tech (Mechanical Engineering)

PEO 1: To enable graduates, pursue successful careers in Indian & Global industrial organizations with application of engineering knowledge and skills to formulate and undertake the industrial design, development, operation and maintenance problems of mechanical systems and find viable solutions.

PEO 2: To inculcate and develop in graduates the lifelong learning aptitudes, ethics and values and leadership qualities that will enable them to serve the industry, society at the national and global levels while serving as professionals, entrepreneurs, academicians and researchers.

PEO 3: To prepare students to be able to work as members of teams on multidisciplinary projects with professional ethics and socio-economic, environmental consciousness along with technological competence.

PEO 4: To provide a sound and updated knowledge base and skill set to the students to enable them pursue higher education and cutting-edge research work at premier institutions/universities and research centers across the globe.

PEO 5: Inspiring and motivating students to apply their analytical, scientific and technical knowledge & skills for innovation in products/processes leading to improvisation in productivity of organizations/society.

School of Engineering & Technology * Amity Gwalior Madhya Pradesh

Director-ASET
Amity University Madhya Pradesh Gwalior

AMITY UNIVERSITY MADHYA PRADESH

AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MECHANICAL ENGINEERING

PROGRAMME OUTCOMES (POs)

Bachelor of Technology (B.Tech.) ME, Academic Year: 2021 – 2022

Programme Outcomes (POs)

[PO.1]. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

[PO.2]. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

[PO.3]. **Design/development of solutions**: solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

[PO.4]. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

[PO.5]. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

[PO.6]. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

[PO.7]. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

[PO.8]. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practices.

[PO.9]. **Individual and teamwork**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

[PO.10]. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

[PO.11]. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects.

[PO.12]. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

Programme Specific Outcomes (PSOs)

PSO1. Professional Skills: An ability to understand the basic concepts in Mechanical Engineering and to apply them to various areas, like Automobile, power plant, Production, Manufacturing etc., in the design and implementation of complex systems.

PSO2. Problem-solving skills: An ability to solve complex Mechanical Engineering problems, using latest hardware and software tools, along with analytical skills to arrive cost effective and appropriate solutions.

PSO3. Successful career and Entrepreneurship: An understanding of social-awareness & environmental-wisdom along with ethical responsibility to have a successful career and to sustain passion and zeal for real-world applications using optimal resources as an entrepreneur.

Note: - Correlation levels 1, 2 and 3 as defined below:
1: Slight (Low), 2: Moderate (Medium) and 3: Substantial (High)
If there is no correlation, put "-"

AMITY UNIVERSITY

MADHYA PRADESH

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

PROGRAMME ARTICULATION MATRIX																
Semester	**Subject Code**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
I Sem	**MAT101**															
	CHE101															
	CSE104															
	BME101	3	1	1	1	-	2	2	-	1	-	-	2	-	2	3
	CIV101															
	CHE121															
	CSE124															
	BME121	3	1	1	1	-	2	2	-	1	-	-	2	-	2	3
	EVS142															
	BCU141															
	BSU143															
	FLU144															
II Sem	**MAT201**															
	PHY101															
	ECE101															
	CSE204															
	BME102	3	1	1	1	-	2	2	-	1	-	-	2	-	2	3
	PHY121															
	ECE121															
	CSE224															
	BME122	3	1	1	1	-	2	2	-	1	-	-	2	-	2	3
	EVS242															
	BCU241															
	BSU243															
	FLU244															

PROGRAMME ARTICULATION MATRIX																
III Sem	MAT301															
	PHY303															
	BME301	3	3	1	3	2	1	-	-	1	-	-	2	1	2	2
	BME302	3	1	1	1	-	3	2	-	1	-	-	2	-	2	2
	BME303	3	3	1	-	-	1	2	-	1	-	-	3	-	2	2
	ECE307															
	PHY323															
	BME321	3	3	3	1	1	2	1	-	1	-	1	2	1	2	3
	BME323	3	2	1	-	1	1	2	1	1	-	-	2	3	3	3
	ECE327															
	NTP330															
	BCU341															
	BSU343															
	FLU344															
IV Sem	BME401	3	3	2	1	-	2	2	1	1	-	-	2	-	2	3
	BME402	3	3	2	1	-	2	2	1	1	-	-	2	-	2	3
	BME403	3	3	2	2	-	2	2	-	1	-	-	2	-	2	3
	BME404	3	1	1	1	-	2	2	-	1	-	-	2	-	2	3
	BME405	3	1	1	1	2	2	2	-	1	-	-	2	2	2	2
	BME422	3	1	1	1	2	2	2	-	1	-	-	2	2	2	2
	BME423	3	2	1	1	-	2	2	-	-	-	-	2	-	2	3
	BME424	3	2	-	1	-	2	2	-	-	-	-	2	-	2	2
	BME425	3	2	1	1	-	2	2	-	-	-	-	2	-	2	3
	BCU441															
	BSU 443															
	FLU 444															

PROGRAMME ARTICULATION MATRIX																
V Sem	BME 501	3	3	1	-	-	1	2	-	1	-	-	3	-	2	2
	BME 502	3	3	2	2	-	2	2	-	2	-	-	2	-	2	3
	BME 503	3	3	3	2	-	3	2	-	1	1	-	3	1	3	3
	BME 504	2	1	1	2	-	2	-	1	1	-	-	3	-	1	2
	BME 505	2	1	1	2	-	2	-	1	1	-	-	3	-	1	2
	BME 522	3	3	1	1	-	2	-	-	1	1	1	2	-	2	2
	BME 524	3	2	1	1	-	2	-	-	2	-	1	3	-	2	2
	BME 525	3	2	1	1	-	2	-	-	2	-	1	3	-	2	2
	NPT 550															
	BCU 541															
	BSU 543															
	FLU 544															
VI Sem	BME 601	3	2	1	1	-	2	-	-	1	-	1	3	-	2	3
	BME 602	3	1	1	1	-	1	-	-	2	-	1	3	-	2	3
	BME 603	3	3	3	2	-	3	2	-	1	1	-	3	1	3	3
	BME 604	3	1	1	1	2	2	2	-	1	-	-	2	2	2	2
	BME 621	3	3	2	1	-	2	-	-	1	-	1	3	-	2	3
	BME 622	3	2	2	2	-	1	-	-	2	-	1	3	-	2	3
	BME 623	3	2	3	2	-	3	2	-	1	1	-	3	1	3	3
	NMP 660															
	BME 606	3	2	1	3	2	3	-	1	1	-	1	3	2	1	2
	BME 607															
	BME 626	3	2	1	3	2	3	-	1	1	-	1	3	2	1	3
	BME 627															
	BCU 641															
	BSU 643															
	FLU 644															

PROGRAMME ARTICULATION MATRIX																
VII Sem	BME 701	3	3	2	1	-	1	-	-	1	-	2	2	2	2	3
	BME 702	3	2	-	2	2	1	-	1	1	-	-	2	2	2	3
	BME 703	1	1	-	-	1	1	-	1	3	3	3	2	1	2	2
	BME 721	3	3	2	1	-	1	-	-	1	-	2	2	3	2	3
	BME 722	3	2	-	2	2	1	-	1	1	-	-	2	2	2	3
	NPT 750															
	NMP 760															
	BME 704	3	1	1	1	-	1	2	2	2	-	1	3	2	2	3
	BME 705															
	BME 724	3	1	1	1	-	1	2	2	2	-	1	3	2	2	3
	BME 725	3	1	1	1	2	2	2	-	1	-	-	2	2	2	2
	BME 706															
	BME 707															
	BME 708	3	2	1	1	-	3	2	2	1	1	1	2	2	2	3
	BME 709															
	BME 710															
	BCU 741															
	BSU 743															
	FLU 744															
VIII Sem	BME 801	2	1	-	-	2	3	2	3	1	-	1	3	1	2	3
	BME 802	3	2	2	-	-	3	2	-	1	-	1	3	-	2	3
	BME 822	3	3	2	-	-	3	2	-	1	-	1	3	-	3	3
	NMP 860															
	BME 803															
	BME 804	3	3	3	2	-	3	2	-	1	1	-	3	1	3	3
	BME 823	3	1	1	1	2	2	2	-	1	-	-	2	2	2	2
	BME 824	3	3	3	2	-	3	2	-	3	1	-	3	1	2	3
	BCU 841															
	BSU 843															
	FLU 844															

PO Mapping of B.Tech (Mechanical Engineering) Syllabus with SDGs

Sr No	Program Outcome PO]	Program Outcome	Mapping with SDGs.
1	PO-1	**Engineering Knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.	**SDG 4 (Quality Education)** as it aims to provide competent knowledge about Computer Science and Engineering.
2	PO-2	**Problem Analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.	**SDG 4 (Quality Education)** as it provides Analytical skills of Computer Science and Engineering.
3	PO-3	**Design/Development of Solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.	**SDG 4 (Quality Education)** & **SDG 9 (Industry, Innovation, and Infrastructure)** as it provides knowledge about design and develop the solutions for societal and industrial problems.
4	PO-4	**Conduct Investigations of Complex Problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.	**SDG 4 (Quality Education)** & **SDG 9 (Industry, Innovation, and Infrastructure)** as it gives capability to handling and identifying the innovative solutions for complex problems.
5	PO-5	**Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.	**SDG 4 (Quality Education) & SDG 9 (Industry, Innovation, and Infrastructure)** as it provides the ability to use modern tools and techniques for innovative problems.
6	PO-6	**The Engineer and Society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.	**SDG 3 (Good Health and Well Being) & SDG 12(Responsible Consumption and Production)** as it focuses on engineering practices towards well-being society and inventions are parallelly concern with people welfare

7	**PO-7**	**Environment and Sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.	**SDG 11 (Sustainable Cities and Communities) & SDG 13 (Climate Action)** by preparing students to contribute to various aspects like developing IoT smart cities with internet communities and making software for sustainable development environments.
8	**PO-8**	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.	**SDG 16 (Peace, Justice, and Strong Institutions) & SDG 10 (Reduce Inequalities)** by promoting awareness, enlightenment, and commitment to ethics and professionalism.
9	**PO-9**	**Individual and Team Work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	**SDG 8 (Decent Work and Economic Growth) & SDG 10(Reduce Inequalities)** by preparing students for various cultural, Sports, Technical Events and club activities.
10	**PO-1O**	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	**SDG 8 (Decent Work and Economic Growth)** by preparing students for paper presentation skills and innovative project presentations.
11	**PO-11**	**Project Management and Finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects.	**SDG 8 (Decent Work and Economic Growth) & SDG 17 (Partnerships for the Goals)** by emphasizing managerial skills and analyzing finance of the projects in various contexts.
12	**PO-12**	**Life-long Learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.	**SDG 4 (Quality Education)** as it provides the ability to adopt new technologies in future.

Courses Mapped with National Missions

S.No.	Name of School	Program Name	Semester	Course Code	Course Name	National Mission
1	Amity School of Engineering & Technology	B.Tech (Mechanical Engineering)	I	BME102	Workshop/ Manufacturing Practices	Skill India
2	Amity School of Engineering & Technology	B.Tech (Mechanical Engineering)	III	BME 303	Thermodynamics	National Mission for Enhanced Energy Efficiency (NMEEE)
3	Amity School of Engineering & Technology	B.Tech (Mechanical Engineering)	IV	BME 403	Kinematic of Machine	Skill India
4	Amity School of Engineering & Technology	B.Tech (Mechanical Engineering)	IV	BME 404	Manufacturing Machine	Make in India
5	Amity School of Engineering & Technology	B.Tech (Mechanical Engineering)	V	BME 503	Machine Design –I	Atal Innovation Mission (AIM)
6	Amity School of Engineering & Technology	B.Tech (Mechanical Engineering)	VI	BME 604	Manufacturing Technology	Make in India
7	Amity School of Engineering & Technology	B.Tech (Mechanical Engineering)	VII	BME 701	Operations Research	Startup India
8	Amity School of Engineering & Technology	B.Tech (Mechanical Engineering)	VII	BME 702	Computer Aided Manufacturing	Skill India
9	Amity School of Engineering & Technology	B.Tech (Mechanical Engineering)	VII	BME 703	Management of Manufacturing Systems	Startup India
10	Amity School of Engineering & Technology	B.Tech (Mechanical Engineering)	VIII	BME 803	Advanced Methods of Manufacturing	Make in India

WORKSHOP/ MANUFACTURING PRACTICES

Course Code: BME 102 **Credit Units: 01**
Total Hours : 10

Course Objective:
The objective of this course is to impart the basic knowledge of Manufacturing methods, CNC machines, materials & their properties and various manufacturing processes to the students of all engineering discipline.

Course Contents:
Module I: Manufacturing Methods- casting, forming, machining, joining, advanced manufacturing methods: **(3 Hours)**
Module II: CNC machining, Additive manufacturing, Fitting operations & power tools: **(2 Hours)**
Module III: Electrical &Electronics, Carpentry, Plastic moulding, glass cutting: **(3 Hours)**
Module IV: Metal casting, Welding (arc welding & gas welding), brazing: **(2 Hours)**

Course Outcomes:
- To gain knowledge of the different manufacturing processes which are commonly employed in the industry
- To fabricate components using different materials

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

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

Text & References:

- Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., "Elements of Workshop Technology", Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.
- Kalpakjian S. And Steven S. Schmid, "Manufacturing Engineering and Technology", 4th edition, Pearson Education India Edition, 2002.
- Gowri P. Hariharan and A. Suresh Babu," Manufacturing Technology – I" Pearson Education, 2008.
- Roy A. Lindberg, "Processes and Materials of Manufacture", 4th edition, Prentice Hall India, 1998.
- Rao P.N., "Manufacturing Technology", Vol. I and Vol. II, Tata McGrawHill House, 2017

THERMODYNAMICS

Course Code: BME 303 **Credit Units: 03**
Total Hours: 30

Course Objective:
Objective of this course is to impart in depth understanding of the principles of thermodynamics and heat transfer. This course also helps students understand the application of basic fluid mechanics, thermodynamic, and heat transfer principles and techniques, including the use of empirical data, to the analysis of representative fluid and thermal energy components and systems encountered in the practice of electrical, electronic, industrial, and related disciplines of engineering.

Course Contents:

Module I: Basic Concepts: (6 Hours)
Thermodynamic system, intensive and extensive properties, cyclic process, Zeroth Law of Thermodynamics, Heat and Work, Flow work

Module II: First Law of Thermodynamics: (5 Hours)
Mechanical equivalent of heat, internal energy, Analysis of non-flow system, flow process and control volume, steady flow, energy equation, flow processes

Module III: Second Law of Thermodynamics and Entropy: (7 Hours)
Heat Engine, heat pump, Kelvin Planck and Clausius statement of Second Law of Thermodynamics, Perpetual motion machine, Reversible cycle- Carnot Cycle, Clausius inequality, entropy, Principle of entropy increase, concepts of availability, irreversibility.

Module IV: Air-Cycles: (6 Hours)
Carnot cycle, Otto cycle, Diesel cycle, Dual cycle, Stirling cycle, Erricsson cycle, Brayton cycle; Reversed Carnot cycle.

Module V: Properties of Steam: (6 Hours)
Definition of Pure substance, Definitions of saturated states; P-v-T surface; Use of steam tables and R134a tables; Saturation tables; Superheated tables; Identification of states & determination of properties, Mollier's chart.

Course Outcomes:

- After completing this course, the students will be able to apply energy balance to systems and control volumes, in situations involving heat and work interactions.
- Students can evaluate changes in thermodynamic properties of substances.
- The students will be able to evaluate the performance of energy conversion devices
- The students will be able to differentiate between high grade and low-grade energies.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text Books & References:

Cengel& Boles, "Thermodynamics", Tata McGraw Hill.

- Nag, P.K, 1995, Engineering Thermodynamics, Tata McGraw-Hill Publishing Co. Ltd.
- V. Wylen and Sonntag, Fundamentals of Classical Thermodynamics, John Wiley.
- Y.V.C. Rao, Engineering Thermodynamics, Khanna Publications
- DhomkundwarKothandaraman, "A Course in Thermal Engineering", Dhanpat Rai Publications.
- P. L. Ballany, *Thermal Engineering* –Khanna Publishers.

KINEMATIC OF MACHINE

Course Code: BME 403 **Credit Units: 03**
Total Hours: 30

Course Objective:
To expose the students to learn the fundamentals of various laws governing rigid bodies and its motions.

Course Contents:

Module I: Mechanisms and Machines: (6 Hours)
Links, Pairs, Chains, Structure, Mechanism, Machine Equivalent linkage, Degrees of freedom, Gruebler's & Kutzback's criterion, Inversions of four bar Chain, Mechanism with lower pairs Pantograph, Straight line motion mechanisms, Davis and Ackermann' Steering mechanisms, Hooke's joint, Numerical problems based on above topics.

Module II: Motion: (6 Hours)
Plane motion, Absolute & Relative motion, Displacement, Velocity and Acceleration of apoint, Velocity and Acceleration Analysis by Graphical & Analytical methods, Velocity image Velocity of rubbing, Kennedy's Theorem, Acceleration image, Acceleration polygon, Coriolis acceleration component, Klein's construction, Velocity and Acceleration Analysis using Complex Algebra (Raven's Approach), Numerical problems based on above topics

Module III: Gears: (6 Hours)
Classification of gears, Helical, Spiral, Bevel, Worm and Spur Gear, Spur Gear Terminology, Law of gearing, Tooth profiles, velocity of sliding, Path of contact, Arc of contact, Contact Ratio, Interference and Undercutting, Conjugate action. Gear Trains: Simple, compound, reverted and epi cyclic gear trains. Velocity ratio and torque calculation in gear trains

Module IV: Cams: (6 Hours)
Classification of Cams and Followers, Radial Cam Terminology, Analysis of Follower motion (uniform, modified uniform, simple harmonic, parabolic, cycloidal), Pressure Angle, Radius of Curvature, Cam Profile for radial and offset followers Synthesis of Cam Profile by Graphical Approach, Cams with Specified Contours.

Module V: Gyroscope: (6 Hours)
Gyroscopic Action in Machines, Angular Velocity and Acceleration, Gyroscopic torque/ couple, Gyroscopic effect on Naval Ships, Stability of two and four wheel Vehicles, Rigid disc at an angle fixed to a rotating shaft.

Course Outcomes:
At the completion of this course, students should be able to know
- Basic mechanisms, velocity and acceleration of simple mechanisms
- Drawing the profile of cams and its analysis
- Gear train calculations, Gyroscopes
- Inertia force analysis and flywheels
- Balancing of rotating and reciprocating masses

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE

Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text &References:

- Thomas Bevan; Theory of Machines; Pearson Education
- Rattan SS; Theory of machines; MC Graw Hills
- Ambekar AG; Mechanism and Machine Theory; PHI. Eastern Economy Edition 2015
- Uicker&Shigley, Theory of machines & Mechanism Second Edition Oxford University Press
- Dr.Jagdish Lal; Theory of Machines; Metropolitan Book Co; Delhi
- Rao J S and Dukkipati; Mechanism and Machine Theory; New Age Delhi.
- Abdulla Shariff, Theory of Machines.

MANUFACTURING MACHINE

Course Code: BME 404 **Credit Units: 03**
Total Hours: 30

Course Objective:
This is a new developmental graduate course for students interested in learning how to design, analyze and build specialty manufacturing process machines. It anticipated that this course would become part of the new manufacturing emphasis area in mechanical engineering.

Course Contents:

Module I: Introduction to Machine Tools: (4 Hours)
Classification of machine tools, kinds of motion in machine tool operations, definition of cutting speed, feed and depth of cut.

Module II: Lathe: (4 Hours)
Classification and various parts of Lathe, specification, Description of important mechanism viz. apron, tail stock, head stock, work holding, devices and operations, e.g. taper, turning, eccentric turning and screw-cutting, Geometry of a single point cutting tool. Calculation of machining time, Capstan and turret lathe

Module III: Drilling Machine: (4 Hours)
Geometry and nomenclature of a twist drill, specification and classification of drilling machines, cutting speed, feed, depth of cut and calculation machining time in drilling, tool holding devices, different types of operations performed on a drilling machine.

Module IV: Milling Machine: (4 Hours)
Classification, up milling and down milling, dividing Head, different types of milling operations – simple, compound and differential indexing, slab milling, spiral milling, slot milling, T-slot milling and end milling.

Module V: Shaper, Slotter & Planner: (4 Hours)
Principal part of a shaper, classification, Quick Return mechanism, table feed mechanism of a shaper, Operations, e.g. horizontal, vertical and inclined shaping, difference between a shaper, planer and slotter, cutting speed, feed, and depth of cut and calculation of machining time in shaping.

Module VI: Grinding Machines: (5 Hours)
Construction and specification of a grinding wheel, wheel turning and dressing, Grinding machines surface, cylindrical and centreless grinding.

Module VII: Special Machines: (5 Hours)
Horizontal and vertical boring machines, Gear Geometry, Gear generation and hobbing; Lapping, honing and super finishing processes.

Course Outcome:
Upon completion of this course, students will be able to understand the different conventional and unconventional manufacturing methods employed for making different products.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- P.N. Rao, "Manufacturing Technology: Metal Cutting & Machine Tools", Tata McGraw Hill, Delhi, 2004.
- B.S. Raghuwanshi, "Workshop Technology", Vol.2, Dhanpat Rai & Sons, 2003.
- Hazra Chandhari S.K., "Elements of Workshop Technology", Vol.2, Media Promoters, 2003.
- P.C. Sharma, "A Text Book of Production. Engineering", S. Chand, New Delhi, 2004.
- Bawa H.S., "Workshop Technology", Vol.2, Tata McGraw Hill, 2004.
- Juneja & Shekhon, "Fundamental of Metal Cutting", New Age Publications
- S.F. Krar Stevan F. and Check A.F., "Technology of M/C Tools", McGraw Hill Book Co., 1986.
- Kibbe Richard et al, "M/c Tool practices", Prentice HallIndia, 2003.
- Bangalore HMT, "Production Technology", Tata McGraw Hill, 1980.
- R.K. Jain, "Production Technology", Khanna Publishers
- Gerling Heinrich, "All about Machine Tools", New Age Publication, 2003.

MACHINE DESIGN – I

Course Code: BME 503 **Credit Units: 03**
Total Hours: 30

Course Objective:
The objective of this course is to help students apply concepts learned in the mechanics, structure, material and manufacturing courses. This course offers working knowledge in the use of proper failure theories under steady and variable loading, design of mechanical elements, such as shaft, coupling, power screws, and detachable, permanent and welded connections.

Course Contents:

Module I: Variable stresses in Machine Parts: (5 Hours)
Fatigue and Endurance Limit, Factor of Safety for Fatigue Loading, Stress concentration, Notch sensitivity, Gerber Method, Goodman Method and Soderberg Method for combination of stresses.

Module II: Power Screws: (5 Hours)
Types of screw threads, Torque required to raise and lower the load, Efficiency of square threaded screw, overhauling and self-locking screw, stresses in power screw, design of screw jack.

Module III: Cotter and Knuckle Joints: (5 Hours)
Types of cotter joints, design of socket and spigot joint, design of sleeve and cotter joint, design of jib and cotter joint, Design procedure of Knuckle joint.

Module IV: Riveted and Welded Joint: (5 Hours)
Types of Riveted joint, Lap joint , Butt Joint, Caulking and Fullering, Failure of Riveted joint, Strength of Riveted joint, Efficiency of Riveted joint. Advantages and Disadvantages of welded joint over Riveted joint, Strength of Fillet joint, strength of Butt joints.

Module V: Keys and Couplings: (5 Hours)
Types of Keys, Splines, Strength of Sunk Key, types of shaft coupling, Sleeve and muff coupling, Flange coupling, Flexible coupling, Oldham coupling, Universal coupling.

Module VI: Drives: (5 Hours)
Types of Belt drives, Flat Belt drives, Velocity ratio, Sleep, Creep of Belt, Length of open Belt, length of cross belt, power transmission by belt, Maximum tension in the belt. Types of V belt and Pulleys, advantages and disadvantages of V belt over Flat Belt, Ratio of Driving tensions for V belt, Rope drives. Chain drives, advantages and disadvantages of Chain drives.

Course Outcome:
Upon completion of this course, students will get an overview of the design methodologies employed for the design of various machine components.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- J.E. Shigley, Mechanical Engineering Design.
- Sadhu Singh, Machine Design
- R.S. Khurmi& J.K. Gupta, Machine design
- D.K. Aggarwal & P.C. Sharma, Machine Design.
- Deutschman, D., Michels, W.J. and Wilson, C.E., Machine Design Theory and Practice, Macmillan,1992.
- Juvinal, R.C., Fundamentals of Machine Component Design, John Wiley,1994.
- Spottes, M.F., Design of Machine elements, Prentice-Hall India,1994.
- R. L. Norton, Mechanical Design – An Integrated Approach, Prentice Hall,1998.

MANUFACTURING TECHNOLOGY

Course Code: BME 604 **Credit Units: 03**
Total Hours: 30

Course Objective:
Metal cutting involves removing metal through machining operations. Machining traditionally takes place on lathes, drill presses, and milling machines with the use of various cutting tools. Successful machining also requires knowledge about the material being cut. This course is designed in such way that it explains all aspects (process and tools) of metal cutting. The course also covers the common tooling setups and operations as well as specialized applications for the more experienced users.

Course Contents:

Module I: Introduction: (4 Hours)
Basic shape of cutting tools, Function of different angles of cutting tools, tool geometry and Nomenclatures-ASA, ORS systems, Conversion of angles, Tool Materials.

Module II: Mechanism of Chip Formation: (5 Hours)
Fracture & yielding mechanism, Types of chips, Factors involved in chip formation analysis, shear plane in flat chips, chip formation in drilling and milling.

Module III: Mechanism of Metal Cutting: (6 Hours)
Force system during turning, merchant circle diagram, velocity relationship, stress in conventional shear plane, Energy of cutting process, Ernst& merchant angle relationship, Lee-Shafer relationship, measurement of forces, Heat generation and temperature distribution in metal cutting.

Module IV: Theory of Tool Wears: (5 Hours)
Criteria of wear, machinability and tool life, Flank wear, Crater wear, Taylor's tool life equation, causes and mechanism of tool failure, cutting fluid, Economics of metal machining.

Module V: Design for Sheet Metal Works: (5 Hours)
Press working Terminology, press operation, types of dies, clearance, cutting forces, methods of reducing cutting forces, minimum diameter of piercing, center of pressure, Drawing dies-blank diameter, drawing force.

Module VI: Jigs and Fixture Design: (5 Hours)
Important considerations in jig and fixture design, Locating and clamping, principles for location purposes, principles for clamping purposes, design principles for jigs and fixtures.

Course Outcome:
Upon completion of this course, students will be able to the tooling needed for manufacturing, assembly of different components and the application of optimization methods in manufacturing.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- A Bhattacharya , “Metal cutting theory& practice”, C.B. Publication
- Geoffrey Boothroyd, “Fundamentals of Metal Machining & Machine Tools”, Tata McGraw Hill Kogakusha Ltd.
- P.N. Rao, “Manufacturing Technology”, Tata McGraw Hill Publication Ltd.
- Dr. P.C. Pandey & C.K. Singh, “Production Engg. Sciences”, Standard Publisher. Distributors.
- Dr. B.J. Ranganath, “Metal Cutting & Tool Design” Vikas Publishing House Pvt. Ltd.

OPERATIONS RESEARCH

Course Code: BME 701 **Credit Units: 03**
Total Hours: 30

Course Objective:
In a rapidly changing environment an understanding is sought which will facilitate the choice and the implementation of more effective solutions, which, typically, may involve complex interactions among people, materials and money. Organizations may seek a very wide range of operational improvements - for example, greater efficiency, better customer service, higher quality or lower cost. Whatever the business, engineering aim, Operation Research can offer the flexibility and adaptability to provide objective help. This course introduces students to the principles of operational research.

Course Contents:

Module I: Linear Programming: (5 Hours)
Formulation of Linear Programming Problem. Graphical and simplex method for maximization and minimization theory and sensitivity analysis

Module II: Transportation Models & Assignment Models: (8 Hours)
Stepping stone algorithm, MODI method and Vogel's Approximation Method (VAM) for self balanced/ unbalanced transportation problems and problems of degeneracy and maximization. Assignment model for maximization and traveling salesman problems, Industrial Problems

Module III: Queuing Theory: (4 Hours)
Basic structured, Terminology, classification. Birth and death process. Sequencing: Processing in jobs through machines with the same processing order. Processing of 2 jobs through machines with each having different processing order.

Module IV: Network Models: (5 Hours)
Introduction to PERT and CPM. Fundamental concept of Network models and construction of network diagrams. PERT activity, time estimate. Critical path and project time duration. Probability of completing the project on or before specified time. Float of a activity.

Module V: Project Management: (4 Hours)
Gantt chart, milestone char. Network scheduling terminology. Path enumeration, Activity on node & activity on arc network precedence diagrams. Reliability: Concept of reliability, objectives, applications, area of use, use of reliability in industry.

Module VI: **Games Theory: (4 Hours)**
Zero Sum two-person competitive games, Minimax and maximin principle Arithmetic, algebraic, matrix algebra method. Solution by dominance, sub game, Graphical and linear programming method.

Module VII: **Industrial Visit**
At least one visit up to Three days to industry in the field of Mechanical Engineering.

Course Outcomes:
- To familiarize students with the basic concepts, models and statements of the operations research theory.
- Know principles of construction of mathematical models of conflicting situations and mathematical analysis methods of operations research;

- Be able to choose rational options in practical decision-making problems using standard• mathematical models of operations research;
- Have skills in analysis of operations research objectives, mathematical methods and• computer systems.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- HM Wagner, Principles of Operations Research, Prentice Hall
- Heizer, J. & Render B., Operations Management, Pearson Education (8/e), 2006
- PK Gupta and DS Hira, Operations Research, S. Chand & Co.
- Taha, Introduction to Operation Research
- F.S. Hiller and G.I. Libermann, Introduction to Operation Research, Holden Ray.

COMPUTER AIDED MANUFACTURING

Course Code: BME 702 **Credit Units: 03**
Total Hours: 30

Course Objective:
The aim of the course is to impart the students the basic and essential concepts in using Computer Assisted Manufacturing (CAM) and Computer Numerical Control (CNC) machines. Students will learn the basic concepts of manufacturing planning and control. They will be offered hands on experience in using CAM software to design, simulate and write CNC programs.

Course Contents:

Module I: (6 Hours)
Introduction to Numerical control. Programmed automation. Nomenclature, type and features of NC machines tools. Axes designation. Point to point, straight and continuous control systems**,** Constructional features of CNC machine tools.

Module II: (6 Hours)
Machining centre and Turning centre, Automatic tool changer, Machine Tool beds and automated pallet changers.

Module III: (6 Hours)
Machine Control Unit, Actuation Systems, open and close loop systems, transducers for NC Systems, revolves encoders and inductosyn.

Module IV: (6 Hours)
Manual Part Programming: Processes planning, G&M codes. Interpolation Cycles. Tools compensation, Computed aided part programming - Post processors - APT programming-CNC programming based on CAD Feedback devices - tooling for CNC machine.

Module V: (6 Hours)
Tooling and tool presetting. Computer Aided inspection - Contact Inspection (Coordinate Measuring Machine) & Non Contact Inspection.

Course Outcomes:
- Understand the importance of CAD/CAM principles in the Product development.
- Develop programs related to manufacturing using codes.
- Analyze the importance of networking in manufacturing environment.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance.

Text & References:
- Mikell P. Groover, "Automation, Production Systems and Computer-Integrated Manufacturing", 2nd Edition, Pentice Hall, 2001.

- Rao, Kundra & Tiwari, “Computer aided Manufacturing” Tata McGraw Hill, 2007.
- Numerical Control: by Koren, Khanna Publisher.
- Mikell P. Groover, Emory W. Zimmers, “CAD/CAM”, Pearson Education, 2006.
- P.N. Rao, “CAD/CAM Principles and Applications”, Tata McGraw Hill, 2006.

MANAGEMENT OF MANUFACTURING SYSTEMS

Course Code: BME 703 **Credit Units: 03**
Total Hours: 30

Course Objective:
The overall objective of this course is to provide high caliber engineering students with an in-depth understanding of strategic, tactical and operational issues relating to manufacturing industries worldwide. On completion of the course the students will be equipped with the state-of-the-art concepts, methods, techniques and tools to allow them to contribute towards the competitiveness of manufacturing organizations.

Course Contents:

Module I: Introduction: (5 Hours)
Production functions, Plant Organization: Principles of organization, Organization structure-line and staff Organization, Plant Location layout, Process layout product layout and combination layout methods of layout, economics of layout.

Module II: Production Planning & Control: (5 Hours)
Types of products, demand, demand forecasting, marketing strategies, scheduling and control of scheduling, production control.

Module III: Work and Method Study: (5 Hours)
Definition and concepts, method study procedures, symbols, advantages, Flow process charts, Motion study, micro motion, SIMO charts, system concepts, classification, analysis techniques.

Module IV: Industrial Maintenance: (5 Hours)
Definition and concepts of Maintenance, Need of Maintenance Management, Maintenance Policies, Strategies and options in Maintenance management. Types, organization for maintenance department, Breakdown and preventive maintenance.

Module V: Inventory Control and Replacement Analysis: (5 Hours)
Purpose of Inventory – Cost related to inventors – Basic EOQ model, Introduction replacement policy and method adopted, ABC Analysis, MRP Analysis.

Module VI: Management Concepts: (5 Hours)
Development of management principles, scientific management, human relation aspects.Project Management – CPM and PERT.

Course Outcomes:
- Conduct market research, demand forecasting and costing
- Demonstrate the knowledge of designing plants and controlling production.
- Optimize the resources of an organization and improve productivity.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance.

Text & References:

- S.K. Sharma, “Industrial Engg. & Operation Management”, S.K. Kataria & Sons.
- Dr. Ravi Shankar, “Industrial Engg. & Management”, Galgotia Publications
- M. Mahajan, “Industrial Engg. & Production Management”, Dhanpat Rai & Co.
- J Moore, Manufacturing Management, Prentice Hall
- Buffa, Modern production and operations management, E.S. Wiley eastern.
- Joseph S. Martinich, “Production & Operation Management”, John Wiley & Sons.

ADVANCED METHODS OF MANUFACTURING

Course Code: BME 803 **Credit Units: 03**
Total Hours: 30

Course Objective:
The aim of the course is to provide the students with the understanding of the basic principles underlying the design, analysis, and synthesis of robotic systems plus machine vision technology in automation. In particular, the course will start from simple problem in transformations, kinematics and inverse kinematics, dynamics and control. Later in the semester more complex problems in sensing, force control, mobile robots and robot programming will be discussed.

Course Contents:

Module I: Kinematics Analysis of Robot: (8 Hours)
Matrix algebra or coordinate transformation, kinematics analysis; geometric and dynamic analysis of robot manipulators.

Module II: Robot Control: (7 Hours)
Robot Control, Robot Vision, Robot Controlled, CNNC, Path planning, Obstruction Avoidance

Module III: Material Handling: (10 Hours)
Computer aided Materials Management-inventory control, materials requirements planning. Computer Controlled parts handling and equipment.

Module IV: Automation Protocol: (5 Hours)
Manufacturing Automation protocol, cross functional implementation Technology for system integration.

Course Outcomes:
- Student should be able to select appropriate manufacturing processes for advanced components with characterization of work pieces.
- Student should be able to understand Various Advanced manufacturing metal forming Processes Student should be able to understand to select proper Advanced Manufacturing process for welding, casting and forging

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

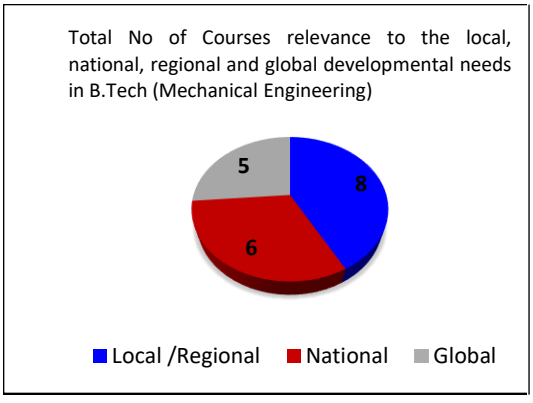
- Raghuvanshi, Manufacturing Process.
- P.N. Rao, Manufacturing Technology, TMH publications
- Hazra-Chowdhary , Workshop Technology
- R.K. Jain, Production Engineering

AMITY UNIVERSITY

MADHYA PRADESH

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

S. No.	Name of Institute/School	Program Name	Semester	Course Code	Course Name	1.1.1 Curricula developed and implemented have relevance to the local, national, regional and global developmental needs, which is reflected in the Programme outcomes (POs), Programme Specific Outcomes(PSOs) and Course Outcomes(COs) of the Programmes offered by the University.		
						Local /Regional	National	Global
1	Amity School of Engineering & Technology	UG. B.Tech (Mechanical Engineering)	I	BME102	Workshop/ Manufacturing Practices	1		
2			III	BME 301	Engineering Mechanics	1		
3				BME 302	Material Science & Metallurgy			1
4				BME 303	Thermodynamics		1	
5			IV	BME 403	Kinematic of Machine	1		
6				BME 404	Manufacturing Machine	1		
7				BME 405	Strength of Material		1	
8			V	BME 501	Applied Thermodynamics		1	
9				BME 502	Dynamics of Machines	1		
10				BME 503	Machine Design –I	1		
11			VI	BME 602	IC Engine & Gas Turbine		1	
12				BME 603	Machine Design – II		1	
13				BME 604	Manufacturing Technology	1		
14			VII	BME 701	Operations Research			1
15				BME 702	Computer Aided Manufacturing		1	
16				BME 703	Management of Manufacturing Systems			1
17			VIII	BME 801	Quality Control & Quality Assurance			1
18				BME 802	Refrigeration & Air-conditioning			1
19				BME 804	Gear Technology	1		
	ASET	Dept. of Mech. Engg.	Total No of Courses relevance to the local, national, regional and global developmental needs			8	6	5



Local /Regional	National	Global
8	6	5

COURSE OUTCOMES

FIRST SEMESTER

S.No.	Course Code	Course Title	Course Outcome
1	BME102	Workshop/ Manufacturing Practices	• Understand the basic concepts of manufacturing industries. • Learn about the basic operations performed in the manufacturing industries as well as in day-to-day life. • Develop basic manufacturing skills required in the manufacturing industries.

THIRD SEMESTER			
S.No.	**Course Code**	**Course Title**	**Course Outcome**
1	BME 301	Engineering Mechanics	• Use scalar and vector analytical techniques for analyzing forces in statically determinate structures, apply fundamental concepts of kinematics and kinetics of particles to the analysis of simple, practical problems and basic knowledge of mechanics to solve real-world problems. • Understand basic kinematics concepts – displacement, velocity and acceleration (and their angular counterparts). Understand basic dynamics concepts – force, momentum, work and Recall principles and theorems related to rigid body mechanics and identify the components of system of forces acting on the rigid body. • Apply the conditions of equilibrium to various practical problems involving different force system and choose appropriate theorems, principles or formulae to solve problems of mechanics. • Analyze and suggest solutions to problems involving rigid bodies, applying the properties of distributed areas and masses.

2	BME 302	Material Science & Metallurgy	• To enable students understand metallic engineering alloys, semiconductors and superconductors, ceramics, plastics and composites. • Understand the basic chemical bonds, crystal structures (BCC, FCC, and HCP), and their relationship with the properties. • Analyze the microstructure of metallic materials using phase diagrams and modify the microstructure and properties using different heat treatments. • Apply the basic principles of ferrous and non-ferrous metallurgy for selecting materials for specific applications. • Define and differentiate engineering materials on the basis of structure and properties for engineering applications.
3	BME 303	Thermodynamics	• After completing this course, the students will be able to apply energy balance to systems and control volumes, in situations involving heat and work interactions. • Students can evaluate changes in thermodynamic properties of substances. • The students will be able to evaluate the performance of energy conversion devices. • The students will be able to differentiate between high grade and low-grade energies. To understand the working of steam power cycle and related components.

FOURTH SEMESTER			
S.No.	**Course Code**	**Course Title**	**Course Outcome**
1	BME 403	Kinematic of Machine	• Understand the fundamentals of kinematics, various planar mechanisms and interpret the basic principles of mechanisms and machines. • Perform analysis and synthesis of mechanisms. • Solve the problem on cams and gear drives, including selection depending on requirement. • Calculate the gyroscopic effect in various situations. • Analyze rotating and reciprocating masses for its unbalance.

2	BME 404	Manufacturing Machine	• Select appropriate Manufacturing Process to manufacture any component. • Demonstrate operation such as Turning, Facing, Threading, Knurling and Grooving on Centre Lathe. • Student will be able to understand milling and drilling process. • Student will be able to understand finishing processes • Student will be able to understand Shaping processes.
3	BME 405	Strength of Material	• Determine the stresses, strains and displacements of structures by tensorial and graphical (Mohr's circle) approaches. • Analyze the strength of materials using stress-strain relationships for structural and thermal loading. • Perform basic design of shafts subjected to torsional loading and analyse beams subjected to bending moments. • Determine the deformation of structures subjected to various loading conditions using strain energy methods. • Analyze column buckling and appreciate the theories of failures and its relevance in engineering design.

FIFTH SEMESTER			
S.No.	**Course Code**	**Course Title**	**Course Outcome**
1	BME 501	Applied Thermodynamics	• After completing this course, the students will get a good understanding of various practical power cycles and heat pump cycles. • They will be able to analyze energy conversion in various thermal devices such as combustors, air coolers, nozzles, diffusers, steam turbines and reciprocating compressors. • They will be able to understand phenomena occurring in high-speed compressible flows, steam power cycle and dynamics of air flow through fluid systems. • To understand and analyze gas and vapor cycles and their first law and second law efficiencies. • To understand about the properties of dry and wet air and the principles of psychrometry.

2	BME 502	Dynamics of Machines	• To understand free and forced vibrations of single degree freedom systems. • To analyze balancing problems in rotating and reciprocating machinery. • To characterize and design flywheels. • To analyze and design centrifugal governors. • To analyze the force analysis of dynamic mechanical system and suggest solutions.
3	BME 503	Machine Design –I	• Understand the different procedures to be followed in design process and the basic material properties. • Estimate the design parameters based on different failure theories and design factors like endurance limit, impact strength etc. • Design various threaded and bolted, riveted, cotter, knuckle and welded joints. • Design different compression springs and leaf springs used. • Analyze various shafts and couplings used.

SIXTH SEMESTER			
S.No.	**Course Code**	**Course Title**	**Course Outcome**
1	BME 602	IC Engine & Gas Turbine	• Get the knowledge of engine classification, performance parameters and characteristics of different types of I C engine designs. • Understand characteristics of engine performance parameters and several losses due to various operational constraints. • Predict performance and fuel economy trends with good accuracy, based on an in-depth analysis of the fuel air mixing and combustion process. • Develop an understanding of modern injection systems, cooling & lubrication systems and supercharging to optimize the thermal efficiency and emission standards. • Understand working principles of instrumentation used for engine performance and emission parameters.

2	BME 603	Machine Design – II	• To design of different types of clutches and brakes. • To select different types of bearing and lubrication system for suitable application. • To design of spur gear, helical, bevel and worm gear for suitable application. • To design of flat belt, v belt and chains for a particular application. • To design Connecting rod and Pressure vessels.
3	BME 604	Manufacturing Technology	• Upon completion of this course, students will be able to the tooling needed for manufacturing, assembly of different components and the application of optimization methods in manufacturing. • Explain and analyze the various casting and metal forming process mechanics and evaluate the force and power requirements of forging, rolling and drawing etc. • Analyze mechanics of metal cutting and various aspects of tools in the process of machining. Illustrate and differentiate various super finishing operations. • Explain and distinguish different welding processes • Comprehend and classify various non-conventional machining

SEVENTH SEMESTER			
S.No.	**Course Code**	**Course Title**	**Course Outcome**
1	BME 701	Operations Research	• Formulate, solve and optimize real-world problems using linear programming model (LPP). • Solve specialized linear programming problems using transportation and assignment model. • Analyze and evaluate game and sequencing theory with the help of practical problems. • Formulate stochastic inventory models and compute with the help of various simulation models for important performance measures. • Analyze and compare project management. techniques such as PERT and CPM. Discuss different waiting line models for solving queuing problems.

2	BME 702	Computer Aided Manufacturing	• Understand the importance of CAD/CAM principles in the Product development. • Develop programs related to manufacturing using codes. • Identify the need of development of automated systems for material handling and cellular manufacturing systems and its applications in various fields. • Analyze different methods of additive manufacturing and its parameters. • Discuss various types of software/hardware/processes used and their advantages.
3	BME 703	Management of Manufacturing Systems	• Conduct market research, demand forecasting and costing. • Demonstrate the knowledge of designing plants and controlling production. • Optimize the resources of an organization and improve productivity through application of application of Industrial Engineering e.g. method study, work measurement and job evaluation. • Explain the principles of plant layout and material handling. • Explain the importance of industrial relations and communication and production planning and control.

EIGHTH SEMESTER			
S.No.	**Course Code**	**Course Title**	**Course Outcome**
1	BME 801	Quality Control & Quality Assurance	• Explain the different meanings of the quality concept and its influence. • Describe, distinguish and use the several techniques and quality management tools. • Explain and distinguish the normalization, homologation and certification activities. • Identify the elements that are part of the quality measuring process in the industry.

2	BME 802	Refrigeration & Air-conditioning	• Students should be able to use Psychometric charts and estimate various essential properties related to Psychrometry and processes. • Students should be able to understand various refrigeration cycles and evaluate performance using Mollier charts and/ or refrigerant property tables. • Students should be able to illustrate the fundamental principles and applications of refrigeration and air conditioning system. • Students should be able to obtain cooling capacity and coefficient of performance by conducting test on vapor compression refrigeration systems. • Students should be able to estimate the condition of steam and performance of vapour power cycle and vapour compression cycle.
3	BME 804	Gear Technology	• To understand the transmission through Gears. mechanism, gear trains, classification and analysis, familiarity with gear standardization. • To understand the power transmission through gear train. • To understand gear set design, gear train and gear teeth. • To understand the basic principles of gears. • Demonstrate the design process of commonly used gears.

AMITY UNIVERSITY

MADHYA PRADESH

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

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

Programme Educational Objectives

BTech(CSE/IT)

PEO - 1: To provide graduating students with core competencies by strengthening their mathematical, scientific and basic engineering fundamentals.

PEO - 2: To train graduates in diversified and applied areas with analysis, design and synthesis of data to create novel products and solutions to meet currentindustrial and societal needs.

PEO - 3: To inculcate high professionalism among the students by providing technical and soft skills with ethical standards.

PEO - 4: To promote collaborative learning and spirit of team work through multidisciplinary projects and diverse professional activities.

PEO - 5: To encourage students for higher studies, research activities and entrepreneurial skills by imparting interactive quality teaching and organizingsymposiums, conferences, seminars, workshops and technical discussions.

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AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Technology (B. Tech.) CSE
Academic Year – 2021-22

Programme Outcomes:

[PO.1].**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems

[PO.2]. **Problem analysis**: Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences

[PO.3]. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations

[PO.4]. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions

[PO.5].**Modern tool usage**: Create, select ,and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations

[PO.6]. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues, and the consequent responsibilities relevant to the professional engineering practice

[PO.7]. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development

[PO.8]. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practices

[PO.9]. **Individual and teamwork**: Function effectively as an individual, and as a member or leader in diverse teams, and in multi disciplinary settings

[PO.10].**Communication**:Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation,make effective presentations,and give and receive clear instructions

[PO.11].**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments

[PO.12].**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change

Programme Specific Outcomes

PSO1. Professional Skills: An ability to understand, analyze and develop computer programs in the areas related to algorithms, system software, multimedia, web design, big data analytics, and networking for efficient design of computer-based systems of varying complexity.

PSO2. Problem-solving skills: An ability to apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success.

PSO3. Successful career and Entrepreneurship: An ability to employ modern computer languages, environments, and platforms in creating innovative career paths to be an entrepreneur, and a zest for higher studies.

Note: - Correlation levels 1, 2 and 3 as defined below:
1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
ISEM	MAT101	3	2	3	3	3	-	-	-	2	-	2	3	-	-	-
	CHE101	3	3	3	3	-	3	3	3	3	3	3	3	-	-	-
	CSE104	3	3	2	3	3	2	2	-	3	2	3	3	3	3	3
	BME101	3	2	1		1	2	1	-	2	-	1	3	3	3	3
	CIV101	2	2	2	-	3	-	3	2	-	3	-	3	3	2	1
	CHE121	3	3	3	2	2	3	3	3	3	3	3	3	-	-	-
	CSE124	3	3	2	3	3	2	2	-	3	2	3	3	3	3	3
	BME121	2	2	2	-	3	-	3	2	-	3	-	3	1	2	1
	BCU141	2	2	2	-	3	-	3	2	-	3	-	3	1	2	1
	EVS142	3	3	2	3	3	2	2	-	3	2	3	3	3	3	3
	BSU143	3	2	1		1	2	1	-	2	-	1	3	3	3	3
	FLU144	1	2	1	2	2	-	-	-	-	-	-	-	2	2	2
IISEM	MAT201	3	2	3	3	3	-	-	-	2	-	2	3	-	-	-
	PHY101	3	3	1	2	3	3	2	1	2	1	-	3	-	-	-
	ECE101	3	3	2	3	3	2	2	-	3	2	3	3	3	3	3
	CSE204	3	2	1		1	2	1	-	2	-	1	3	3	3	3
	BME102	3	3	2	3	3	2	2	-	3	2	3	3	3	3	3
	PHY121	3	3	3	2	2	1	1	1	1	3	3	3	-	-	-
	ECE121	3	3	2	3	3	2	2	-	3	2	3	3	3	3	3
	CSE224	3	3	3	2	2	1	1	1	1	3	3	3	-	-	-
	BME122	3	3	2	3	3	2	2	-	3	2	3	3	3	3	3
	BCU241	3	3	3	2	2	1	1	1	1	3	3	3	-	-	-
	EVS242	3	3	2	3	3	2	2	-	3	2	3	3	3	3	3
	BSU243	3	3	3	2	2	1	1	1	1	3	3	3	-	-	-
	FLU244	1	2	1	2	2	-	-	-	-	-	-	-	2	2	2

PROGRAMME ARTICULATION MATRIX																
2nd Year		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
IIISEM	MAT 301	3	2	1	-	-	-	-	-	-	-	-	2	1	1	1
	CSE 202	3	3	3	2	-	-	-	-	-	-	-	3	3	3	3
	CSE 302	3	2	2	-	-	-	-	-	-	-	-	2	3	-	2
	CSE 304	3	2	2	2	-		-	-	1	1	1	2	2	-	-
	ECE 306	3	3	2	-	-	-	-	-	-	-	-	2	3	-	2
	CSE 222	1	2	2	1	1	-	-	-	-	-	-	-	2	-	-
	CSE 322	3	3	2	-	-	-	-	-	-	-	-	2	3	-	2
	CSE 324	1	2	2	1	1	-	-	-	-	-	-	-	2	-	-
	ECE 326	3	2	2	-	-	-	-	-	-	-	-	2	3	-	2
	BCU 341	1	2	1	2	2	-	-	-	-	-	-	-	2	2	2
	BSU 343	3	3	3	2	2	1	1	1	1	3	3	3	-	-	-
	FLU 344	1	2	1	2	2	-	-	-	-	-	-	-	2	2	2
IV SEM	CSE 401	3	2	2	-	2	-	-	3	2	-	-	2	3	-	2
	CSE 402	3	2	2	-	-	-	1	-	-	-	-	2	3	-	2
	ECE 406	3	2	2	-	2	-	1	-	-	-	-	2	3	-	2
	CSE 403	3	2	2	-	2	-	-	3	2	-	-	2	3	-	2
	CSE 404	3	2	2	-	2	-	1	3	2	-	1	2	3	-	2
	ECE 426	3	2	2	1	2	-	-	3	2	-	2	2	3	-	2
	CSE 423	3	2	2	-	-	-	-	-	-	-	-	2	3	-	2
	CSE 424	3	2	2	1	2	-	-	3	2	-	2	2	3	-	2
	BCU 441	3	2	2	1	2	-	-	3	2	-	2	2	3	-	2
	BSU 443	3	2	2	1	2	-	-	3	2	-	2	2	3	-	2
	FLU 444	3	2	2	1	2	-	-	3	2	-	2	2	3	-	2

ROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3

VSEM	CSE 303	3	3	2	3	3	2	2	-	3	2	3	3	3	3	3
	CSE 501	2	2	2	-	3	-	3	2	-	3	-	3	1	2	1
	CSE 503	3	3	1	2	3	3	3	3	3	-	1	3	3	2	2
	CSE 504	2	-	2	-	3	-	3	2	-	3	-	3	3	2	2
	CSE 505	3	3	3	2	2	1	1	-	-	-	-	3	3	3	3
	CSE 323	2	2	2	-	3	-	3	2	-	3	-	3	1	2	1
	CSE 523	3	3	1	2	3	3	3	3	3	-	1	3	3	2	2
	CSE 524	3	3	2	3	3	2	2	-	3	2	3	3	3	3	3
	CSE 525	2	2	2	-	3	-	3	2	-	3	-	3	1	2	1
	BCU 541	3	3	1	2	3	3	3	3	3	-	1	3	3	2	2
	BSU 543	3	2	1		1	2	1	-	2	-	1	3	3	3	3
	FLU 544	1	**1**	1	2	**3**	-	-	-	-	-	-	-	2	2	2
	NPT 550	3	2	1	1	2	-	-	2	-	1	-	-	2	2	2
VISEM	CSE 601	3	3	2	3	3	2	2	-	3	2	3	3	1	2	1
	CSE 602	2	2	2	-	3	-	3	2	-	3	-	3	3	2	2
	CSE 603	3	3	1	2	3	3	3	3	3	-	1	3	3	2	2
	CSE 604	2	2	2	-	3	-	3	2	-	3	-	3	3	3	3
	CSE 623	3	3	1	2	3	3	3	3	3	-	1	3	1	2	1
	CSE 624	2	-	2	-	3	-	3	2	-	3	-	3	3	2	2
	CSE 605	3	3	1	2	3	3	3	3	3	-	1	3	3	3	3
	CSE 606	2	2	2	-	3	-	3	2	-	3	-	3	1	2	1
	CSE 607	3	3	1	2	3	3	3	3	3	-	1	3	3	2	2
	CSE 625	3	3	1	2	3	3	3	3	3	-	1	3	3	2	2
	CSE 626	2	2	2	-	3	-	3	2	-	3	-	3	3	3	3
	CSE 627	3	3	1	2	3	3	3	3	3	-	1	3	1	2	1
	BCU 641	2	2	2	-	3	-	3	2	-	3	-	3	3	2	2
	BSU 643	2	2	2	-	3	-	3	2	-	3	-	3	3	3	3
	FLU 644	3	1	2	3	3	1	1	-	-	3	3	3	3	3	2

	NMP 660	1	2	1	2	2	-	-	-	-	-	-	-	2	2	2

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
VII SEM	CSE 701	3	3	2	3	3	2	2	-	3	2	3	3	3	3	3
	CSE 702	2	2	2	-	3	-	3	2	-	3	-	3	1	2	1
	CSE 703	2	2	2	-	3	-	3	2	-	3	-	3	1	2	1
	CSE 721	3	3	2	3	3	2	2	-	3	2	3	3	3	3	3
	CSE 722	3	2	1		1	2	1	-	2	-	1	3	3	3	3
	CSE 723	3	3	2	3	3	2	2	-	3	2	3	3	3	3	3
	CSE 704	3	3	2	3	3	2	2	-	3	2	3	3	3	3	3
	CSE 705	2	2	2	-	3	-	3	2	-	3	-	3	1	2	1
	CSE 706	2	2	2	-	3	-	3	2	-	3	-	3	1	2	1
	CSE 724	3	3	2	3	3	2	2	-	3	2	3	3	3	3	3
	CSE 725	3	2	1		1	2	1	-	2	-	1	3	3	3	3
	CSE 726	3	2	1		1	2	1	-	2	-	1	3	3	3	3
	CSE 707	3	1	1		1	2	1	-	2	-	1	3	2	3	3
	CSE 708	3	2	1		1	2	2	-	2	-	1	3	3	2	3
	CSE 709	3	2	1		1	1	1	-	2	-	1	3	3	3	3
	BCU 741	2	2	2	-	3	-	3	2	-	3	-	3	3	2	2
	BSU 743	2	2	2	-	3	-	3	2	-	3	-	3	3	3	3
	FLU 744	3	1	2	3	3	1	1	-	-	3	3	3	3	3	2
	NPT 750	1	2	1	2	2	-	-	-	-	-	-	-	2	2	2
	NMP 760	1	2	1	2	2	-	-	-	-	-	-	-	2	2	2
	CSE 801	3	3	2	3	3	2	2	-	3	2	3	3	1	2	1
	CSE 802	2	2	2	-	3	-	3	2	-	3	-	3	3	2	2

VIII SEM	CSE 803	3	3	1	2	3	3	3	3	3	-	1	3	3	2	2
	CSE 821	2	-	2	-	3	-	3	2	-	3	-	3	3	2	2
	CSE 822	3	3	1	2	3	3	3	3	3	-	1	3	3	2	2
	CSE 804	3	1	2	3	3	1	1	-	-	3	3	3	3	3	2
	CSE 805	3	2	1		1	2	1	-	2	-	1	3	3	3	3
	CSE 806	3	1	1		1	2	1	-	2	-	1	3	2	3	3
	CSE 824	3	2	1		1	2	1	-	2	-	1	3	3	3	3
	CSE 825	3	1	1		1	2	1	-	2	-	1	3	2	3	3
	CSE 826	3	2	1		1	2	1	-	2	-	1	3	3	3	3
	BCU 841	3	1	1		1	2	1	-	2	-	1	3	2	3	3
	BSU 843	2	2	2	-	3	-	3	2	-	3	-	3	3	2	2
	FLU 844	1	2	1	2	2	-	-	-	-	-	-	-	2	2	2
	NMP 860	3	2	1	3	1	-	-	-	-	-	-	-	2	3	2

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

PO Mapping of B.Tech(CSE) Program Outcomes with the SDGs

Engineering Programme Outcome (EPO)	Sustainable Development Goal (SDG)
EPO 1: Engineering Knowledge	SDG 4: Quality Education
EPO 2: Problem Analysis	SDG 1: No Poverty
EPO 3: Design/Development of Solutions	SDG 9: Industry, Innovation, and Infrastructure
EPO 4: Investigation	SDG 12: Responsible Consumption and Production
EPO 5: Modern Tool Usage	SDG 8: Decent Work and Economic Growth
EPO 6: The Engineer and Society	SDG 16: Peace, Justice, and Strong Institutions
EPO 7: Environment and Sustainability	SDG 13: Climate Action
EPO 8: Ethics	SDG 16: Peace, Justice, and Strong Institutions
EPO 9: Individual and Team Work	SDG 17: Partnerships for the Goals
EPO 10: Communication	SDG 4: Quality Education
EPO 11: Project Management	SDG 9: Industry, Innovation, and Infrastructure
EPO 12: Lifelong Learning	SDG 4: Quality Education

AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY

B.Tech Computer Science and Engineering

2021-2022

Courses Mapped with various National Missions

Sr. No.	Semester	Course Code	Course Name	National Mission
1.	3	CSE 302	Python Programming	Startup India
2.	5	CSE 503	Introduction to Android Application Development	Make in India
3.	5	CSE 525	Web Technologies Lab	Digital India (DI)
4.	6	CSE 603	Internet of Things (IOT)	Startup India
5.	6	CSE 623	Internet of Things (IOT) Lab	Make in India
6.	6	NMP 660	Minor Project	Skill India / Pradhan Mantri Kaushal Vikas Yojana (PMKVY)
7.	7	CSE 702	Artificial Intelligence	National Supercomputing Mission (NSM)
8.	7	CSE 722	Artificial Intelligence Lab	National Supercomputing Mission (NSM)
9.	7	CSE 704	Data Analytics	Make in India
10.	7	NMP 760	Major Project – I	Skill India / Pradhan Mantri Kaushal Vikas Yojana (PMKVY)
11.	8	CSE 825	Big Data and Business Analytics Lab	Atal Innovation Mission (AIM)
12.	8	NMP 860	Major Project-II	Skill India / Pradhan Mantri Kaushal Vikas Yojana (PMKVY)

Syllabus 2021-2022(National Mission)

PYTHON PROGRAMMING

Course Code: CSE 302 **CreditUnits: 03**

Total Hours: 30

Course Objective:

To understand the basic concepts such as lists, tuples and dictionary Data structures. To understand concepts like networking and website development using frameworks of python. To understand working third party libraries in python. To understand Scientific programming paradigm.

Course Contents:

Module I: Introduction of Python: (08 Hours)

History of Python, Features of Python Programming, Applications of Python, Use of python, install and Run Python in Windows/Linux, Keyword and Identifier, Statements and Comments, Python Variables, Python Data types, Python Type Conversion,Python I/O and Import, Python Operators, Python Namespace.

Python If-else statements, Python for Loop, while loop, break and continue, String manipulation, List Tuple, dictionaries, pass statement, looping technique, functions, function arguments, recursion,anonymous function, python global, local and Nonlocal.

Module II: Object and Class: (05 Hours)

Python modules, python package, File operation, Python directory, Python exception, Exception Handling, User-Define Exception, Python OOP, class, inheritance, multiple inheritance, operator overloading.

Module III: Regular Expression, CGI and Database: (08 Hours)

Match function, Search function, matching vs. searching, modifier, pattern, Introduction of CGI,CGI Architecture, CGI environment Variable, GET/POST Method, Cookies,File upload, Introduction of Database, connections, Executing queries, transactions, handling errors.

Module IV: GUI Programming: (09 Hours)

Tkinter Programming, Tkinter widgets, Standard Attributes, CGI Programming, Introduction to Web Framework: - Django, Application Lifecycle, creating a Django Project, Creating Admin

Interface, Creating Views, URL Mapping, Template System, Creating Database Models, Interfacing database: - PostgreSQL with the Django Project, Page Redirection, Form Processing.

Module V: Industrial Visit

At least one day visit to local industry in the field of Computer Science & Engineering.

Course Outcomes:

- Ability to create client-server application for real world problems.
- Ability to apply Regular Expression, CGI and Database.
- Ability to apply GUI Programming in real world problems.

Examination Scheme:

Components	**A**	**CT**	**S/V/Q/HA**	**ESE**
Weightage (%)	5	15	10	70

A: Attendance, CT: Class Test,:, S/V/Q/HA: Seminar/Viva/Quiz/ Home Assignment, ESE: End Semester Examination;

Text & References:

Text:

- Core Python Programming , Wesley J. Chun, Publisher: Prentice Hall PTR, First Edition.
- Django Unleashed, Andrew Pinkham, SAMS, second edition
- OpenCV 4, Roy Shilkrot, Packt Pub, third edition
- Elegant Scipy, Juan Nunez, O'Reilly, third edition.

Reference:

- Learning Python, Mark Lutz, O'Reilly. Ltd., Second Edition.
- Python CookBook, Alex Martelli, O'Reilly. Ltd., Third Edition.

INTRODUCTION TO ANDROID APPLICATION DEVELOPMENT

Course Code: CSE 503 **Credit Units: 03**

Total Hours: 30

Course Objective:

This course provides students with the knowledge of fundamentals of Android application; Android Application Development is a hands-on course which is designed for providing essential skills and experiences to the students in developing applications on mobile platform. The hands-on training is effective for beginners and experienced developers for practical Android Code Application.

Course Contents:

Module I: (07 Hours)

Introduction to Android -Overview of Android, What does Android run On – Android Internals, Android for mobile apps development, Environment setup for Android apps Development, Framework - Android- SDK, Eclipse, Emulators – What is an Emulator / Android AVD?

Module II: (09 Hours)

Android activities and GUI design concepts- Design criteria for Android Application: Hardware Design Consideration, Design Demands for Android application, Intent**,** Activity, Activity Lifecycle and Manifest, Creating Application and new Activities, Simple UI -Layouts and Layout, Properties: Introduction to android UI design, Introducing Layouts, GUI objects, Layout design concepts.

Module III: (07 Hours)

Advanced UI Programming: Event driven Programming in Android(Text Edit, Button clicked etc.) Activity Lifecycle of Android, Exception handling

Module IV: (07 Hours)

Menu:Basics, Custom v/s System Menus, Create and Use Handset menu Button (Hardware) Dialog : Creating and Altering Dialogs Toast : List & Adapters Demo Application Development and Launching Basic operation of SQLite Database Android Application Priorities.

Course Outcome:

At the end of the course the participant will. Create a Web Application with server controls.

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

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

Text & References:

Text:

- Professional Android
- Application Development, Reto Meier
- Beginning Android, Mark L Murphy
- Pro Android, S.Y Hashimi & Satya Komatineni

References:

- Android Studio Development Essentials, Neil Smyth
- The Definitive Guide to SQL Lite, Michael Owens
- Building Android Apps, IN EASY STEPS

WEB TECHNOLOGIES LAB

Course Code: CSE 525 **Credit Unit: 01**

Total Hours: 20

Course Objective:

Software Required: Notepad++, Wamp or Xammp Server

Objective: The objective of this lab is to to develop an ability to design and implement static and dynamic website

Course Contents:

Experiments should include but not limited to:

1. Write an HTML code to display your education details in a tabular format**:(01 Hour)**
2. Write an HTML code to display your CV on a web page**:(01 Hour)**
3. Write an HTML code to create a Home page having three links: About Us, Our Services and Contact Us. Create separate web pages for the three links**:(01 Hour)**
4. Write an HTML code to create a login form. On submitting the form, the user should get navigated to a profile page**:(01 Hour)**
5. Write an HTML code to create a Registration Form. On submitting the form, the user should be asked to login with this new credentials**:(01 Hour)**
6. Write an HTML code to create your Institute website, Department Website and Tutorial website for specific subject**:(01 Hour)**
7. Write an HTML code to illustrate the usage of the following: · Ordered List · Unordered List · Definition List**:(01 Hour)**
8. Write an HTML code to create a frameset having header, navigation and content sections**:(01 Hour)**
9. Write an HTML code to demonstrate the usage of inline CSS**:(01 Hour)**

10. Write an HTML code to demonstrate the usage of internal CSS**:(01 Hour)**
11. Write an HTML code to demonstrate the usage of external CSS**:(01 Hour)**
12. Write a Java script to prompt for user's name and display it on the screen**:(01 Hour)**
13. Design HTML form for keeping the students record and validate it using Java script**:(01 Hour)**
14. Write an HTML program to design an entry form of student details and send it to store at database server like SQL, Oracle or MS Access**:(02 Hours)**
15. Write programs using a Java script for Web Page to display browsers information**:(02 Hours)**
16. Create an applet which will have a line, an Oval & a Rectangle**:(01 Hour)**
17. Write a program using PHP and HTML to create a form and display the details entered by the user**:(02 Hours)**

Course Outcomes:

At the end of the course, students should be able to:

- Design and implement dynamic websites with good aesthetic sense of designing and latest technical know-how's.
- Have a Good grounding of Web Application Terminologies, Internet Tools, E – Commerce and other web services.
- Get introduced in the area of Online Game programming.

Examination Scheme:

IA			**EE**			
A	**PR**	**Practical Based Test**	**Major Experiment**	**Minor Experiment**	**LR**	**Viva**
5	10	15	35	15	10	10

Note: IA –InternalAssessment, EE- External Exam, A- Attendance, PR- Performance, LR – Lab Record, V – Viva.

Text & References

- P. J. Deitel, H.M. Deitel, Internet &World Wide Web How To Program, 4/e, Pearson International Edition 2010.
- Robert W Sebesta, Programming the World Wide Web, 7/e, Pearson Education Inc., 2014.
- Bear Bibeault and Yehuda Katz, jQuery in Action, Second Edition, Manning Publications. [Chapter 1] Black Book, Kogent Learning Solutions Inc. 2009.
- Bob Boiko, Content Management Bible, 2nd Edition, Wiley Publishers. [Chapter 1, 2]
- Chris Bates, Web Programming Building Internet Applications, 3/e, Wiley India Edition 2009.
- Dream Tech, Web Technologies: HTML, JS, PHP, Java, JSP, ASP.NET, XML, AJAX,
- Jeffrey C Jackson, Web Technologies A Computer Science Perspective, Pearson Education Inc. 2009.
- Lindsay Bassett, Introduction to JavaScript Object Notation: A To-the-Point Guide to JSON 1st Edition, O'Reilly. [Chapter 1,2,3,4] 7.
- Matthew MacDonald, WordPress: The Missing Manual, 2nd Edition, O'Reilly Medi

INTERNET OF THINGS (IOT)

Course Code: CSE 603 **Credit Units: 02**

Total Hours: 20

Course Objective:

The objective of the course is to:Vision and Introduction to IOT, Understand IOT Market perspective, Data and Knowledge Management and use of Devices in IOT Technology, Understand State of the Art – IOT Architecture, Real World IOT Design Constraints, Industrial Automation and Commercial Building Automation in IOT.

Course Contents:

Module I: Introduction to the Internet of Things: (07 Hours)

Key Features, advantages, disadvantages, Wearable electronics, The Basics of Sensors & Actuators, Introduction to Cloud Computing, IOT Software.

Module II: IoT-An Architectural Overview: (06 Hours)

Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations. IoT Technology Fundamentals- Devices and gateways, Local and wide area networking, Data management, Business processes in IoT, Everything as a Service(XaaS), M2M and IoT Analytics, Knowledge Management.

Module III: The Arduino Platform: (06 Hours)

What is Arduino, Why Arduino, Driver installation, programming &Burning ,Coding in wiring language, Compiling in Arduino, The Arduino Open-Microcontroller Platform, Arduino Basics, Arduino Board Layout & Architecture Reading from Sensors.

Module IV: Arduino Programming & Interface of Sensors: (05 Hours)

LED display, PUSH button to array of LED, Communicating to and from computer, GSM, GPS and Zigbee interfacing ,Interface sensor with arduino, Programming arduino, Reading from sensor, Connecting Arduino with Mobile Device. The Android Mobile OS, Using the Bluetooth Module.

Module V: Projects: (06 Hours)

1. Creating own Android App using MIT App Inventor & controlling Arduino connected devices. 2. Use Arduino to Upload free data from Environmental Sensors to Cloud Server. 3. Receive Automatic Call Notification on Mobile Phone for Burglar Alarm using IoT Platform4.Control Electronic Devices from anywhere across the world using Internet & Mobile App.

Course Outcome:

Ability to develop IOT application.

Examination Scheme:

Components	**A**	**CT**	**S/V/Q/HA**	**ESE**
Weightage (%)	5	15	10	70

A: Attendance, CT: Class Test,:, S/V/Q/HA: Seminar/Viva/Quiz/ Home Assignment, ESE: End Semester Examination;

Text & References:

Text:

- Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, StamatisKarnouskos, David Boyle, **"From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence",** 1st Edition, Academic Press, 2014.

Reference Books:

- Vijay Madisetti and ArshdeepBahga, **"Internet of Things (A Hands-on-Approach)",** 1stEdition, VPT, 2014.
- Francis daCosta, **"Rethinking the Internet of Things: A Scalable Approach to Connecting Everything",** 1st Edition, Apress Publications, 2013

INTERNET OF THINGS (IOT) LAB

Course Code: CSE 623 **Credit Units: 02**

Total Hours: 40

Course Objective:

The objective of the course is to:Vision and Introduction to IOT, Understand IOT Market perspective, Data and Knowledge Management and use of Devices in IOT Technology, Understand State of the Art – IOT Architecture, Real World IOT Design Constraints, Industrial Automation and Commercial Building Automation in IOT.

SOFTWARE REQUIREMENTS: Arduino IDE

List of experiments/demonstrations:

1. Study and Install Python in Eclipse and WAP for data types in python. **(03 Hours)**
2. Write a Program for arithmetic operation in Python. **(03 Hours)**
3. Write a Program for looping statement in Python. **(03 Hours)**
4. Study and Install IDE of Arduino and different types of Arduino. **(03 Hours)**
5. Write program using Arduino IDE for Blink LED. **(03 Hours)**
6. Write Program for RGB LED using Arduino. **(03 Hours)**
7. Study the Temperature sensor and Write Program foe monitor temperature using Arduino **(03 Hours)**
8. Study and Implement RFID, NFC using Arduino. **(03 Hours)**
9. Study and implement MQTT protocol using Arduino. **(04 Hours)**
10. Study and Configure Raspberry Pi. **(04 Hours)**
11. WAP for LED blink using Raspberry Pi. **(04 Hours)**
12. Study and Implement Zigbee Protocol using Arduino / Raspberry Pi.**(04 Hours)**

Course Outcomes:

Ability to develop IOT application

Examination Scheme:

IA			EE			
A	**PR**	**Practical Based Test**	**Major Experiment**	**Minor Experiment**	**LR**	**Viva**

5	10	15	35	15	10	10

Note: IA –InternalAssessment, EE- External Exam, A- Attendance PR- Performance, LR – Lab Record, V – Viva.

Text & References:

Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, StamatisKarnouskos, David Boyle, **"From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence",** 1st Edition, Academic Press, 2014.

MINOR PROJECT

Course Code: NMP 660 **Credit Units: 02**

Course objectives:

The objective of Minor project is to enable the student to take up investigative study in the broad field of Engineering, either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on an individual basis or two/three students in a group, under the guidance of a Supervisor.

Methodology:

Topics of project are to be based on the latest trends, verifying engineering concepts /principals and should involve elementary research work. The projects may involve design, fabrications, testing, computer modeling, and analysis of any engineering problem. On completion of the practical training the students are to present a report covering various aspects learnt by them and give a presentation on same.

Course Outcomes:

At the end of the course, students will demonstrate the ability to:

1 Conceive a problem statement either from rigorous literature survey or from the requirements raised from need analysis.
2 Design, implement and test the prototype/algorithm in order to solve the conceived problem.
3 Write comprehensive report on mini project work.

Examination Scheme:

Literature study/ Fabrication/ Experimentation	40
Written Report	20
Viva	15
Presentation	25
Total	**100**

ARTIFICIAL INTELLIGENCE

Course Code: CSE 702 **Credit Units: 03**
Total Hours: 30

Course Objective:
To develop semantic-based and context-aware systems to acquire, organize process, share and use the knowledge embedded in multimedia content. Research will aim to maximize automation of the complete knowledge lifecycle and achieve semantic interoperability between Web resources and services. The field of Robotics is a multi disciplinary as robots are amazingly complex system comprising mechanical, electrical, electronic H/W and S/W and issues germane to all these.

Course Contents:

Module I: Problem solving and Scope of AI: (7 Hours)
Introduction to Artificial Intelligence. Applications- Games, theorem proving, natural language processing, vision and speech processing, robotics, expert systems. AI techniques- search knowledge, abstraction.

Problem Solving
State space search; Production systems, search space control: depth-first, breadth-first search. Heuristic search - Hill climbing, best-first search, branch and bound. Problem Reduction, Constraint Satisfaction End, Means-End Analysis.

Module II: Knowledge Representation: (6 Hours)
Knowledge Representation issues, first order predicate calculus, Horn Clauses, Resolution, Semantic Nets, Frames, Partitioned Nets, Procedural Vs Declarative knowledge, Forward Vs Backward Reasoning.

Module III: Understanding Natural Languages: (6 Hours)
Introduction to NLP, Basics of Syntactic Processing, Basics of Semantic Analysis, Basics of Parsing techniques, context free and transformational grammars, transition nets, augmented transition nets,Scripts, Basics of grammar free analyzers, Basics of sentence generation, and Basics of translation.

Module IV: (5 Hours)
Expert System: Need and justification for expert systems, knowledge acquisition, Case studies: MYCIN, RI.

Learning: Concept of learning, learning automation, genetic algorithm, learning by inductions, neural nets. **Programming Language:** Introduction to programming Language, LISP and PROLOG.

Module V: Introduction to Robotics: (6 Hours)
Fundamentals of Robotics, Robot Kinematics: Position Analysis, Dynamic Analysis and Forces, Trajectory Planning, Sensors and vision system.
Robot Programming languages & systems: Introduction, the three levels of robot programming, requirements of a robot programming language, problems peculiar to robot programming languages.

Module VI: Industrial Visit

At least one visit up to Three days to industry in the field of Computer Science & Engineering.

Course Outcomes:
Upon successful completion of this course student will:

- be able to design a knowledge based system,
- be familiar with terminology used in this topical area,
- have read and analyzed important historical and current trends addressing artificial intelligence.

Examination Scheme:

Components	A	CT	S/V/Q/HA	ESE
Weightage (%)	5	15	10	70

A: Attendance, CT: Class Test,:, S/V/Q/HA: Seminar/Viva/Quiz/ Home Assignment, ESE: End Semester Examination;

Text & References:
Text:

- E. Rich and K. Knight, "Artificial intelligence", TMH, 2nd ed., 1992.
- N.J. Nilsson, "Principles of AI", Narosa Publ. House, 1990.
- John J. Craig, "Introduction to Robotics", Addison Wesley publication
- Richard D. Klafter, Thomas A. Chmielewski, Michael Negin, "Robotic Engineering – An integrated approach", PHI Publication
- Tsuneo Yoshikawa, "Foundations of Robotics", PHI Publication

References:

- D.W. Patterson, "Introduction to AI and Expert Systems", PHI, 1992.
- Peter Jackson, "Introduction to Expert Systems", AWP, M.A., 1992.
- R.J. Schalkoff, "Artificial Intelligence - an Engineering Approach", McGraw Hill Int.

Ed., Singapore, 1992.

- M. Sasikumar, S. Ramani, “Rule Based Expert Systems”, Narosa Publishing House, 1994.

ARTIFICIAL INTELLIGENCE LAB

Course Code: CSE 722 **Credit Unit: 01**
Total Hours: 20

Course Objective:
To understand LISP Programming.

SOFTWARE REQUIREMENTS: Lisp online editor

List of experiments/demonstrations:

1 Program to add two numbers in lisp : **(02 Hours)**
2 Program to add first ten numbers in lisp: **(02 Hours)**
3 Program to print ten elements using loop for construct: **(02 Hours)**
4, Program to calculate factorial of a number in lisp: **(02 Hours)**
5 Program of list manipulation functions in lisp: **(02 Hours)**
6 Program to find max and min element of list in lisp: **(01 Hour)**
7 Program of Numeric functions in lisp: **(01 Hour)**
8 Program to print even numbers in list of first 20 numbers in lisp: **(01 Hour)**
9 Program of arrays in lisp: **(01 Hour)**
10 Program to display average of elements of list in lisp: **(01 Hour)**
11 Program to find the area of a circle with given radius by function in lisp: **(01 Hour)**
12 Program of list concatenation functions in lisp: **(01 Hour)**
13 Program to calculate sum of all the numbers of a given list in prolog: **(01 Hour)**
14 Program to define a structure of book and use it in lisp: **(01 Hour)**
15 Program to add two numbers in prolog: **(01 Hour)**

Course Outcomes:
Learner will be able to...

- program in lisp
- create different AI solutions in LISP

Examination Scheme:

IA			EE			
A	**PR**	**Practical Based Test**	**Major Experiment**	**Minor Experiment**	**LR**	**Viva**
5	10	15	35	15	10	10

Note: IA –Internal Assessment, EE- External Exam, A- Attendance PR- Performance, LR – Lab Record, V – Viva.

Text & References:

- Bromley, Hank, and Richard Lamson.*LISP Lore: A Guide to Programming the LISP Machine*, 2nd edition. Kluwer Academic, Boston, 1987. 337 pages. ISBN 0-89-83822-8-9,
- Brooks, Rodney A.*Programming in Common Lisp*. John Wiley & Sons, New York, 1985. 303 pages. ISBN 0-471-81888-7
- Cameron, Robert D., and Anthony H. Dixon, *Symbolic Computing with Lisp*. Prentice-Hall, 1992, 326 pages. ISBN 0-13-877846-9

DATA ANALYTICS

Course Code: CSE 704 **Credit Units: 03**

Total Hours: 30

Course objectives:

- To know the fundamental concepts of big data and analytics.
- To explore tools and practices for working with big data
- To learn about stream computing.
- To know about the research that requires the integration of large amounts of data.

Course Contents:

Module I: Introduction to Big Data: (08 Hours)

Evolution of Big data – Best Practices for Big data Analytics – Big data characteristics – Validating – The Promotion of the Value of Big Data – Big Data Use Cases- Characteristics of Big Data Applications – Perception and Quantification of Value -Understanding Big Data Storage – A General Overview of High-Performance Architecture – HDFS – MapReduce and YARN – Map Reduce Programming Model

Module II: Clustering and Classification: (06 Hours)

Analytical Theory and Methods: Overview of Clustering – K-means – Use Cases – Overview of the Method – Determining the Number of Clusters – Diagnostics – Reasons to Choose and Cautions .- Classification: Decision Trees – Overview of a Decision Tree – The General Algorithm – Decision Tree Algorithms – Evaluating a Decision Tree

Module III: Association and Recommendation System: (08 Hours)

Analytical Theory and Methods: Association Rules – Overview – Apriori Algorithm – Evaluation of Candidate Rules – Applications of Association Rules – Finding Association& finding similarity Introduction to Streams Concepts – Stream Data Model and Architecture – Stream Computing, Sampling Data in a Stream – Filtering Streams – Counting Distinct Elements in a Stream – Estimating moments ,Case Studies – Real Time Sentiment Analysis. Using Graph Analytics for Big Data: Graph Analytics

Module IV: NoSQL Data Management for Big Data and Visualization: (08 Hours)

NoSQL Databases: Schema-less Models‖: Increasing Flexibility for Data Manipulation-Key Value Stores- Document Stores – Tabular Stores – Object Data Stores – Graph Databases Hive – Sharding –- Hbase – Analyzing big data with twitter – Big data for E-Commerce Big data for blogs – Review of Basic Data Analytic Methods using R.

Course Outcomes:

Upon completion of the course, the students will be able to:

- Work with big data tools and its analysis techniques
- Analyze data by utilizing clustering and classification algorithms
- Learn and apply different mining algorithms and recommendation systems for large volumes of data
- Perform analytics on data streams
- Learn NoSQL databases and management.

Examination Scheme:

Components	A	CT	S/V/Q/HA	ESE
Weightage (%)	5	15	10	70

A: Attendance, CT: Class Test,:, S/V/Q/HA: Seminar/Viva/Quiz/ Home Assignment, ESE: End Semester Examination;

Text & References:

Text:

- Anand Rajaraman and Jeffrey David Ullman, "Mining of Massive Datasets", Cambridge University Press, 2012.
- David Loshin, "Big Data Analytics: From Strategic Planning to Enterprise Integration with Tools, Techniques, NoSQL, and Graph", Morgan Kaufmann/El sevier Publishers, 2013.

References:

- EMC Education Services, "Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data", Wiley publishers, 2015.

- Bart Baesens, “Analytics in a Big Data World: The Essential Guide to Data Science and its Applications”, Wiley Publishers, 2015.
- Dietmar Jannach and Markus Zanker, “Recommender Systems: An Introduction”, Cambridge University Press, 2010.
- Kim H. Pries and Robert Dunnigan, “Big Data Analytics: A Practical Guide for Managers ” CRC Press, 2015.
- Jimmy Lin and Chris Dyer, “Data-Intensive Text Processing with MapReduce”, Synthesis Lectures on Human Language Technologies, Vol. 3, No. 1, Pages 1-177, Morgan Claypool publishers, 2010.

MAJOR PROJECT – I

Course Code: NMP 760 **Credit Units: 06**

Course Objective:

The object of Major Project I is to enable the student to extend further the investigative study taken up under NMP 660, either fully theoretical/practical or involving both theoretical and practical work, under the guidance of a Supervisor from the Department alone or jointly with a Supervisor drawn from R&D laboratory/Industry. This is expected to provide a good training for the student(s) in R&D work and technical leadership. The aim is to provide students an opportunity to exercise their creative and innovative qualities in a group project environment and to excite the imagination of aspiring engineers, innovators and technopreneurs.

Methodology:

Topics of project are to be based on the latest trends, verifying engineering concepts /principals and should involve elementary research work. The projects may involve design, fabrications, testing, computer modeling, and analysis of any engineering problem. On completion of the practical training the students are to present a report covering various aspects learnt by them and give a presentation on same.

Course Outcomes:

On successful completion of the course students will be able to:

- Demonstrate a sound technical knowledge of their selected project topic.
- Undertake problem identification, formulation and solution.
- Design engineering solutions to complex problems utilising a systems approach.
- Conduct an engineering project
- Communicate with engineers and the community at large in written an oral forms.
- Demonstrate the knowledge, skills and attitudes of a professional engineer.
- Write comprehensive report on project work.

Examination Scheme:

Literature study/ Fabrication/ Experimentation	40

Written Report	20
Viva	15
Presentation	25
Total	**100**

BIG DATA AND BUSINESS ANALYTICS LAB

Course Code: CSE 825 **Credit Unit: 01**

Total Hours: 20

Course Objectives:

- To explore the fundamental concepts of big data analytics.
- To learn to analyze the big data using intelligent techniques.
- To understand the various search methods and visualization techniques.
- To learn to use various techniques for mining data stream.
- To understand the applications using Map Reduce Concepts.
- To introduce programming tools PIG & HIVE in Hadoop echo system.

Course Contents:

1. To draw and explain Hadoop Architecture and Ecosystem with the help of a case study usingWorkCount example. To define and install Hadoop**: (02 Hours)**
2. To implement the following file management tasks in Hadoop System (HDFS): Adding files and directories, Retrieving files, Deleting files.**: (02 Hours)**
3. To run a basic Word Count MapReduce program to understand MapReduce Paradigm: To count words in a given file, To view the output file, and To calculate execution time. **: (02 Hours)**
4. To perform NoSQL database using mongodb to create, update and insert**: (02 Hours)**
5. To study and implement basic functions and commands in R Programming**: (02 Hours)**
6. To build WordCloud, a text mining method using R for easy to understand and visualization than a table data**: (02 Hours)**
7. Install and Run Hive then use Hive to create, alter, and drop databases, tables, views, functions, and indexes**: (02 Hours)**
8. For a Purchases.txt Dataset, Instead of breaking the sales down by store, give us a sales breakdown by product category across all stores and from that find out**: (02 Hours)**

What is the value of total sales for the following categories?

(a) Toys

(b) Consumer Electronics

9. To implement clustering program using R programming**: (02 Hours)**
10. To find Term Frequency and Inverse Document Frequency (tf-idf) Matrix for Recommendation Systems and Plot TF Using R used**: (02 Hours)**

Course Outcomes:

- Design efficient algorithms for mining the data from large volumes.
- Analyze the HADOOP and Map Reduce technologies associated with big data analytics.
- Explore on Big Data applications Using Pig and Hive.
- Understand the fundamentals of various big data analytics techniques.
- Build a complete business data analytics solution

Examination Scheme:

IA			**EE**			
A	**PR**	**Practical Based Test**	**Major Experiment**	**Minor Experiment**	**LR**	**Viva**
5	10	15	35	15	10	10

Note: IA –Internal Assessment, EE- External Exam, A- Attendance PR- Performance, LR – Lab Record, V – Viva.

References:

- Michael Berthold, David J. Hand, “Intelligent Data Analysis”, Springer, 2007.
- Tom White “Hadoop: The Definitive Guide” Third Edition, O’reilly Media, 2012.

- Chris Eaton, Dirk DeRoos, Tom Deutsch, George Lapis, Paul Zikopoulos, "Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data", McGrawHill Publishing, 2012.
- Anand Rajaraman and Jeffrey David Ullman, "Mining of Massive Datasets", CUP, 2012.
- Bill Franks, "Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics", John Wiley& sons, 2012.
- Glenn J. Myatt, "Making Sense of Data", John Wiley & Sons, 2007.
- Pete Warden, "Big Data Glossary", O'Reilly, 2011.
- Jiawei Han, Micheline Kamber "Data Mining Concepts and Techniques", 2 nd Edition, Elsevier, Reprinted 2008.
- Da Ruan, Guoquing Chen, Etienne E.Kerre, Geert Wets, "Intelligent Data Mining", Springer, 2007.
- Paul Zikopoulos, Dirkde Roos, Krishnan Parasuraman, Thomas Deutsch, James Giles , David Corrigan, "Harness the Power of Big Data The IBM Big Data Platform", Tata McGraw Hill Publications, 2012.

MAJOR PROJECT – II

Course Code: NMP 860 **Credit Units: 09**

Course Objective:

The objective of Major project is to enable the student to take up investigative study in the broad field of Engineering, either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on an individual basis or two/three students in a group, under the guidance of a Supervisor. The aim is to provide students an opportunity to exercise their creative and innovative qualities in a group project environment and to excite the imagination of aspiring engineers, innovators and technopreneurs.

Methodology:

Topics of project are to be based on the latest trends, verifying engineering concepts /principals and should involve elementary research work. The projects may involve design, fabrications, testing, computer modelling, and analysis of any engineering problem. On completion of the project the students are to present a report covering various aspects learnt by them and give a presentation on same.

Course Outcomes:

On successful completion of the course students will be able to:

- Apply critical and creative thinking in the design of engineering projects
- Plan and manage time effectively as a team.
- Consider the business context and commercial positioning of designed devices or systems.
- Apply knowledge of the 'real world' situations that a professional engineer can encounter.
- Use fundamental knowledge and skills in engineering and apply it effectively on a project.
- Design and develop a functional product prototype while working in a team.
- Use various tools and techniques to study existing systems.
- Achieve precision in uses of the tools related to their experiments/fabrication.

- Timely reflect on peers' technical and non-technical learning.
- Orally present and demonstrate your product to peers, academics, general and industry community.
  Write comprehensive report on project work.

Examination Scheme:

Literature study/ Fabrication/ Experimentation	40
Written Report	20
Viva	15
Presentation	25
Total	**100**

AMITY UNIVERSITY
MADHYA PRADESH
(Established by Ritnand Balved Education Foundation)

S.No.	Name of Institute/School	Programme Name	Semester	Course Code	Course Name	1.1.1 Curricula developed and implemented have relevance to the local, national, regional and global developmental needs, which is reflected in the Programme outcomes (POs), Programme Specific Outcomes(PSOs) and Course Outcomes(COs) of the Programmes offered by the University.		
						LOCAL /REGIONAL	NATIONAL	GLOBAL
Amity School of Engineering & Technology								
1	Amity School of Engineering & Technology	BTECH(CSE/IT)	I	CSE 104	Programming for Problem Solving	1	1	1
2				CSE 124	Programming for Problem Solving Lab	1	1	1
3				CSA 101	Introduction to Artificial intelligence and Machine Learning	1	1	1
4			II	CSE 204	Object Oriented Programming Using C++	1	1	
5				CSE 224	Object Oriented Programming Using C++ Lab	1	1	
6				CSI 201	IoT Sensors and Devices	1	1	
7				CSE 202	Data Structures Through C++	1	1	
8			III	CSE 302	Python Programming	1	1	1
9				CSE 322	Python Programming Lab	1	1	1
10				CSA 301	Machine Learning Techniques	1	1	1
11			IV	CSE 403	Java Programming			
14				CSE 404	Operating Systems			
15				CSE 423	Java Programming Lab	1	1	1
16				CSA 401	Neural Networks and Deep Learning	1	1	1
17			V	CSE 503	Introduction to Android Application Development	1	1	1
18				CSE 505	Introduction to Web Technologies	1	1	1
19				CSE 524	Advanced Java Programming Lab	1	1	1
20			VI	CSE 604	Problem Solving Techniques	1	1	

21				CSE 624	Problem Solving Techniques Lab	1	1	
24				CSE 701	Cloud Computing		1	1
25				CSE 721	Cloud Computing Lab		1	1
26			VII	CSE 704	Data Analytics		1	1
27				CSE 724	Data Analytics Lab		1	1
28				CSE 801	Digital Image Processing		1	1
29			VIII	CSE 803	Cryptography & Network Security		1	1
30				CSE 824	ASP .NET LAB	1	1	1
	ASET	CSE Dept.	Total No of Courses relevance to the local, national, regional and global developmental needs					

Course Outcomes

S.No.	Course Code	Course Title	Course Outcomes
	CSE 104	Programming for Problem Solving	**CSE 104.1.** Understand the basic concept of algorithm, flowchart, and programs. **CSE 104.2**. Understand the arithmetic expressions and precedence, Conditional Branching and Loop. **CSE 104.3**. Apply arrays (1-D, 2-D), Character arrays and string operations. **CSE 104.4**. Analyse Basic Sorting Algorithms (Bubble, Insertion and Selection), Finding roots of equations and complexity. **CSE 104.5**. implement functions, structures, pointers and file handling.
	CSE 124	Programming for Problem Solving Lab	**CSE124.1.** Understand the algorithms for simple problems. **CSE124.2**. Analyse the looping statements, arrays and its applications. **CSE124.3**. Implement problems using functions, structures and recursive

			programs. **CSE124.4.** Formulate the problems in pointers. **CSE124.5**. Create the various problems in file handling.
	CSA 101	Introduction to Artificial intelligence and Machine Learning	**CSA101.1**. Demonstrate a fundamental understanding of artificial intelligence (AI) and Machine Learning (ML). **CSA101.2**. Understand the concepts of knowledge management and representation in AI and ML. **CSA101.3.** Apply AI and ML algorithms for various problems. **CSA101.4.** Analyse the computational cognitive modelling and decision-making systems. **CSA101.5**. Build the classical models for various problems like searching, constraint satisfaction.
	CSE 204	Object Oriented Programming Using C++	**CSE204.1** Describe the ideas of streams, classes, functions, data, and objects in the procedural and object-oriented paradigm. **CSE204.2** Apply OOP features to program design and implementation. **CSE204.3** Categorize inheritance with the understanding of early and late binding, generic programming **CSE204.4** Experiment with the concept of function overloading, operator overloading, virtual functions, and polymorphism. **CSE204.5** Develop real-world problems in file handling and exception handling.
	CSE 224	Object Oriented Programming Using C++ Lab	**CSE224.1**. Understand the basics of Programming concepts like structured, unstructured & Object-oriented programming concepts. **CSE224.2**. Implement the Inheritance and functions to various problems. **CSE224.3**. Implement the pointer to class and nested classes. **CSE224.4.** Demonstrate the programs

			for constructors and destructors. **CSE224.5.** Evaluate the problems based on polymorphism and file handling.
	CSI 201	IoT Sensors and Devices	**CSI 201.1** Understand the environmental parameters for IoT. **CSI 201.2** Apply the sensors for various applications of IoT. **CSI 201.3** Understand the concepts of fractional order element. **CSI 201.4** Demonstrate the architecture for various sensors. **CSI 201.5** Evaluate various smart sensors for real world applications.
	CSE 202	Data Structures Through C++	**CSE202.1.** Understand the basic C++ programming concepts, Object oriented programming concepts, Abstract Data Types, Linear and Non-Linear Data structures. **CSE202.2**. Analyze and implement various kinds of searching and sorting techniques. **CSE202.3**. Apply the concept of identifying time complexities for various algorithms. **CSE202.4**. Design programs using a variety of data structures such as stacks, queues, hash tables, binary trees, search trees, heaps, graphs, and B-trees. **CSE202.5**. Reframe appropriate data structures to represent data items in real world problems.
	CSE 302	Python Programming	**CSE302.1**. Understand the basic concept of programing using python. **CSE302.2.** Identify the applications which are based on oops concepts along with Python modules, python package, and File operation. **CSE302.3**. Apply GUI Programming in real world problems with Database. **CSE302.4.** Analyze the complex problems that can be solved using python. **CSE302.5**. Create client-server

			application for real world problems by using Regular Expression, and CGI.
	CSE 322	Python Programming Lab	**CSE 322.1** Understand the basics of python, its functionalities, data types, etc. **CSE 322.2** Analyze the different types of program using Python Programming. **CSE 322.3** Evaluate the real world problems that can be solved using Python. **CSE 322.4** Develop multithreaded applications using Python. **CSE 322.5** Create web application for real world problem.
	CSA 301	Machine Learning Techniques	**CSA301.1.** Understand various machine learning models and differentiate between supervised, unsupervised, semi supervised machine learning approaches. **CSA301.2**. Discuss the concept of feature engineering, decision tree algorithm, identify and overcome the problem of overfitting. **CSA301.3**. Apply the Bayesian concepts to machine learning. **CSA301.4**. Analyze and suggest appropriate supervised machine learning approaches for various types of problems. **CSA301.5**. Analyze and suggest appropriate unsupervised machine learning approaches for various types of problems.
	CSE 403	Java Programming	**CSE403.1** Identify the object oriented programming concepts. **CSE403.2**. Understand the event handling concepts. **CSE403.3**. Formulate Java programs using class and objects that may include basic data types, operators, tokens and control flow constructs. **CSE403.4**. Develop exception handling, multithreaded applications with synchronizations and I/O. **CSE403.5**. Design GUI based applications and develops AWT for web applications.

	CSE 404	Operating Systems	**CSE404.1**. Identify the difference between various operating systems and their working **CSE404.2.** Understand the functionality of file systems. **CSE404.3**. Apply the various scheduling algorithms for process scheduling. **CSE404.4**. Analyze the various deadlock, prevention and avoidance algorithms. **CSE404.5**. Evaluate the various memory management schemes.
	CSE 423	Java Programming Lab	**CSE 423.1** Identify the structure and model of the Java programming language. **CSE 423.2** Understand the object-oriented paradigm with respect to java language. **CSE 423.3** Evaluate user requirements for software functionality required to decide whether the Java programming language can meet user requirements. **CSE 423.4** Propose the use of certain technologies by implementing them in the Java programming language to solve the given problem. **CSE 423.5** Develop software in the Java programming language for existing problems.
	CSA 401	Neural Networks and Deep Learning	**CSA401.1**. Identify the deep learning algorithms which are more appropriate for various types of learning tasks in various domains. **CSA401.2**. Define what is Neural Network and model a Neuron and Express both Artificial Intelligence and Neural Network. **CSA401.3**. Understand the Deep Learning Research techniques and their tools in use. **CSA401.4**. Analyze deep learning algorithms and solve real-world problems. **CSA401.5**. Reframe and evaluate a variety of deep learning tasks.
	CSE 503	Introduction to Android Application Development	**CSE503.1**. Understand Android app development it's Installation and configuration.

				CSE503.2. Design and develop User Interfaces for the Android platform. **CSE503.3**. Implement advanced UI component and exception handling. **CSE503.4**. Apply Java concepts to implement event driven programming in Android app development. **CSE503.5.** Apply Database concepts to Android app development to manage connection with Mysql and SQLite databases.
	CSE 505	Introduction to Web Technologies		**CSE505.1**. Understand different components in web technology and know about CGI and CMS. **CSE505.2**. Develop interactive Web pages using HTML/XHTML and CSS. **CSE505.3** Understand the concepts of Java Script and JQuery. **CSE505.4**. Design and develop websites for user interactions using JavaScript and JQuery. **CSE505.5**. Develop Web applications using PHP.
	CSE 524	Advanced Java Programming Lab		**CSE524.1**. Design and develop Java Applets, Beans programming. **CSE524.2**. Design and structure the Server Side Programming Concepts. **CSE524.3**. Create and design Dynamic web Application. **CSE524.4**. Implement the structured code for JDBC (back end database). **CSE504.5**. Develop and design the enterprise level applications.
	CSE 604	Problem Solving Techniques		**CSE604.1**. Understand the concepts of data structure, data types and array data structure. **CSE604.2**. Implement linked list data structure to solve various problems. **CSE604.3**. Apply concepts and techniques of object oriented programming. **CSE604.4**.Apply various data structure such as stacks, queues, trees and graphs to solve various computing problems

			using programming language. **CSE604.5.** Analyze various tree and graph based techniques to solve problems.
	CSE 624	Problem Solving Techniques Lab	**CSE624.1** Understand various concepts of C Programming and data structure. **CSE624.2** Apply C programming concepts to solve various problems. **CSE624.3** Implement various data structures in programming language. **CSE624.4** Implement various object oriented concepts to solve problems. **CSE624.5** Apply various data structure such as stacks, queues, trees and graphs to solve various computing problems using C/C++ programming language.
	CSE 701	Cloud Computing	**CSE701.1** Understand basic concepts, principles and paradigm of Cloud Computing **CSE701.2** Interpret various Cloud computing models and services. **CSE701.3** Identify the significance of implementing virtualization techniques. **CSE701.4** Understand the need of security in Cloud computing. **CSE 701.5** Understand the concept SOA and cloud-based storage in Cloud computing.
	CSE 721	Cloud Computing Lab	**CSE721.1** Understand the different Cloud Computing environment **CSE721.2** Use appropriate data storage technique on Cloud, based on Cloud application **CSE721.3** Analyze virtualization technology and install virtualization software **CSE721.4** Develop and deploy applications on Cloud. **CSE721.5** Apply security in cloud applications

	CSE 704	Data Analytics	**CSE704.1** *Understand fundamentals of Big Data analytics.* **CSE704.2** *Understand Hadoop framework and Hadoop Distributed File system.* **CSE704.3** *Illustrate the concepts of NoSQL using MongoDB and Cassandra for Big Data* **CSE704.4** *Demonstrate the Map Reduce programming model to process the big data along with Hadoop tools* **CSE704.5** Apply machine Learning algorithms for real world big data., web contents and Social Networks to provide analytics with relevant visualization tools.
	CSE 724	Data Analytics Lab	**CSE724.1** Understand simple applications using Java language. **CSE724.2** Apply map reduce concepts for desired applications. **CSE724.3** Implement programs by making use of Hadoop I/O **CSE724.4** Inspect the big data using programming tools like Pig and Hive **CSE724.6** Analyze file systems such as GFS and HDFS.
	CSE 801	Digital Image Processing	**CSE802.1.** Examine various types of images, intensity transformations and spatial filtering. **CSE802.2**. Understand the methodologies for image segmentation, restoration etc. **CSE802.3**. Apply image processing algorithms in practical applications **CSE802.4**. Understand Fourier transform for image processing in frequency domain **CSE802.5**. Examine Boundary Descriptors, Boundary Descriptors and Patterns and Pattern Classes.
	CSE 803	Cryptography & Network Security	**CSE803.1.** Understand the vulnerabilities in any computing system and hence be able to design a security solution. **CSE803.2**. Identify the security issues

			in the network and resolve it. **CSE803.3**. Discuss security mechanisms using rigorous approaches, including theoretical. **CSE803.4**. Compare and Contrast different IEEE standards and electronic mail security. **CSE803.5**. Understand the penetration testing functionality, Polices and Access Control.
	CSE 824	ASP .NET LAB	**CSE824.1** Develop dynamic web applications, create and consume web services. **CSE824.2** Use appropriate data sources and data bindings in ASP.NET web applications. **CSE824.3** Create multiple web pages for a single application.

AMITY UNIVERSITY

MADHYA PRADESH

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

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

Programme Educational Objectives

BTech(CSE/IT)

PEO - 1: To provide graduating students with core competencies by strengthening their mathematical, scientific and basic engineering fundamentals.

PEO - 2: To train graduates in diversified and applied areas with analysis, design and synthesis of data to create novel products and solutions to meet currentindustrial and societal needs.

PEO - 3: To inculcate high professionalism among the students by providing technical and soft skills with ethical standards.

PEO - 4: To promote collaborative learning and spirit of team work through multidisciplinary projects and diverse professional activities.

PEO - 5: To encourage students for higher studies, research activities and entrepreneurial skills by imparting interactive quality teaching and organizingsymposiums, conferences, seminars, workshops and technical discussions.

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DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Technology (B. Tech.) IT
Academic Year – 2021-22

Programme Outcomes:

[PO.1].**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems

[PO.2]. **Problem analysis**: Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences

[PO.3]. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations

[PO.4]. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions

[PO.5].**Modern tool usage**: Create, select ,and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations

[PO.6]. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues, and the consequent responsibilities relevant to the professional engineering practice

[PO.7]. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development

[PO.8]. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practices

[PO.9]. **Individual and teamwork**: Function effectively as an individual, and as a member or leader in diverse teams, and in multi disciplinary settings

[PO.10].**Communication**:Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation,make effective presentations,and give and receive clear instructions

[PO.11].**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments

[PO.12].**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change

Programme Specific Outcomes

PSO1. Professional Skills: An ability to understand, analyze and develop computer programs in the areas related to algorithms, system software, multimedia, web design, big data analytics, and networking for efficient design of computer-based systems of varying complexity.

PSO2. Problem-solving skills: An ability to apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success.

PSO3. Successful career and Entrepreneurship: An ability to employ modern computer languages, environments, and platforms in creating innovative career paths to be an entrepreneur, and a zest for higher studies.

Note: - Correlation levels 1, 2 and 3 as defined below:
1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
ISEM	MAT101	3	2	3	3	3	-	-	-	2	-	2	3	-	-	-
	CHE101	3	3	3	3	-	3	3	3	3	3	3	3	-	-	-
	CSE104	3	3	2	3	3	2	2	-	3	2	3	3	3	3	3
	BME101	3	2	1		1	2	1	-	2	-	1	3	3	3	3
	CIV101	2	2	2	-	3	-	3	2	-	3	-	3	3	2	1
	CHE121	3	3	3	2	2	3	3	3	3	3	3	3	-	-	-
	CSE124	3	3	2	3	3	2	2	-	3	2	3	3	3	3	3
	BME121	2	2	2	-	3	-	3	2	-	3	-	3	1	2	1
	BCU141	2	2	2	-	3	-	3	2	-	3	-	3	1	2	1
	EVS142	3	3	2	3	3	2	2	-	3	2	3	3	3	3	3
	BSU143	3	2	1		1	2	1	-	2	-	1	3	3	3	3
	FLU144	1	2	1	2	2	-	-	-	-	-	-	-	2	2	2
IISEM	MAT201	3	2	3	3	3	-	-	-	2	-	2	3	-	-	-
	PHY101	3	3	1	2	3	3	2	1	2	1	-	3	-	-	-
	ECE101	3	3	2	3	3	2	2	-	3	2	3	3	3	3	3
	CSE204	3	2	1		1	2	1	-	2	-	1	3	3	3	3
	BME102	3	3	2	3	3	2	2	-	3	2	3	3	3	3	3
	PHY121	3	3	3	2	2	1	1	1	1	3	3	3	-	-	-
	ECE121	3	3	2	3	3	2	2	-	3	2	3	3	3	3	3
	CSE224	3	3	3	2	2	1	1	1	1	3	3	3	-	-	-
	BME122	3	3	2	3	3	2	2	-	3	2	3	3	3	3	3
	BCU241	3	3	3	2	2	1	1	1	1	3	3	3	-	-	-
	EVS242	3	3	2	3	3	2	2	-	3	2	3	3	3	3	3
	BSU243	3	3	3	2	2	1	1	1	1	3	3	3	-	-	-
	FLU244	1	2	1	2	2	-	-	-	-	-	-	-	2	2	2

PROGRAMME ARTICULATION MATRIX																
2nd Year		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
IIISEM	MAT 301	3	2	1	-	-	-	-	-	-	-	-	2	1	1	1
	CSE 202	3	3	3	2	-	-	-	-	-	-	-	3	3	3	3
	CSE 302	3	2	2	-	-	-	-	-	-	-	-	2	3	-	2
	CSE 304	3	2	2	2	-		-	-	1	1	1	2	2	-	-
	ECE 306	3	3	2	-	-	-	-	-	-	-	-	2	3	-	2
	CSE 222	1	2	2	1	1	-	-	-	-	-	-	-	2	-	-
	CSE 322	3	3	2	-	-	-	-	-	-	-	-	2	3	-	2
	CSE 324	1	2	2	1	1	-	-	-	-	-	-	-	2	-	-
	ECE 326	3	2	2	-	-	-	-	-	-	-	-	2	3	-	2
	BCU 341	1	2	1	2	2	-	-	-	-	-	-	-	2	2	2
	BSU 343	3	3	3	2	2	1	1	1	1	3	3	3	-	-	-
	FLU 344	1	2	1	2	2	-	-	-	-	-	-	-	2	2	2
IV SEM	CSE 401	3	2	2	-	2	-	-	3	2	-	-	2	3	-	2
	CSE 402	3	2	2	-	-	-	1	-	-	-	-	2	3	-	2
	ECE 406	3	2	2	-	2	-	1	-	-	-	-	2	3	-	2
	CSE 403	3	2	2	-	2	-	-	3	2	-	-	2	3	-	2
	CSE 404	3	2	2	-	2	-	1	3	2	-	1	2	3	-	2
	ECE 426	3	2	2	1	2	-	-	3	2	-	2	2	3	-	2
	CSE 423	3	2	2	-	-	-	-	-	-	-	-	2	3	-	2
	CSE 424	3	2	2	1	2	-	-	3	2	-	2	2	3	-	2
	BCU 441	3	2	2	1	2	-	-	3	2	-	2	2	3	-	2
	BSU 443	3	2	2	1	2	-	-	3	2	-	2	2	3	-	2
	FLU 444	3	2	2	1	2	-	-	3	2	-	2	2	3	-	2

ROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3

VSEM	CSE 303	3	3	2	3	3	2	2	-	3	2	3	3	3	3	3
	CSE 501	2	2	2	-	3	-	3	2	-	3	-	3	1	2	1
	CSE 503	3	3	1	2	3	3	3	3	3	-	1	3	3	2	2
	CSE 504	2	-	2	-	3	-	3	2	-	3	-	3	3	2	2
	CSE 505	3	3	3	2	2	1	1	-	-	-	-	3	3	3	3
	CSE 323	2	2	2	-	3	-	3	2	-	3	-	3	1	2	1
	CSE 523	3	3	1	2	3	3	3	3	3	-	1	3	3	2	2
	CSE 524	3	3	2	3	3	2	2	-	3	2	3	3	3	3	3
	CSE 525	2	2	2	-	3	-	3	2	-	3	-	3	1	2	1
	BCU 541	3	3	1	2	3	3	3	3	3	-	1	3	3	2	2
	BSU 543	3	2	1		1	2	1	-	2	-	1	3	3	3	3
	FLU 544	1	**1**	1	2	**3**	-	-	-	-	-	-	-	2	2	2
	NPT 550	3	2	1	1	2	-	-	2	-	1	-	-	2	2	2
VISEM	CSE 601	3	3	2	3	3	2	2	-	3	2	3	3	1	2	1
	CSE 602	2	2	2	-	3	-	3	2	-	3	-	3	3	2	2
	CSE 603	3	3	1	2	3	3	3	3	3	-	1	3	3	2	2
	CSE 604	2	2	2	-	3	-	3	2	-	3	-	3	3	3	3
	CSE 623	3	3	1	2	3	3	3	3	3	-	1	3	1	2	1
	CSE 624	2	-	2	-	3	-	3	2	-	3	-	3	3	2	2
	CSE 605	3	3	1	2	3	3	3	3	3	-	1	3	3	3	3
	CSE 606	2	2	2	-	3	-	3	2	-	3	-	3	1	2	1
	CSE 607	3	3	1	2	3	3	3	3	3	-	1	3	3	2	2
	CSE 625	3	3	1	2	3	3	3	3	3	-	1	3	3	2	2
	CSE 626	2	2	2	-	3	-	3	2	-	3	-	3	3	3	3
	CSE 627	3	3	1	2	3	3	3	3	3	-	1	3	1	2	1
	BCU 641	2	2	2	-	3	-	3	2	-	3	-	3	3	2	2
	BSU 643	2	2	2	-	3	-	3	2	-	3	-	3	3	3	3
	FLU 644	3	1	2	3	3	1	1	-	-	3	3	3	3	3	2

	NMP 660	1	2	1	2	2	-	-	-	-	-	-	-	2	2	2

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
VII SEM	CSE 701	3	3	2	3	3	2	2	-	3	2	3	3	3	3	3
	CSE 702	2	2	2	-	3	-	3	2	-	3	-	3	1	2	1
	CSE 703	2	2	2	-	3	-	3	2	-	3	-	3	1	2	1
	CSE 721	3	3	2	3	3	2	2	-	3	2	3	3	3	3	3
	CSE 722	3	2	1		1	2	1	-	2	-	1	3	3	3	3
	CSE 723	3	3	2	3	3	2	2	-	3	2	3	3	3	3	3
	CSE 704	3	3	2	3	3	2	2	-	3	2	3	3	3	3	3
	CSE 705	2	2	2	-	3	-	3	2	-	3	-	3	1	2	1
	CSE 706	2	2	2	-	3	-	3	2	-	3	-	3	1	2	1
	CSE 724	3	3	2	3	3	2	2	-	3	2	3	3	3	3	3
	CSE 725	3	2	1		1	2	1	-	2	-	1	3	3	3	3
	CSE 726	3	2	1		1	2	1	-	2	-	1	3	3	3	3
	CSE 707	3	1	1		1	2	1	-	2	-	1	3	2	3	3
	CSE 708	3	2	1		1	2	2	-	2	-	1	3	3	2	3
	CSE 709	3	2	1		1	1	1	-	2	-	1	3	3	3	3
	BCU 741	2	2	2	-	3	-	3	2	-	3	-	3	3	2	2
	BSU 743	2	2	2	-	3	-	3	2	-	3	-	3	3	3	3
	FLU 744	3	1	2	3	3	1	1	-	-	3	3	3	3	3	2
	NPT 750	1	2	1	2	2	-	-	-	-	-	-	-	2	2	2
	NMP 760	1	2	1	2	2	-	-	-	-	-	-	-	2	2	2
	CSE 801	3	3	2	3	3	2	2	-	3	2	3	3	1	2	1
	CSE 802	2	2	2	-	3	-	3	2	-	3	-	3	3	2	2

VIII SEM	CSE 803	3	3	1	2	3	3	3	3	3	-	1	3	3	2	2
	CSE 821	2	-	2	-	3	-	3	2	-	3	-	3	3	2	2
	CSE 822	3	3	1	2	3	3	3	3	3	-	1	3	3	2	2
	CSE 804	3	1	2	3	3	1	1	-	-	3	3	3	3	3	2
	CSE 805	3	2	1		1	2	1	-	2	-	1	3	3	3	3
	CSE 806	3	1	1		1	2	1	-	2	-	1	3	2	3	3
	CSE 824	3	2	1		1	2	1	-	2	-	1	3	3	3	3
	CSE 825	3	1	1		1	2	1	-	2	-	1	3	2	3	3
	CSE 826	3	2	1		1	2	1	-	2	-	1	3	3	3	3
	BCU 841	3	1	1		1	2	1	-	2	-	1	3	2	3	3
	BSU 843	2	2	2	-	3	-	3	2	-	3	-	3	3	2	2
	FLU 844	1	2	1	2	2	-	-	-	-	-	-	-	2	2	2
	NMP 860	3	2	1	3	1	-	-	-	-	-	-	-	2	3	2

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
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DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

PO Mapping of B.Tech(IT) Program Outcomes with the SDGs

Engineering Programme Outcome (EPO)	Sustainable Development Goal (SDG)
EPO 1: Engineering Knowledge	SDG 4: Quality Education
EPO 2: Problem Analysis	SDG 1: No Poverty
EPO 3: Design/Development of Solutions	SDG 9: Industry, Innovation, and Infrastructure
EPO 4: Investigation	SDG 12: Responsible Consumption and Production
EPO 5: Modern Tool Usage	SDG 8: Decent Work and Economic Growth
EPO 6: The Engineer and Society	SDG 16: Peace, Justice, and Strong Institutions
EPO 7: Environment and Sustainability	SDG 13: Climate Action
EPO 8: Ethics	SDG 16: Peace, Justice, and Strong Institutions
EPO 9: Individual and Team Work	SDG 17: Partnerships for the Goals
EPO 10: Communication	SDG 4: Quality Education
EPO 11: Project Management	SDG 9: Industry, Innovation, and Infrastructure
EPO 12: Lifelong Learning	SDG 4: Quality Education

AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY

B.Tech INFORMATION TECHNOLOGY

2021-2022

Courses Mapped with various National Missions

Sr. No.	Semester	Course Code	Course Name	National Mission
1.	3	CSE 302	Python Programming	Startup India
2.	5	CSE 503	Introduction to Android Application Development	Make in India
3.	5	CSE 525	Web Technologies Lab	Digital India (DI)
4.	6	CSE 603	Internet of Things (IOT)	Startup India
5.	6	CSE 623	Internet of Things (IOT) Lab	Make in India
6.	6	NMP 660	Minor Project	Skill India / Pradhan Mantri Kaushal Vikas Yojana (PMKVY)
7.	7	CSE 702	Artificial Intelligence	National Supercomputing Mission (NSM)
8.	7	CSE 722	Artificial Intelligence Lab	National Supercomputing Mission (NSM)
9.	7	CSE 704	Data Analytics	Make in India
10.	7	NMP 760	Major Project – I	Skill India / Pradhan Mantri Kaushal Vikas Yojana (PMKVY)
11.	8	CSE 825	Big Data and Business Analytics Lab	Atal Innovation Mission (AIM)
12.	8	NMP 860	Major Project-II	Skill India / Pradhan Mantri Kaushal Vikas Yojana (PMKVY)

Syllabus 2021-2022(National Mission)

PYTHON PROGRAMMING

Course Code: CSE 302 **Credit Units: 03**

Total Hours: 30

Course Objective:

To understand the basic concepts such as lists, tuples and dictionary Data structures. To understand concepts like networking and website development using frameworks of python. To understand working third party libraries in python. To understand Scientific programming paradigm.

Course Contents:

Module I: Introduction of Python: (08 Hours)

History of Python, Features of Python Programming, Applications of Python, Use of python, install and Run Python in Windows/Linux, Keyword and Identifier, Statements and Comments, Python Variables, Python Data types, Python Type Conversion,Python I/O and Import, Python Operators, Python Namespace.

Python If-else statements, Python for Loop, while loop, break and continue, String manipulation, List Tuple, dictionaries, pass statement, looping technique, functions, function arguments, recursion,anonymous function, python global, local and Nonlocal.

Module II: Object and Class: (05 Hours)

Python modules, python package, File operation, Python directory, Python exception, Exception Handling, User-Define Exception, Python OOP, class, inheritance, multiple inheritance, operator overloading.

Module III: Regular Expression, CGI and Database: (08 Hours)

Match function, Search function, matching vs. searching, modifier, pattern, Introduction of CGI,CGI Architecture, CGI environment Variable, GET/POST Method, Cookies,File upload, Introduction of Database, connections, Executing queries, transactions, handling errors.

Module IV: GUI Programming: (09 Hours)

Tkinter Programming, Tkinter widgets, Standard Attributes, CGI Programming, Introduction to Web Framework: - Django, Application Lifecycle, creating a Django Project, Creating Admin

Interface, Creating Views, URL Mapping, Template System, Creating Database Models, Interfacing database: - PostgreSQL with the Django Project, Page Redirection, Form Processing.

Module V: Industrial Visit

At least one day visit to local industry in the field of Computer Science & Engineering.

Course Outcomes:

- Ability to create client-server application for real world problems.
- Ability to apply Regular Expression, CGI and Database.
- Ability to apply GUI Programming in real world problems.

Examination Scheme:

Components	**A**	**CT**	**S/V/Q/HA**	**ESE**
Weightage (%)	5	15	10	70

A: Attendance, CT: Class Test,:, S/V/Q/HA: Seminar/Viva/Quiz/ Home Assignment, ESE: End Semester Examination;

Text & References:

Text:

- Core Python Programming , Wesley J. Chun, Publisher: Prentice Hall PTR, First Edition.
- Django Unleashed, Andrew Pinkham, SAMS, second edition
- OpenCV 4, Roy Shilkrot, Packt Pub, third edition
- Elegant Scipy, Juan Nunez, O'Reilly, third edition.

Reference:

- Learning Python, Mark Lutz, O'Reilly. Ltd., Second Edition.
- Python CookBook, Alex Martelli, O'Reilly. Ltd., Third Edition.

INTRODUCTION TO ANDROID APPLICATION DEVELOPMENT

Course Code: CSE 503 **Credit Units: 03**

Total Hours: 30

Course Objective:

This course provides students with the knowledge of fundamentals of Android application; Android Application Development is a hands-on course which is designed for providing essential skills and experiences to the students in developing applications on mobile platform. The hands-on training is effective for beginners and experienced developers for practical Android Code Application.

Course Contents:

Module I: (07 Hours)

Introduction to Android -Overview of Android, What does Android run On – Android Internals, Android for mobile apps development, Environment setup for Android apps Development, Framework - Android- SDK, Eclipse, Emulators – What is an Emulator / Android AVD?

Module II: (09 Hours)

Android activities and GUI design concepts- Design criteria for Android Application: Hardware Design Consideration, Design Demands for Android application, Intent**,** Activity, Activity Lifecycle and Manifest, Creating Application and new Activities, Simple UI -Layouts and Layout, Properties: Introduction to android UI design, Introducing Layouts, GUI objects, Layout design concepts.

Module III: (07 Hours)

Advanced UI Programming: Event driven Programming in Android(Text Edit, Button clicked etc.) Activity Lifecycle of Android, Exception handling

Module IV: (07 Hours)

Menu:Basics, Custom v/s System Menus, Create and Use Handset menu Button (Hardware) Dialog : Creating and Altering Dialogs Toast : List & Adapters Demo Application Development and Launching Basic operation of SQLite Database Android Application Priorities.

Course Outcome:

At the end of the course the participant will. Create a Web Application with server controls.

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

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

Text & References:

Text:

- Professional Android
- Application Development, Reto Meier
- Beginning Android, Mark L Murphy
- Pro Android, S.Y Hashimi & Satya Komatineni

References:

- Android Studio Development Essentials, Neil Smyth
- The Definitive Guide to SQL Lite, Michael Owens
- Building Android Apps, IN EASY STEPS

WEB TECHNOLOGIES LAB

Course Code: CSE 525 **Credit Unit: 01**

Total Hours: 20

Course Objective:

Software Required: Notepad++, Wamp or Xammp Server

Objective: The objective of this lab is to to develop an ability to design and implement static and dynamic website

Course Contents:

Experiments should include but not limited to:

1. Write an HTML code to display your education details in a tabular format**:(01 Hour)**
2. Write an HTML code to display your CV on a web page**:(01 Hour)**
3. Write an HTML code to create a Home page having three links: About Us, Our Services and Contact Us. Create separate web pages for the three links**:(01 Hour)**
4. Write an HTML code to create a login form. On submitting the form, the user should get navigated to a profile page**:(01 Hour)**
5. Write an HTML code to create a Registration Form. On submitting the form, the user should be asked to login with this new credentials**:(01 Hour)**
6. Write an HTML code to create your Institute website, Department Website and Tutorial website for specific subject**:(01 Hour)**
7. Write an HTML code to illustrate the usage of the following: · Ordered List · Unordered List · Definition List**:(01 Hour)**
8. Write an HTML code to create a frameset having header, navigation and content sections**:(01 Hour)**
9. Write an HTML code to demonstrate the usage of inline CSS**:(01 Hour)**

10. Write an HTML code to demonstrate the usage of internal CSS**:(01 Hour)**
11. Write an HTML code to demonstrate the usage of external CSS**:(01 Hour)**
12. Write a Java script to prompt for user's name and display it on the screen**:(01 Hour)**
13. Design HTML form for keeping the students record and validate it using Java script**:(01 Hour)**
14. Write an HTML program to design an entry form of student details and send it to store at database server like SQL, Oracle or MS Access**:(02 Hours)**
15. Write programs using a Java script for Web Page to display browsers information**:(02 Hours)**
16. Create an applet which will have a line, an Oval & a Rectangle**:(01 Hour)**
17. Write a program using PHP and HTML to create a form and display the details entered by the user**:(02 Hours)**

Course Outcomes:

At the end of the course, students should be able to:

- Design and implement dynamic websites with good aesthetic sense of designing and latest technical know-how's.
- Have a Good grounding of Web Application Terminologies, Internet Tools, E – Commerce and other web services.
- Get introduced in the area of Online Game programming.

Examination Scheme:

IA			**EE**			
A	**PR**	**Practical Based Test**	**Major Experiment**	**Minor Experiment**	**LR**	**Viva**
5	10	15	35	15	10	10

Note: IA –InternalAssessment, EE- External Exam, A- Attendance, PR- Performance, LR – Lab Record, V – Viva.

Text & References

- P. J. Deitel, H.M. Deitel, Internet &World Wide Web How To Program, 4/e, Pearson International Edition 2010.
- Robert W Sebesta, Programming the World Wide Web, 7/e, Pearson Education Inc., 2014.
- Bear Bibeault and Yehuda Katz, jQuery in Action, Second Edition, Manning Publications. [Chapter 1] Black Book, Kogent Learning Solutions Inc. 2009.
- Bob Boiko, Content Management Bible, 2nd Edition, Wiley Publishers. [Chapter 1, 2]
- Chris Bates, Web Programming Building Internet Applications, 3/e, Wiley India Edition 2009.
- Dream Tech, Web Technologies: HTML, JS, PHP, Java, JSP, ASP.NET, XML, AJAX,
- Jeffrey C Jackson, Web Technologies A Computer Science Perspective, Pearson Education Inc. 2009.
- Lindsay Bassett, Introduction to JavaScript Object Notation: A To-the-Point Guide to JSON 1st Edition, O'Reilly. [Chapter 1,2,3,4] 7.
- Matthew MacDonald, WordPress: The Missing Manual, 2nd Edition, O'Reilly Medi

INTERNET OF THINGS (IOT)

Course Code: CSE 603 **Credit Units: 02**

Total Hours: 20

Course Objective:

The objective of the course is to:Vision and Introduction to IOT, Understand IOT Market perspective, Data and Knowledge Management and use of Devices in IOT Technology, Understand State of the Art – IOT Architecture, Real World IOT Design Constraints, Industrial Automation and Commercial Building Automation in IOT.

Course Contents:

Module I: Introduction to the Internet of Things: (07 Hours)

Key Features, advantages, disadvantages, Wearable electronics, The Basics of Sensors & Actuators, Introduction to Cloud Computing, IOT Software.

Module II: IoT-An Architectural Overview: (06 Hours)

Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations. IoT Technology Fundamentals- Devices and gateways, Local and wide area networking, Data management, Business processes in IoT, Everything as a Service(XaaS), M2M and IoT Analytics, Knowledge Management.

Module III: The Arduino Platform: (06 Hours)

What is Arduino, Why Arduino, Driver installation, programming &Burning ,Coding in wiring language, Compiling in Arduino, The Arduino Open-Microcontroller Platform, Arduino Basics, Arduino Board Layout & Architecture Reading from Sensors.

Module IV: Arduino Programming & Interface of Sensors: (05 Hours)

LED display, PUSH button to array of LED, Communicating to and from computer, GSM, GPS and Zigbee interfacing ,Interface sensor with arduino, Programming arduino, Reading from sensor, Connecting Arduino with Mobile Device. The Android Mobile OS, Using the Bluetooth Module.

Module V: Projects: (06 Hours)

1. Creating own Android App using MIT App Inventor & controlling Arduino connected devices. 2. Use Arduino to Upload free data from Environmental Sensors to Cloud Server. 3. Receive Automatic Call Notification on Mobile Phone for Burglar Alarm using IoT Platform4.Control Electronic Devices from anywhere across the world using Internet & Mobile App.

Course Outcome:

Ability to develop IOT application.

Examination Scheme:

Components	**A**	**CT**	**S/V/Q/HA**	**ESE**
Weightage (%)	5	15	10	70

A: Attendance, CT: Class Test,:, S/V/Q/HA: Seminar/Viva/Quiz/ Home Assignment, ESE: End Semester Examination;

Text & References:

Text:

- Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, StamatisKarnouskos, David Boyle, **"From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence",** 1st Edition, Academic Press, 2014.

Reference Books:

- Vijay Madisetti and ArshdeepBahga, **"Internet of Things (A Hands-on-Approach)",** 1stEdition, VPT, 2014.
- Francis daCosta, **"Rethinking the Internet of Things: A Scalable Approach to Connecting Everything",** 1st Edition, Apress Publications, 2013

INTERNET OF THINGS (IOT) LAB

Course Code: CSE 623 **Credit Units: 02**

Total Hours: 40

Course Objective:

The objective of the course is to:Vision and Introduction to IOT, Understand IOT Market perspective, Data and Knowledge Management and use of Devices in IOT Technology, Understand State of the Art – IOT Architecture, Real World IOT Design Constraints, Industrial Automation and Commercial Building Automation in IOT.

SOFTWARE REQUIREMENTS: Arduino IDE

List of experiments/demonstrations:

1. Study and Install Python in Eclipse and WAP for data types in python. **(03 Hours)**
2. Write a Program for arithmetic operation in Python. **(03 Hours)**
3. Write a Program for looping statement in Python. **(03 Hours)**
4. Study and Install IDE of Arduino and different types of Arduino. **(03 Hours)**
5. Write program using Arduino IDE for Blink LED. **(03 Hours)**
6. Write Program for RGB LED using Arduino. **(03 Hours)**
7. Study the Temperature sensor and Write Program foe monitor temperature using Arduino **(03 Hours)**
8. Study and Implement RFID, NFC using Arduino. **(03 Hours)**
9. Study and implement MQTT protocol using Arduino. **(04 Hours)**
10. Study and Configure Raspberry Pi. **(04 Hours)**
11. WAP for LED blink using Raspberry Pi. **(04 Hours)**
12. Study and Implement Zigbee Protocol using Arduino / Raspberry Pi.**(04 Hours)**

Course Outcomes:

Ability to develop IOT application

Examination Scheme:

IA			EE			
A	**PR**	**Practical Based Test**	**Major Experiment**	**Minor Experiment**	**LR**	**Viva**

5	10	15	35	15	10	10

Note: IA –InternalAssessment, EE- External Exam, A- Attendance PR- Performance, LR – Lab Record, V – Viva.

Text & References:

Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, StamatisKarnouskos, David Boyle, **"From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence",** 1st Edition, Academic Press, 2014.

MINOR PROJECT

Course Code: NMP 660 **Credit Units: 02**

Course objectives:

The objective of Minor project is to enable the student to take up investigative study in the broad field of Engineering, either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on an individual basis or two/three students in a group, under the guidance of a Supervisor.

Methodology:

Topics of project are to be based on the latest trends, verifying engineering concepts /principals and should involve elementary research work. The projects may involve design, fabrications, testing, computer modeling, and analysis of any engineering problem. On completion of the practical training the students are to present a report covering various aspects learnt by them and give a presentation on same.

Course Outcomes:

At the end of the course, students will demonstrate the ability to:

1 Conceive a problem statement either from rigorous literature survey or from the requirements raised from need analysis.
2 Design, implement and test the prototype/algorithm in order to solve the conceived problem.
3 Write comprehensive report on mini project work.

Examination Scheme:

Literature study/ Fabrication/ Experimentation	40
Written Report	20
Viva	15
Presentation	25
Total	**100**

ARTIFICIAL INTELLIGENCE

Course Code: CSE 702 **Credit Units: 03**
Total Hours: 30

Course Objective:
To develop semantic-based and context-aware systems to acquire, organize process, share and use the knowledge embedded in multimedia content. Research will aim to maximize automation of the complete knowledge lifecycle and achieve semantic interoperability between Web resources and services. The field of Robotics is a multi disciplinary as robots are amazingly complex system comprising mechanical, electrical, electronic H/W and S/W and issues germane to all these.

Course Contents:

Module I: Problem solving and Scope of AI: (7 Hours)
Introduction to Artificial Intelligence. Applications- Games, theorem proving, natural language processing, vision and speech processing, robotics, expert systems. AI techniques- search knowledge, abstraction.

Problem Solving
State space search; Production systems, search space control: depth-first, breadth-first search. Heuristic search - Hill climbing, best-first search, branch and bound. Problem Reduction, Constraint Satisfaction End, Means-End Analysis.

Module II: Knowledge Representation: (6 Hours)
Knowledge Representation issues, first order predicate calculus, Horn Clauses, Resolution, Semantic Nets, Frames, Partitioned Nets, Procedural Vs Declarative knowledge, Forward Vs Backward Reasoning.

Module III: Understanding Natural Languages: (6 Hours)
Introduction to NLP, Basics of Syntactic Processing, Basics of Semantic Analysis, Basics of Parsing techniques, context free and transformational grammars, transition nets, augmented transition nets,Scripts, Basics of grammar free analyzers, Basics of sentence generation, and Basics of translation.

Module IV: (5 Hours)
Expert System: Need and justification for expert systems, knowledge acquisition, Case studies: MYCIN, RI.

Learning: Concept of learning, learning automation, genetic algorithm, learning by inductions, neural nets. **Programming Language:** Introduction to programming Language, LISP and PROLOG.

Module V: Introduction to Robotics: (6 Hours)
Fundamentals of Robotics, Robot Kinematics: Position Analysis, Dynamic Analysis and Forces, Trajectory Planning, Sensors and vision system.
Robot Programming languages & systems: Introduction, the three levels of robot programming, requirements of a robot programming language, problems peculiar to robot programming languages.

Module VI: Industrial Visit

At least one visit up to Three days to industry in the field of Computer Science & Engineering.

Course Outcomes:
Upon successful completion of this course student will:

- be able to design a knowledge based system,
- be familiar with terminology used in this topical area,
- have read and analyzed important historical and current trends addressing artificial intelligence.

Examination Scheme:

Components	A	CT	S/V/Q/HA	ESE
Weightage (%)	5	15	10	70

A: Attendance, CT: Class Test,:, S/V/Q/HA: Seminar/Viva/Quiz/ Home Assignment, ESE: End Semester Examination;

Text & References:
Text:

- E. Rich and K. Knight, "Artificial intelligence", TMH, 2nd ed., 1992.
- N.J. Nilsson, "Principles of AI", Narosa Publ. House, 1990.
- John J. Craig, "Introduction to Robotics", Addison Wesley publication
- Richard D. Klafter, Thomas A. Chmielewski, Michael Negin, "Robotic Engineering – An integrated approach", PHI Publication
- Tsuneo Yoshikawa, "Foundations of Robotics", PHI Publication

References:

- D.W. Patterson, "Introduction to AI and Expert Systems", PHI, 1992.
- Peter Jackson, "Introduction to Expert Systems", AWP, M.A., 1992.
- R.J. Schalkoff, "Artificial Intelligence - an Engineering Approach", McGraw Hill Int.

Ed., Singapore, 1992.

- M. Sasikumar, S. Ramani, “Rule Based Expert Systems”, Narosa Publishing House, 1994.

ARTIFICIAL INTELLIGENCE LAB

Course Code: CSE 722 **Credit Unit: 01**
Total Hours: 20

Course Objective:
To understand LISP Programming.

SOFTWARE REQUIREMENTS: Lisp online editor

List of experiments/demonstrations:

1 Program to add two numbers in lisp : **(02 Hours)**
2 Program to add first ten numbers in lisp: **(02 Hours)**
3 Program to print ten elements using loop for construct: **(02 Hours)**
4, Program to calculate factorial of a number in lisp: **(02 Hours)**
5 Program of list manipulation functions in lisp: **(02 Hours)**
6 Program to find max and min element of list in lisp: **(01 Hour)**
7 Program of Numeric functions in lisp: **(01 Hour)**
8 Program to print even numbers in list of first 20 numbers in lisp: **(01 Hour)**
9 Program of arrays in lisp: **(01 Hour)**
10 Program to display average of elements of list in lisp: **(01 Hour)**
11 Program to find the area of a circle with given radius by function in lisp: **(01 Hour)**
12 Program of list concatenation functions in lisp: **(01 Hour)**
13 Program to calculate sum of all the numbers of a given list in prolog: **(01 Hour)**
14 Program to define a structure of book and use it in lisp: **(01 Hour)**
15 Program to add two numbers in prolog: **(01 Hour)**

Course Outcomes:
Learner will be able to...

- program in lisp
- create different AI solutions in LISP

Examination Scheme:

IA			EE			
A	**PR**	**Practical Based Test**	**Major Experiment**	**Minor Experiment**	**LR**	**Viva**
5	10	15	35	15	10	10

Note: IA –Internal Assessment, EE- External Exam, A- Attendance PR- Performance, LR – Lab Record, V – Viva.

Text & References:

- Bromley, Hank, and Richard Lamson.*LISP Lore: A Guide to Programming the LISP Machine*, 2nd edition. Kluwer Academic, Boston, 1987. 337 pages. ISBN 0-89-83822-8-9,
- Brooks, Rodney A.*Programming in Common Lisp*. John Wiley & Sons, New York, 1985. 303 pages. ISBN 0-471-81888-7
- Cameron, Robert D., and Anthony H. Dixon, *Symbolic Computing with Lisp*. Prentice-Hall, 1992, 326 pages. ISBN 0-13-877846-9

DATA ANALYTICS

Course Code: CSE 704 **Credit Units: 03**

Total Hours: 30

Course objectives:

- To know the fundamental concepts of big data and analytics.
- To explore tools and practices for working with big data
- To learn about stream computing.
- To know about the research that requires the integration of large amounts of data.

Course Contents:

Module I: Introduction to Big Data: (08 Hours)

Evolution of Big data – Best Practices for Big data Analytics – Big data characteristics – Validating – The Promotion of the Value of Big Data – Big Data Use Cases- Characteristics of Big Data Applications – Perception and Quantification of Value -Understanding Big Data Storage – A General Overview of High-Performance Architecture – HDFS – MapReduce and YARN – Map Reduce Programming Model

Module II: Clustering and Classification: (06 Hours)

Analytical Theory and Methods: Overview of Clustering – K-means – Use Cases – Overview of the Method – Determining the Number of Clusters – Diagnostics – Reasons to Choose and Cautions .- Classification: Decision Trees – Overview of a Decision Tree – The General Algorithm – Decision Tree Algorithms – Evaluating a Decision Tree

Module III: Association and Recommendation System: (08 Hours)

Analytical Theory and Methods: Association Rules – Overview – Apriori Algorithm – Evaluation of Candidate Rules – Applications of Association Rules – Finding Association& finding similarity Introduction to Streams Concepts – Stream Data Model and Architecture – Stream Computing, Sampling Data in a Stream – Filtering Streams – Counting Distinct Elements in a Stream – Estimating moments ,Case Studies – Real Time Sentiment Analysis. Using Graph Analytics for Big Data: Graph Analytics

Module IV: NoSQL Data Management for Big Data and Visualization: (08 Hours)

NoSQL Databases: Schema-less Models‖: Increasing Flexibility for Data Manipulation-Key Value Stores- Document Stores – Tabular Stores – Object Data Stores – Graph Databases Hive – Sharding –- Hbase – Analyzing big data with twitter – Big data for E-Commerce Big data for blogs – Review of Basic Data Analytic Methods using R.

Course Outcomes:

Upon completion of the course, the students will be able to:

- Work with big data tools and its analysis techniques
- Analyze data by utilizing clustering and classification algorithms
- Learn and apply different mining algorithms and recommendation systems for large volumes of data
- Perform analytics on data streams
- Learn NoSQL databases and management.

Examination Scheme:

Components	A	CT	S/V/Q/HA	ESE
Weightage (%)	5	15	10	70

A: Attendance, CT: Class Test,:, S/V/Q/HA: Seminar/Viva/Quiz/ Home Assignment, ESE: End Semester Examination;

Text & References:

Text:

- Anand Rajaraman and Jeffrey David Ullman, "Mining of Massive Datasets", Cambridge University Press, 2012.
- David Loshin, "Big Data Analytics: From Strategic Planning to Enterprise Integration with Tools, Techniques, NoSQL, and Graph", Morgan Kaufmann/El sevier Publishers, 2013.

References:

- EMC Education Services, "Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data", Wiley publishers, 2015.

- Bart Baesens, “Analytics in a Big Data World: The Essential Guide to Data Science and its Applications”, Wiley Publishers, 2015.
- Dietmar Jannach and Markus Zanker, “Recommender Systems: An Introduction”, Cambridge University Press, 2010.
- Kim H. Pries and Robert Dunnigan, “Big Data Analytics: A Practical Guide for Managers ” CRC Press, 2015.
- Jimmy Lin and Chris Dyer, “Data-Intensive Text Processing with MapReduce”, Synthesis Lectures on Human Language Technologies, Vol. 3, No. 1, Pages 1-177, Morgan Claypool publishers, 2010.

MAJOR PROJECT – I

Course Code: NMP 760 **Credit Units: 06**

Course Objective:

The object of Major Project I is to enable the student to extend further the investigative study taken up under NMP 660, either fully theoretical/practical or involving both theoretical and practical work, under the guidance of a Supervisor from the Department alone or jointly with a Supervisor drawn from R&D laboratory/Industry. This is expected to provide a good training for the student(s) in R&D work and technical leadership. The aim is to provide students an opportunity to exercise their creative and innovative qualities in a group project environment and to excite the imagination of aspiring engineers, innovators and technopreneurs.

Methodology:

Topics of project are to be based on the latest trends, verifying engineering concepts /principals and should involve elementary research work. The projects may involve design, fabrications, testing, computer modeling, and analysis of any engineering problem. On completion of the practical training the students are to present a report covering various aspects learnt by them and give a presentation on same.

Course Outcomes:

On successful completion of the course students will be able to:

- Demonstrate a sound technical knowledge of their selected project topic.
- Undertake problem identification, formulation and solution.
- Design engineering solutions to complex problems utilising a systems approach.
- Conduct an engineering project
- Communicate with engineers and the community at large in written an oral forms.
- Demonstrate the knowledge, skills and attitudes of a professional engineer.
- Write comprehensive report on project work.

Examination Scheme:

Literature study/ Fabrication/ Experimentation	40

Written Report	20
Viva	15
Presentation	25
Total	**100**

BIG DATA AND BUSINESS ANALYTICS LAB

Course Code: CSE 825 **Credit Unit: 01**

Total Hours: 20

Course Objectives:

- To explore the fundamental concepts of big data analytics.
- To learn to analyze the big data using intelligent techniques.
- To understand the various search methods and visualization techniques.
- To learn to use various techniques for mining data stream.
- To understand the applications using Map Reduce Concepts.
- To introduce programming tools PIG & HIVE in Hadoop echo system.

Course Contents:

1. To draw and explain Hadoop Architecture and Ecosystem with the help of a case study usingWorkCount example. To define and install Hadoop**: (02 Hours)**
2. To implement the following file management tasks in Hadoop System (HDFS): Adding files and directories, Retrieving files, Deleting files.**: (02 Hours)**
3. To run a basic Word Count MapReduce program to understand MapReduce Paradigm: To count words in a given file, To view the output file, and To calculate execution time. **: (02 Hours)**
4. To perform NoSQL database using mongodb to create, update and insert**: (02 Hours)**
5. To study and implement basic functions and commands in R Programming**: (02 Hours)**
6. To build WordCloud, a text mining method using R for easy to understand and visualization than a table data**: (02 Hours)**
7. Install and Run Hive then use Hive to create, alter, and drop databases, tables, views, functions, and indexes**: (02 Hours)**
8. For a Purchases.txt Dataset, Instead of breaking the sales down by store, give us a sales breakdown by product category across all stores and from that find out**: (02 Hours)**

What is the value of total sales for the following categories?

(a) Toys

(b) Consumer Electronics

9. To implement clustering program using R programming**: (02 Hours)**
10. To find Term Frequency and Inverse Document Frequency (tf-idf) Matrix for Recommendation Systems and Plot TF Using R used**: (02 Hours)**

Course Outcomes:

- Design efficient algorithms for mining the data from large volumes.
- Analyze the HADOOP and Map Reduce technologies associated with big data analytics.
- Explore on Big Data applications Using Pig and Hive.
- Understand the fundamentals of various big data analytics techniques.
- Build a complete business data analytics solution

Examination Scheme:

IA			**EE**			
A	**PR**	**Practical Based Test**	**Major Experiment**	**Minor Experiment**	**LR**	**Viva**
5	10	15	35	15	10	10

Note: IA –Internal Assessment, EE- External Exam, A- Attendance PR- Performance, LR – Lab Record, V – Viva.

References:

- Michael Berthold, David J. Hand, “Intelligent Data Analysis”, Springer, 2007.
- Tom White “Hadoop: The Definitive Guide” Third Edition, O’reilly Media, 2012.

- Chris Eaton, Dirk DeRoos, Tom Deutsch, George Lapis, Paul Zikopoulos, "Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data", McGrawHill Publishing, 2012.
- Anand Rajaraman and Jeffrey David Ullman, "Mining of Massive Datasets", CUP, 2012.
- Bill Franks, "Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics", John Wiley& sons, 2012.
- Glenn J. Myatt, "Making Sense of Data", John Wiley & Sons, 2007.
- Pete Warden, "Big Data Glossary", O'Reilly, 2011.
- Jiawei Han, Micheline Kamber "Data Mining Concepts and Techniques", 2 nd Edition, Elsevier, Reprinted 2008.
- Da Ruan, Guoquing Chen, Etienne E.Kerre, Geert Wets, "Intelligent Data Mining", Springer, 2007.
- Paul Zikopoulos, Dirkde Roos, Krishnan Parasuraman, Thomas Deutsch, James Giles , David Corrigan, "Harness the Power of Big Data The IBM Big Data Platform", Tata McGraw Hill Publications, 2012.

MAJOR PROJECT – II

Course Code: NMP 860 **Credit Units: 09**

Course Objective:

The objective of Major project is to enable the student to take up investigative study in the broad field of Engineering, either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on an individual basis or two/three students in a group, under the guidance of a Supervisor. The aim is to provide students an opportunity to exercise their creative and innovative qualities in a group project environment and to excite the imagination of aspiring engineers, innovators and technopreneurs.

Methodology:

Topics of project are to be based on the latest trends, verifying engineering concepts /principals and should involve elementary research work. The projects may involve design, fabrications, testing, computer modelling, and analysis of any engineering problem. On completion of the project the students are to present a report covering various aspects learnt by them and give a presentation on same.

Course Outcomes:

On successful completion of the course students will be able to:

- Apply critical and creative thinking in the design of engineering projects
- Plan and manage time effectively as a team.
- Consider the business context and commercial positioning of designed devices or systems.
- Apply knowledge of the 'real world' situations that a professional engineer can encounter.
- Use fundamental knowledge and skills in engineering and apply it effectively on a project.
- Design and develop a functional product prototype while working in a team.
- Use various tools and techniques to study existing systems.
- Achieve precision in uses of the tools related to their experiments/fabrication.

- Timely reflect on peers' technical and non-technical learning.
- Orally present and demonstrate your product to peers, academics, general and industry community.
  Write comprehensive report on project work.

Examination Scheme:

Literature study/ Fabrication/ Experimentation	40
Written Report	20
Viva	15
Presentation	25
Total	**100**

AMITY UNIVERSITY
MADHYA PRADESH
(Established by Ritnand Balved Education Foundation)

S.No.	Name of Institute/School	Programme Name	Semester	Course Code	Course Name	1.1.1 Curricula developed and implemented have relevance to the local, national, regional and global developmental needs, which is reflected in the Programme outcomes (POs), Programme Specific Outcomes(PSOs) and Course Outcomes(COs) of the Programmes offered by the University.		
						LOCAL /REGIONAL	NATIONAL	GLOBAL
Amity School of Engineering & Technology								
1	Amity School of Engineering & Technology	BTECH(CSE/IT)	I	CSE 104	Programming for Problem Solving	1	1	1
2				CSE 124	Programming for Problem Solving Lab	1	1	1
3				CSA 101	Introduction to Artificial intelligence and Machine Learning	1	1	1
4			II	CSE 204	Object Oriented Programming Using C++	1	1	
5				CSE 224	Object Oriented Programming Using C++ Lab	1	1	
6				CSI 201	IoT Sensors and Devices	1	1	
7				CSE 202	Data Structures Through C++	1	1	
8			III	CSE 302	Python Programming	1	1	1
9				CSE 322	Python Programming Lab	1	1	1
10				CSA 301	Machine Learning Techniques	1	1	1
11			IV	CSE 403	Java Programming			
14				CSE 404	Operating Systems			
15				CSE 423	Java Programming Lab	1	1	1
16				CSA 401	Neural Networks and Deep Learning	1	1	1
17			V	CSE 503	Introduction to Android Application Development	1	1	1
18				CSE 505	Introduction to Web Technologies	1	1	1
19				CSE 524	Advanced Java Programming Lab	1	1	1
20			VI	CSE 604	Problem Solving Techniques	1	1	

21				CSE 624	Problem Solving Techniques Lab	1	1	
24				CSE 701	Cloud Computing		1	1
25				CSE 721	Cloud Computing Lab		1	1
26			VII	CSE 704	Data Analytics		1	1
27				CSE 724	Data Analytics Lab		1	1
28				CSE 801	Digital Image Processing		1	1
29			VIII	CSE 803	Cryptography & Network Security		1	1
30				CSE 824	ASP .NET LAB	1	1	1
	ASET	CSE Dept.	Total No of Courses relevance to the local, national, regional and global developmental needs					

Course Outcomes

S.No.	Course Code	Course Title	Course Outcomes
	CSE 104	Programming for Problem Solving	**CSE 104.1.** Understand the basic concept of algorithm, flowchart, and programs. **CSE 104.2**. Understand the arithmetic expressions and precedence, Conditional Branching and Loop. **CSE 104.3**. Apply arrays (1-D, 2-D), Character arrays and string operations. **CSE 104.4**. Analyse Basic Sorting Algorithms (Bubble, Insertion and Selection), Finding roots of equations and complexity. **CSE 104.5**. implement functions, structures, pointers and file handling.
	CSE 124	Programming for Problem Solving Lab	**CSE124.1.** Understand the algorithms for simple problems. **CSE124.2**. Analyse the looping statements, arrays and its applications. **CSE124.3**. Implement problems using functions, structures and recursive

			programs. **CSE124.4.** Formulate the problems in pointers. **CSE124.5**. Create the various problems in file handling.
	CSA 101	Introduction to Artificial intelligence and Machine Learning	**CSA101.1**. Demonstrate a fundamental understanding of artificial intelligence (AI) and Machine Learning (ML). **CSA101.2**. Understand the concepts of knowledge management and representation in AI and ML. **CSA101.3.** Apply AI and ML algorithms for various problems. **CSA101.4.** Analyse the computational cognitive modelling and decision-making systems. **CSA101.5**. Build the classical models for various problems like searching, constraint satisfaction.
	CSE 204	Object Oriented Programming Using C++	**CSE204.1** Describe the ideas of streams, classes, functions, data, and objects in the procedural and object-oriented paradigm. **CSE204.2** Apply OOP features to program design and implementation. **CSE204.3** Categorize inheritance with the understanding of early and late binding, generic programming **CSE204.4** Experiment with the concept of function overloading, operator overloading, virtual functions, and polymorphism. **CSE204.5** Develop real-world problems in file handling and exception handling.
	CSE 224	Object Oriented Programming Using C++ Lab	**CSE224.1**. Understand the basics of Programming concepts like structured, unstructured & Object-oriented programming concepts. **CSE224.2**. Implement the Inheritance and functions to various problems. **CSE224.3**. Implement the pointer to class and nested classes. **CSE224.4.** Demonstrate the programs

			for constructors and destructors. **CSE224.5.** Evaluate the problems based on polymorphism and file handling.
	CSI 201	IoT Sensors and Devices	**CSI 201.1** Understand the environmental parameters for IoT. **CSI 201.2** Apply the sensors for various applications of IoT. **CSI 201.3** Understand the concepts of fractional order element. **CSI 201.4** Demonstrate the architecture for various sensors. **CSI 201.5** Evaluate various smart sensors for real world applications.
	CSE 202	Data Structures Through C++	**CSE202.1.** Understand the basic C++ programming concepts, Object oriented programming concepts, Abstract Data Types, Linear and Non-Linear Data structures. **CSE202.2**. Analyze and implement various kinds of searching and sorting techniques. **CSE202.3**. Apply the concept of identifying time complexities for various algorithms. **CSE202.4**. Design programs using a variety of data structures such as stacks, queues, hash tables, binary trees, search trees, heaps, graphs, and B-trees. **CSE202.5**. Reframe appropriate data structures to represent data items in real world problems.
	CSE 302	Python Programming	**CSE302.1**. Understand the basic concept of programing using python. **CSE302.2.** Identify the applications which are based on oops concepts along with Python modules, python package, and File operation. **CSE302.3**. Apply GUI Programming in real world problems with Database. **CSE302.4.** Analyze the complex problems that can be solved using python. **CSE302.5**. Create client-server

			application for real world problems by using Regular Expression, and CGI.
	CSE 322	Python Programming Lab	**CSE 322.1** Understand the basics of python, its functionalities, data types, etc. **CSE 322.2** Analyze the different types of program using Python Programming. **CSE 322.3** Evaluate the real world problems that can be solved using Python. **CSE 322.4** Develop multithreaded applications using Python. **CSE 322.5** Create web application for real world problem.
	CSA 301	Machine Learning Techniques	**CSA301.1.** Understand various machine learning models and differentiate between supervised, unsupervised, semi supervised machine learning approaches. **CSA301.2**. Discuss the concept of feature engineering, decision tree algorithm, identify and overcome the problem of overfitting. **CSA301.3**. Apply the Bayesian concepts to machine learning. **CSA301.4**. Analyze and suggest appropriate supervised machine learning approaches for various types of problems. **CSA301.5**. Analyze and suggest appropriate unsupervised machine learning approaches for various types of problems.
	CSE 403	Java Programming	**CSE403.1** Identify the object oriented programming concepts. **CSE403.2**. Understand the event handling concepts. **CSE403.3**. Formulate Java programs using class and objects that may include basic data types, operators, tokens and control flow constructs. **CSE403.4**. Develop exception handling, multithreaded applications with synchronizations and I/O. **CSE403.5**. Design GUI based applications and develops AWT for web applications.

	CSE 404	Operating Systems	**CSE404.1**. Identify the difference between various operating systems and their working **CSE404.2.** Understand the functionality of file systems. **CSE404.3**. Apply the various scheduling algorithms for process scheduling. **CSE404.4**. Analyze the various deadlock, prevention and avoidance algorithms. **CSE404.5**. Evaluate the various memory management schemes.
	CSE 423	Java Programming Lab	**CSE 423.1** Identify the structure and model of the Java programming language. **CSE 423.2** Understand the object-oriented paradigm with respect to java language. **CSE 423.3** Evaluate user requirements for software functionality required to decide whether the Java programming language can meet user requirements. **CSE 423.4** Propose the use of certain technologies by implementing them in the Java programming language to solve the given problem. **CSE 423.5** Develop software in the Java programming language for existing problems.
	CSA 401	Neural Networks and Deep Learning	**CSA401.1**. Identify the deep learning algorithms which are more appropriate for various types of learning tasks in various domains. **CSA401.2**. Define what is Neural Network and model a Neuron and Express both Artificial Intelligence and Neural Network. **CSA401.3**. Understand the Deep Learning Research techniques and their tools in use. **CSA401.4**. Analyze deep learning algorithms and solve real-world problems. **CSA401.5**. Reframe and evaluate a variety of deep learning tasks.
	CSE 503	Introduction to Android Application Development	**CSE503.1**. Understand Android app development it's Installation and configuration.

				CSE503.2. Design and develop User Interfaces for the Android platform. **CSE503.3**. Implement advanced UI component and exception handling. **CSE503.4**. Apply Java concepts to implement event driven programming in Android app development. **CSE503.5.** Apply Database concepts to Android app development to manage connection with Mysql and SQLite databases.
	CSE 505	Introduction to Web Technologies		**CSE505.1**. Understand different components in web technology and know about CGI and CMS. **CSE505.2**. Develop interactive Web pages using HTML/XHTML and CSS. **CSE505.3** Understand the concepts of Java Script and JQuery. **CSE505.4**. Design and develop websites for user interactions using JavaScript and JQuery. **CSE505.5**. Develop Web applications using PHP.
	CSE 524	Advanced Java Programming Lab		**CSE524.1**. Design and develop Java Applets, Beans programming. **CSE524.2**. Design and structure the Server Side Programming Concepts. **CSE524.3**. Create and design Dynamic web Application. **CSE524.4**. Implement the structured code for JDBC (back end database). **CSE504.5**. Develop and design the enterprise level applications.
	CSE 604	Problem Solving Techniques		**CSE604.1**. Understand the concepts of data structure, data types and array data structure. **CSE604.2**. Implement linked list data structure to solve various problems. **CSE604.3**. Apply concepts and techniques of object oriented programming. **CSE604.4**.Apply various data structure such as stacks, queues, trees and graphs to solve various computing problems

			using programming language. **CSE604.5.** Analyze various tree and graph based techniques to solve problems.
	CSE 624	Problem Solving Techniques Lab	**CSE624.1** Understand various concepts of C Programming and data structure. **CSE624.2** Apply C programming concepts to solve various problems. **CSE624.3** Implement various data structures in programming language. **CSE624.4** Implement various object oriented concepts to solve problems. **CSE624.5** Apply various data structure such as stacks, queues, trees and graphs to solve various computing problems using C/C++ programming language.
	CSE 701	Cloud Computing	**CSE701.1** Understand basic concepts, principles and paradigm of Cloud Computing **CSE701.2** Interpret various Cloud computing models and services. **CSE701.3** Identify the significance of implementing virtualization techniques. **CSE701.4** Understand the need of security in Cloud computing. **CSE 701.5** Understand the concept SOA and cloud-based storage in Cloud computing.
	CSE 721	Cloud Computing Lab	**CSE721.1** Understand the different Cloud Computing environment **CSE721.2** Use appropriate data storage technique on Cloud, based on Cloud application **CSE721.3** Analyze virtualization technology and install virtualization software **CSE721.4** Develop and deploy applications on Cloud. **CSE721.5** Apply security in cloud applications

	CSE 704	Data Analytics	**CSE704.1** *Understand fundamentals of Big Data analytics.* **CSE704.2** *Understand Hadoop framework and Hadoop Distributed File system.* **CSE704.3** *Illustrate the concepts of NoSQL using MongoDB and Cassandra for Big Data* **CSE704.4** *Demonstrate the Map Reduce programming model to process the big data along with Hadoop tools* **CSE704.5** Apply machine Learning algorithms for real world big data., web contents and Social Networks to provide analytics with relevant visualization tools.
	CSE 724	Data Analytics Lab	**CSE724.1** Understand simple applications using Java language. **CSE724.2** Apply map reduce concepts for desired applications. **CSE724.3** Implement programs by making use of Hadoop I/O **CSE724.4** Inspect the big data using programming tools like Pig and Hive **CSE724.6** Analyze file systems such as GFS and HDFS.
	CSE 801	Digital Image Processing	**CSE802.1.** Examine various types of images, intensity transformations and spatial filtering. **CSE802.2**. Understand the methodologies for image segmentation, restoration etc. **CSE802.3**. Apply image processing algorithms in practical applications **CSE802.4**. Understand Fourier transform for image processing in frequency domain **CSE802.5**. Examine Boundary Descriptors, Boundary Descriptors and Patterns and Pattern Classes.
	CSE 803	Cryptography & Network Security	**CSE803.1.** Understand the vulnerabilities in any computing system and hence be able to design a security solution. **CSE803.2**. Identify the security issues

			in the network and resolve it. **CSE803.3**. Discuss security mechanisms using rigorous approaches, including theoretical. **CSE803.4**. Compare and Contrast different IEEE standards and electronic mail security. **CSE803.5**. Understand the penetration testing functionality, Polices and Access Control.
	CSE 824	ASP .NET LAB	**CSE824.1** Develop dynamic web applications, create and consume web services. **CSE824.2** Use appropriate data sources and data bindings in ASP.NET web applications. **CSE824.3** Create multiple web pages for a single application.

AMITY UNIVERSITY
MADHYA PRADESH
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AMITY UNIVERSITY MADHYA PRADESH, GWALIOR

AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Programme Educational Objectives
Bachelor of Computer Application
Academic Year – 2021-22

Graduates of the programme BCA will

PEO 1: Graduates will demonstrate proficiency in computer science and application development, enabling them to secure employment in diverse sectors of the information technology industry.

PEO 2: Graduates will develop strong problem-solving and analytical skills to design, implement, and evaluate computer-based solutions.

PEO 3: Graduates will possess effective communication skills and the ability to work collaboratively as part of a team.

PEO 4: Graduates will adhere to ethical principles and professional standards, recognizing the social implications of computing, and demonstrating responsibility in their roles.

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AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Computer Application B.C.A.

Academic Year – 2021-22

Programme Outcomes:

[PO.1].Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems

[PO.2]. Problem analysis: Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences

[PO.3]. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations

[PO.4]. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions

[PO.5].Modern tool usage: Create, select ,and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations

[PO.6]. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues, and the consequent responsibilities relevant to the professional engineering practice

[PO.7]. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development

[PO.8]. Ethics: Apply ethical principles and commit to professional ethics and responsibilities

and norms of the engineering practices

[PO.9]. **Individual and teamwork**: Function effectively as an individual, and as a member or leader in diverse teams, and in multi disciplinary settings

[PO.10].**Communication**:Communicateeffectivelyoncomplexengineeringactivitieswiththeengineeringcommunity and with society at large, such as, being able to comprehend and write effective reports anddesigndocumentation,makeeffectivepresentations,andgiveandreceiveclearinstructions

[PO.11].**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multi disciplinary environments

[PO.12].**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change

Programme Specific Outcomes

PSO1.Professional Skills: An ability to understand, analyze and develop computer programs in the areas related to algorithms, system software, multimedia, web design, big data analytics, and networking for efficient design of computer-based systems of varying complexity.

PSO2. Problem-solving skills: An ability to apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success.

PSO3. Successful career and Entrepreneurship: An ability to employ modern computer languages, environments, and platforms in creating innovative career paths to be an entrepreneur, and a zest for higher studies

Note: - Correlation levels 1, 2 and 3 as defined below:
1: Slight (Low), 2: Moderate (Medium) and 3 : Substantial (High)

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I SEM	MAT102	3	2	3	3	3	-	-	-	2	-	2	3	-	-	-
	CSE104	2	1	3	2	2	3	3	1	3	3	2	3	2	3	2
	BCA101	3	2	3	3	2	3	3	3	2	3	3	3	2	2	-
	ECE106	2	3	1	2	3	3	2	1	2	1	-	3	2	-	-
	BCH110	2	2	2	-	3	-	3	2	-	3	-	3	3	2	1
	BCA121	3	3	3	2	2	3	3	3	3	3	3	3	-	-	-
	CSE124	2	1	3	2	2	3	3	1	3	3	2	3	2	3	2
	ECE126	2	3	1	2	3	3	2	1	2	1	-	3	2	-	-
	BCU141	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EVS142	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BSU143	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FLU144	1	2	1	2	2	-	-	-	-	-	-	-	2	2	2
II SEM	MAT203	3	2	3	1	3	-	2	-	2	-	2	3	-	-	-
	CSE204	3	3	1	2	3	3	2	1	2	1	-	3	-	-	-
	BCA201	3	2	3	2	2	3	1	3	2	3	3	3	2	3	1
	BME103	2	3	-	1	2	3	2	1	2	1	-	3	1	2	-
	BCA202	2	2	3	2	2	3	1	3	3	3	3	3	2	2	1
	CSE224	2	3	1	2	3	3	2	1	2	1	-	3	2	-	-
	BCA222	3	2	3	2	2	3	1	3	3	3	3	3	2	2	1
	BCU241															
	EVS242															
	BSU243															
	FLU244	1	2	1	2	2	-	-	-	-	-	-	-	2	2	2

PROGRAMME ARTICULATION MATRIX																
2nd Year		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
III SEM	MAT302	3	2	1	-	-	-	-	-	-	-	-	2	1	1	1
	CSE202	3	3	3	2	2	3	1	3	3	2	2	3	3	3	3
	CSE304	3	2	2	2	3	1	3	2	2	3	2	2	3	-	2

	CSE 302	3	2	2	2	2	3	1	2	1	1	1	2	2	-	-
	BCA301	3	3	2	-	1	3	2	3	3	2	3	2	3	-	2
	CSE222	2	2	2	1	1	2	2	3	1	2	2	2	2	-	-
	CSE324	3	2	2	2	3	1	3	2	2	3	2	2	3	1	2
	CSE322	3	2	2	1	1	2	2	3	1	2	2	2	2	3	2
	BCU341															
	BSU343															
	FLU344	1	2	1	2	2	-	-	-	-	-	-	-	2	2	2
	NPT360	3	2	1	2	2	3	3	2	3	-	1	3	3	2	3
IV SEM	MAT 401	3	2	2	-	2	-	-	3	2	-	-	2	3	-	2
	BCA 401	3	2	2	-	-	-	1	-	-	-	-	2	3	-	2
	CSE 403	3	2	2	-	2	-	1	-	-	-	-	2	3	-	2
	BCA 402	3	2	2	-	2	-	-	3	2	-	-	2	3	-	2
	BCA 403	3	2	2	-	2	-	1	3	2	-	1	2	3	-	2
	BCA 423	3	2	2	1	2	-	-	3	2	-	2	2	3	-	2
	CSE 423	3	2	2	-	-	-	-	-	-	-	-	2	3	-	2
	BCU 441	3	2	2	1	2	-	-	3	2	-	2	2	3	-	2
	BSU 443	3	2	2	1	2	-	-	3	2	-	2	2	3	-	2
	FLU 444	1	2	1	2	2	-	-	-	-	-	-	-	2	2	2

ROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
V SEM	CSE 303	3	3	2	3	3	2	2	-	3	2	3	3	3	3	3
	BCA 501	2	2	2	-	3	-	3	2	-	3	-	3	1	2	1
	BCA 502	3	3	1	2	3	3	3	3	3	-	1	3	3	2	2
	CSE 323	2	-	2	-	3	-	3	2	-	3	-	3	3	2	2

	BCA 521	3	3	3	2	2	1	1	-	-	-	-	3	3	3	3
	BCA 522	2	2	2	-	3	-	3	2	-	3	-	3	1	2	1
	BCU 541															
	BSU 543	3	3	2	3	3	2	2	-	3	2	3	3	3	3	3
	FLU 544	1	2	1	2	2	-	-	-	-	-	-	-	2	2	2
	NPT 560	3	2	1	3	3	3	3	3	3	-	1	3	3	2	2
	NMP 561	3	3	1	2	3	3	3	3	3	-	1	3	3	2	2
	NPT550	**3**	**2**	**1**		**1**	**2**	**1**	**-**	**2**	**-**	**1**	**3**	**3**	**3**	**3**
VI SEM	BCA 602	3	3	2	3	3	2	2	-	3	2	3	3	1	2	1
	BCA 603	2	2	2	-	3	-	3	2	-	3	-	3	3	2	2
	CSE 605	3	3	1	2	3	3	3	3	3	-	1	3	3	2	2
	BCA 622	2	2	2	-	3	-	3	2	-	3	-	3	3	3	3
	BCA 623	3	3	1	2	3	3	3	3	3	-	1	3	1	2	1
	CSE 625	2	-	2	-	3	-	3	2	-	3	-	3	3	2	2
	BCU 641	3	3	1	2	3	3	3	3	3	-	1	3	3	3	3
	BSU 643	2	2	2	-	3	-	3	2	-	3	-	3	1	2	1
	FLU 644	1	2	1	2	2	-	-	-	-	-	-	-	2	2	2
	NMP661	3	1	2	3	3	1	1	-	-	3	3	3	3	3	2

Amity University Madhya Pradesh

Amity School of Engineering and Technology

PO Mapping of BCA with the SDGs

Programme Outcome (EPO)	**Sustainable Development Goal (SDG)**
PO 1: Engineering Knowledge	SDG 4: Quality Education
PO 2: Problem Analysis	SDG 1: No Poverty
PO 3: Design/Development of Solutions	SDG 9: Industry, Innovation, and Infrastructure
PO 4: Investigation	SDG 12: Responsible Consumption and Production
PO 5: Modern Tool Usage	SDG 8: Decent Work and Economic Growth
PO 6: The Engineer and Society	SDG 16: Peace, Justice, and Strong Institutions
PO 7: Environment and Sustainability	SDG 13: Climate Action
PO 8: Ethics	SDG 16: Peace, Justice, and Strong Institutions
PO 9: Individual and Team Work	SDG 17: Partnerships for the Goals
PO 10: Communication	SDG 4: Quality Education
PO 11: Project Management	SDG 9: Industry, Innovation, and Infrastructure
PO 12: Lifelong Learning	SDG 4: Quality Education

Amity University Madhya Pradesh

Amity School of Engineering and Technology

Courses Mapped with various National Missions

Sr. No.	Name of School	Program Name	Semester	Course Code	Course Name	National Mission
1	Amity School Of Engineering and Technology (ASET)	BCA	1	BCA 120	C Programming Lab	Make in India
2			3	BCA 302	Object Oriented Programming Concepts Using C++	Atal Innovation Mission (AIM)
3			4	BCA 420	Computer Graphics & Introduction to Dotnet Framework with Visual Basic Lab	Startup India
4			5	BCA 502	Java Programming	Startup India
5			5	BCA 560	Summer Project – II	Skill India / Pradhan Mantri Kaushal Vikas Yojana (PMKVY)
6			6	BCA 602	Web Technologies	National Mission on Education through ICT (NMEICT)
7			6	BCA 660	Project Work	Skill India / Pradhan Mantri Kaushal Vikas Yojana (PMKVY)

SUMMER PROJECT – I

Course Code: NPT 360 **Credit Units: 03**

Course Objective:

This course will enable the students to explore the preferred field of specialization and develop analytical / hardware / software / experimental / observation skills. It will help them to manage the technical content and work. It will also help them to prepare and present technical report.

Methodology:

Practical training is based on the theoretical subjects studied by students. It can be arranged within the college or in any related industrial unit. The students are to learn various industrial, technical and administrative processes followed in the industry. In case of on-campus training the students will be given specific task of fabrication/assembly/testing/analysis. On completion of the practical training the students are to present a report covering various aspects learnt by them and give a presentation on same.

Examination Scheme:

Feedback from industry/work place	20
Training Report	40
Viva	15
Presentation	25
Total	**100**

Course Outcomes:

After successful completion of the course, the students will be able to

1. Explore the preferred field of specialization and develop analytical / hardware / software / experimental / observation skills.
2. Manage the technical content and work.
3. Learn the various administrative process followed in industry.

Prepare and present technical report.

SUMMER PROJECT – II

Course Code: NPT 560 **Credit Units: 06**

Course objectives:

1. To expose students to the 'real' working environment and get acquainted with the organization structure, business operations and administrative functions.
2. To have hands-on experience in the students' related field so that they can relate and reinforce what has been taught at the university.
3. To promote cooperation and to develop synergetic collaboration between industry and the university in promoting a knowledgeable society.
4. To set the stage for future recruitment by potential employers.

Methodology:

Practical training is based on the theoretical subjects studied by students. It can be arranged within the college or in any related industrial unit. The students are to learn various industrial, technical and administrative processes followed in the industry. In case of on-campus training the students will be given specific task of fabrication/assembly/testing/analysis. On completion of the practical training the students are to present a report covering various aspects learnt by them and give a presentation on same.

Examination Scheme:

Feedback from industry/work place	20
Training Report	40
Viva	15
Presentation	25
Total	**100**

Course Outcomes:

After successful completion of the course, the students will be able to

1. Explore the preferred field of specialization and develop analytical / hardware / software / experimental / observation skills.
2. Manage the technical content and work.
3. Learn the various administrative process followed in industry.

Prepare and present technical report.

MULTIMEDIA LAB

Course Code: BCA 621 **Credit Unit: 01**
Total Hours: 20

Course Objective:

The objective of the course is to give an overview of different multimedia technologies like audio and video including multimedia devices. The course also includes some practical sessions on these technologies.

SOFTWARE REQUIREMENTS: Photoshop tool.

Course Contents :

List of Programmes:

1. Create the animation of flying bird in flash. **(2 Hours)**
2. Create the animation of walking man with his arms and legs moving.(**2 Hours)**
3. Create the animation of Virtual typewriter**.(2 Hours)**
4. Show a example of Masking in flash**.(2 Hours)**
5. Make an animation of bouncing ball using flash.(**2 Hours)**
6. Create the animation of moving Car in flash**.(2 Hours)**
7. Make the blinking colorful text in flash**.(2 Hours)**
8. Make a scenery showing rising sun in it using flash. **(2 Hours)**
9. Show a flower growing in a flower pot. **(2 Hours)**
10. Case study as per the latest multimedia based application. (**2 Hours)**

Course Outcomes:

- Ability to create animation for different objects using multimedia devices.
- Ability to perform audio and video compression.
- Ability to create multimedia based application for real world problem.

Examination Scheme:

IA			EE			
A	**PR**	**Practical Based Test**	**Major Experiment**	**Minor Experiment**	**LR**	**Viva**
5	10	15	35	15	10	10

Note: IA –InternalAssessment, EE- External Exam, A- Attendance, PR- Performance, LR – Lab Record, V – Viva.

Text & References:

- Multimedia systems John F. Koegal Buford Addison- Wesley

MAJOR PROJECT

Course Code: NMP 661 **Credit Units: 09**

Course Objectives:

The object of Major Project is to enable the student to extend further the investigative study taken up ,either fully theoretical/practical or involving both theoretical and practical work, under the guidance of a Supervisor from the Department alone or jointly with a Supervisor drawn from R&D laboratory/Industry. This is expected to provide a good training for the student(s) in R&D work and technical leadership. The aim is to provide students an opportunity to exercise their creative and innovative qualities in a group project environment and to excite the imagination of aspiring engineers, innovators and technopreneurs.

Methodology:

Topics of project are to be based on the latest trends, verifying engineering concepts /principals and should involve elementary research work. The projects may involve design, fabrications, testing, computer modeling, and analysis of any engineering problem. On completion of the practical training the students are to present a report covering various aspects learnt by them and give a presentation on same.

Examination Scheme:

Literature study/ Fabrication/ Experimentation	40
Written Report	20
Viva	15
Presentation	25
Total	**100**

Course Outcomes:

On successful completion of the course students will be able to:

1. Demonstrate a sound technical knowledge of their selected project topic.
2. Undertake problem identification, formulation and solution.
3. Design engineering solutions to complex problems utilising a systems approach.
4. Conduct an engineering project
5. Communicate with engineers and the community at large in written an oral forms.
6. Demonstrate the knowledge, skills and attitudes of a professional engineer.
7. Write comprehensive report on project work.

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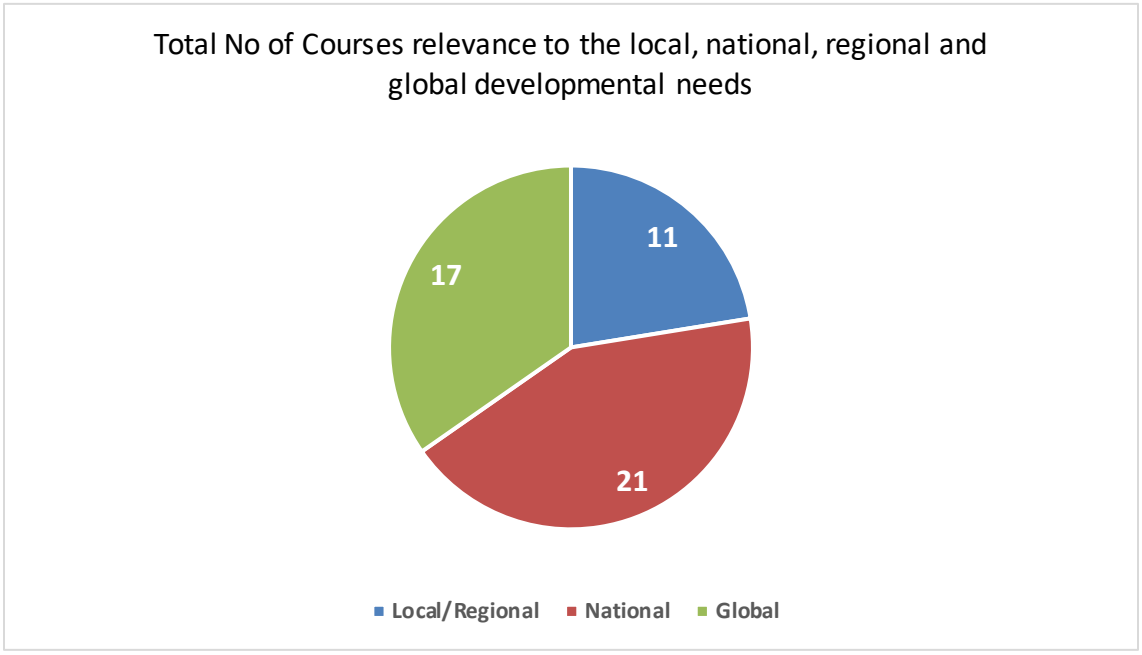
S.No	Name of Institute/School	Programme Name	Semester	Course Code	Course Name	1.1.1 Curricula developed and implemented have relevance to the local, national, regional and global developmental needs, which is reflected in the Programme outcomes (POs), Programme Specific Outcomes(PSOs) and Course Outcomes(COs) of the Programmes offered by the University.		
						LOCAL /REGIONAL	NATIONAL	GLOBAL
Amity School of Engineering & Technolgy								
1	Amity School of Engineering & Technology	BCA	I	BCA 101	Computer Fundamentals and Office Automation	1	1	1
2				CSE 104	Programming for Problem Solving	1	1	1
3				BCH 110	Principles of Management	1	1	
4			II	CSE 204	Object Oriented Programming Using C++		1	1
5				BCA 202	Web Design & Development	1	1	1
6			III	CSE 202	Data Structures through C++		1	1
7				CSE 304	Database Management Systems		1	1
8				CSE 302	Python Programming		1	1
9				NPT 360	Summer Project – I (Evaluation)	1	1	
10			IV	BCA 401	Computer Networks		1	1
11				CSE 403	Java Programming		1	1
12				BCA 402	Quantitative Techniques	1	1	1
13				BCA 403	Programming Techniques for Problem Solving	1	1	1
14			V	CSE 303	Design and Analysis of Algorithms		1	1
15				BCA 501	Internet of Things and Applications	1	1	1
16				BCA 502	Android Application Development		1	1
17				NPT 560	Summer Project – II (Evaluation)	1	1	
18				NMP 561	Minor Project	1	1	
19			VI	BCA 602	Artificial Intelligence and its Applications		1	1
20				CSE 605	Software Engineering		1	1
21				NMP 661	Major Project	1	1	1
	ASET	CSE Dep.	Total No of Courses relevance to the local, national, regional and global developmental needs			**11**	**21**	**17**


Total No of Courses relevance to the local, national, regional and global developmental needs
11
21
17
Local/Regional
National
Global

Course Outcomes

FIRST SEMESTER

S.No.	Course Code	Course Title	Course Outcomes
1	BCA 101	Computer Fundamentals and Office Automation	• Making the students understand and learn the basics of computer. • To make familiar with the part and functions of computer, types, functioning, usages, limitations and benefits. • To know about software, its type and its uses. • To familiarize student with various office automation software.
2	CSE 104	Programming for Problem Solving	• To formulate simple algorithms for arithmetic and logical problems. • To translate the algorithms to programs (in C language). • To test and execute the programs and correct syntax and logical error • To implement conditional branching, iteration and recursion. • To decompose a problem into functions and synthesize a complete program using divide and conquer approach. • To use arrays, pointers and structures to formulate algorithms and programs
3	BCH 110	Principles of Management	• Understand management principles for organizational setup. • Understand the types of organizational structures and design. • Design and implement the management processes for specific organization. • Understand the relevance of computer applications in different functional areas of management.

SECOND SEMESTER

S.No.	Course Code	Course Title	Course Outcomes
1	CSE 204	Object Oriented Programming Using C++	• To apply concepts of classes and objects in real world scenarios. • Understand object-oriented programming features in C++, • Apply these features to program design and implementation, • Understand object-oriented concepts and how they are supported by C++, • Gain some practical experience of C++.
2	BCA 202	Web Design & Development	• Understand different components in web technology and to know about CGI and CMS. • Develop interactive Web pages using HTML/XHTML. • Present a professional document using Cascaded

			Style Sheets. • Construct websites for user interactions using JavaScript and JQuery.

THIRD SEMESTER

S.No.	Course Code	Course Title	Course Outcomes
1	CSE 202	Data Structures through C++	• Ability to choose appropriate data structures to represent data items in real world problems. • Ability to analyze the time and space complexities of algorithms. • Ability to design programs using a variety of data structures such as stacks, queues, hash tables, binary trees, search trees, heaps, graphs, and B-trees. • Able to analyze and implement various kinds of searching and sorting techniques.
2	CSE 304	Database Management Systems	• Describe DBMS architecture, physical and logical database designs, database modeling, relational, hierarchical and network models. • Identify basic database storage structures and access techniques such as file organizations, indexing methods including B-tree, and hashing. • Learn and apply Structured query language (SQL) for database definition and database manipulation. • Demonstrate an understanding of normalization theory and apply such knowledge to the normalization of a database. • Understand various transaction processing, concurrency control mechanisms and database protection mechanisms.
3	CSE 302	Python Programming	• Ability to create client-server application for real world problems. • Ability to apply Regular Expression, CGI and Database. • Ability to apply GUI Programming in real world problems.
4	NPT 360	Summer Project – I (Evaluation)	• Ability to apply knowledge of computer applications in solving real world problems and to build a new system.

FOURTH SEMESTER

S.No.	Course Code	Course Title	Course Outcomes
1	BCA 401	Computer Networks	• The objective of the course is to provide knowledge of various multiplexing techniques and communication medias for transmission of data. • Learn how computer network hardware and software operate. • Investigate the fundamental issues driving network design Learn about dominant network technologies, routing techniques, error detection and correction techniques, various protocols and their working.
2	CSE 403	Java Programming	• Students can perform object oriented programming solution and develop solutions to problems demonstrating usage of control structure, modularity, classes, I/O and the scope of the class members • Students can demonstrate adeptness of object oriented programming in developing solution to problems demonstrating usage of data abstraction, encapsulation and inheritance • Students can demonstrate ability to implement one or more patterns involving dynamic binding and utilization of polymorphism in the solution of problems
3	BCA 402	Quantitative Techniques	• Understand the basic concepts of QUANTITATIVE ABILITY • Understand the basic concepts of LOGICAL REASONING Skills • Acquire satisfactory competency in use of VERBAL REASONING • Solve campus placements aptitude papers covering Quantitative Ability, Logical Reasoning and Verbal Ability. • Compete in various competitive exams like CAT, CMAT, GATE, GRE, GATE, UPSC, GPSC etc
4	BCA 403	Programming Techniques for Problem Solving	• Able to understand the concepts of data structure, data type and array data structure. • Able to implement linked list data structure to solve various problems. • Able to understand and apply various data structure such as stacks, queues, trees and graphs to solve various computing problems using C/C++ programming language. • Understand DBMS and SQL Concepts • To apply concepts and techniques for implementation.

FIFTH SEMESTER

S.No.	Course Code	Course Title	Course Outcomes
1	CSE 303	Design and Analysis of Algorithms	• Analyze the asymptotic performance of algorithms. • Write rigorous correctness proofs for algorithms. • Demonstrate a familiarity with major algorithms and data structures. • Apply important algorithmic design paradigms and methods of analysis. • Synthesize efficient algorithms in common engineering design situations
2	BCA 501	Internet of Things and Applications	• Ability to develop IoT application.
3	BCA 502	Android Application Development	• At the end of the course the participant will. Create a Web Application with server controls
4	NPT 560	Summer Project – II (Evaluation)	• Explore the preferred field of specialization and develop analytical/ hardware / software / experimental / observation skills. • Manage the technical content and work. • Learn the various administrative process followed in industry.
5	NMP 561	Minor Project	• Demonstrate a sound technical knowledge of their selected project topic. • Undertake problem identification, formulation and solution. • Design engineering solutions to complex problems utilising a systems approach. • Conduct an engineering project • Communicate with engineers and the community at large in written an oral forms. • Demonstrate the knowledge, skills and attitudes of a professional engineer. • Write comprehensive report on project work.

SIXTH SEMESTER

S.No.	Course Code	Course Title	Course Outcomes
1	BCA 602	Artificial Intelligence and its Applications	Upon successful completion of this course student will: • be able to design a knowledge based system, • be familiar with terminology used in this topical area, • have read and analyzed important historical and current trends addressing artificial intelligence.
2	CSE 605	Software Engineering	• Ability to use the modeling approaches for the designing of software. • Ability to use the testing tools and designing of test cases for testing. • Ability to use the Unified modeling language (UML) for the designing of software product.
3	NMP 661	Major Project	• Demonstrate a sound technical knowledge of their selected project topic. • Undertake problem identification, formulation and solution. • Design engineering solutions to complex problems utilising a systems approach. • Conduct an engineering project • Communicate with engineers and the community at large in written an oral forms. • Demonstrate the knowledge, skills and attitudes of a professional engineer. • Write comprehensive report on project work.

AMITY UNIVERSITY

MADHYA PRADESH

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

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Programme Educational Objectives

Master of Computer Applications

Graduates of the programme MCA will

PEO 1: Graduates will demonstrate proficiency in computer science and application development, enabling them to secure employment in diverse sectors of the information technology industry.

PEO 2: Graduates will develop strong problem-solving and analytical skills to design, implement, and evaluate computer-based solutions.

PEO 3: Graduates will possess effective communication skills and the ability to work collaboratively as part of a team.

PEO 4: Graduates will adhere to ethical principles and professional standards, recognizing the social implications of computing, and demonstrating responsibility in their roles.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Master of Computer Application M.C.A., Academic Year – 2022-23

Programme Outcomes:

[PO.1].Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems

[PO.2]. Problem analysis: Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences

[PO.3]. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations

[PO.4]. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions

[PO.5]. Modern tool usage: Create, select ,and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations

[PO.6]. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues, and the consequent responsibilities relevant to the professional engineering practice

[PO.7]. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development

[PO.8]. Ethics: Apply ethical principles and commit to professional ethics and responsibilities

and norms of the engineering practices

[PO.9]. **Individual and teamwork**: Function effectively as an individual, and as a member or leader in diverse teams, and in multi-disciplinary settings

[PO.10]. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

[PO.11]. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multi-disciplinary environments.

[PO.12]. **Life-long learning**: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes

PSO1.Professional Skills: An ability to understand, analyze and develop computer programs in the areas related to algorithms, system software, multimedia, web design, big data analytics, and networking for efficient design of computer-based systems of varying complexity.

PSO2. Problem-solving skills: An ability to apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success.

PSO3. Successful career and Entrepreneurship: An ability to employ modern computer languages, environments, and platforms in creating innovative career paths to be an entrepreneur, and a zest for higher studies

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

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

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I SEM	MCA 101	3	2	3	3	3	-	-	-	2	-	2	3	-	-	-
	MCA 102	2	1	3	2	2	3	3	1	3	3	2	3	2	3	2
	MCA 103	3	2	3	3	2	3	3	3	2	3	3	3	2	2	-
	MCA 104	2	3	1	2	3	3	2	1	2	1	-	3	2	-	-
	MCA 105	2	2	2	-	3	-	3	2	-	3	-	3	3	2	1
	MCA 124	3	3	3	2	2	3	3	3	3	3	3	3	-	-	-
	MCA 125	2	1	3	2	2	3	3	1	3	3	2	3	2	3	2
	BCP 141	2	3	1	2	3	3	2	1	2	1	-	3	2	-	-
	BSP 143	1	2	2	2	-	-	-	-	-	-	-	2	2	-	-
	FLP 144	1	2	1	2	2	-	-	-	-	-	-	-	2	2	2
	MCP130	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
II SEM	MCA 201	3	2	3	1	3	-	2	-	2	-	2	3	-	-	-
	MCA 202	3	3	1	2	3	3	2	1	2	1	-	3	-	-	-
	MCA 203	3	2	3	2	2	3	1	3	2	3	3	3	2	3	1
	MCA 204	2	3	-	1	2	3	2	1	2	1	-	3	1	2	-
	MCA 205	2	2	3	2	2	3	1	3	3	3	3	3	2	2	1
	MCA 206	2	3	1	2	3	3	2	1	2	1	-	3	2	-	-
	MCA 223	3	2	3	2	2	3	1	3	3	3	3	3	2	2	1
	MCA 224	2	2	2	1	1	1	-	-	-	-	-	2	1	1	-
	MCA 225	2	2	2	1	1	1	-	-	-	-	-	2	1	1	-
	BCP 241	2	2	2	1	1	1	-	-	-	-	-	2	1	1	-
	BSP 243	2	2	2	1	1	1	2	-	-	-	-	2	1	1	-
	FLP 244	1	2	1	2	2	-	-	-	-	-	-	-	2	2	2
	MMP 260	2	2	2	2	2	2	1	-	-	-	-	1	1	1	1

PROGRAMME ARTICULATION MATRIX																
2nd Year		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
III SEM	MCA 301	3	2	1	-	-	-	-	-	-	-	-	2	1	1	1
	MCA 302	3	3	3	2	2	3	1	3	3	2	2	3	3	3	3
	MCA 303	3	2	2	2	3	1	3	2	2	3	2	2	3	-	2
	MCA 304	3	2	2	2	2	3	1	2	1	1	1	2	2	-	-
	MCA 305	3	3	2	-	1	3	2	3	3	2	3	2	3	-	2
	MCA 322	2	2	2	1	1	2	2	3	1	2	2	2	2	-	-
	MCA 323	3	2	2	2	3	1	3	2	2	3	2	2	3	1	2
	MCA 324	3	2	2	1	1	2	2	3	1	2	2	2	2	2	2
	MCA 325	3	2	2	2	1	2	2	3	1	1	1	2	2	2	2
	MCA 306	3	2	2	1	1	2	2	3	1	2	2	2	2	2	2
	MCA 307	3	2	2	2	1	2	2	3	1	1	1	2	2	2	2
	MCA 308	3	2	2	1	1	2	2	3	1	2	2	2	2	2	2
	MCA 309	3	2	2	2	2	2	2	2	1	1	1	2	2	2	2
	BCP 341	2	2	2	1	2	2	2	2	1	2	2	2	2	2	2
	BSP 343	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2
	FLP 344	1	2	1	2	2	-	-	-	-	-	-	-	2	2	2
	MSP 350	3	2	1	2	2	3	3	2	3	-	1	3	3	2	2
	MMP 360	3	2	1	2	2	3	3	2	3	-	1	3	3	2	2
IV SEM	MMP 460	3	2	2	-	2	-	-	3	2	-	-	2	3	-	2

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PO Mapping of MCA Program Outcomes with the SDGs

Engineering Programme Outcome (EPO)	Sustainable Development Goal (SDG)
PO 1: Engineering Knowledge	SDG 4: Quality Education
PO 2: Problem Analysis	SDG 1: No Poverty
PO 3: Design/Development of Solutions	SDG 9: Industry, Innovation, and Infrastructure
PO 4: Investigation	SDG 12: Responsible Consumption and Production
PO 5: Modern Tool Usage	SDG 8: Decent Work and Economic Growth
PO 6: The Engineer and Society	SDG 16: Peace, Justice, and Strong Institutions
PO 7: Environment and Sustainability	SDG 13: Climate Action
PO 8: Ethics	SDG 16: Peace, Justice, and Strong Institutions
PO 9: Individual and Team Work	SDG 17: Partnerships for the Goals
PO 10: Communication	SDG 4: Quality Education
PO 11: Project Management	SDG 9: Industry, Innovation, and Infrastructure
PO 12: Lifelong Learning	SDG 4: Quality Education

Courses Mapped with various National Missions

S. No.	Name of School	Programme Name	Semester	Course Code	Course Name	National Mission
1	Amity School of Engineering & Technology	MCA	I	BCP 141	Advanced Communication – I	National Mission for Natural Language Translation
2	Amity School of Engineering & Technology	MCA	I	BSP 143	Behavioural Science – I	National Mission for Natural Language Translation
3	Amity School of Engineering & Technology	MCA	I	FLP 144	French – I	National Mission for Natural Language Translation
4	Amity School of Engineering & Technology	MCA	II	MMP 260	Minor Project-I	Make in India
5	Amity School of Engineering & Technology	MCA	III	MMP 360	Minor Project-II	Skill India / Pradhan Mantri Kaushal Vikas Yojana (PMKVY)
6	Amity School of Engineering & Technology	MCA	IV	MMP 460	Dissertation	Skill India / Pradhan Mantri Kaushal Vikas Yojana (PMKVY)

MULTIMEDIA AND ITS APPLICATIONS

Course Code: MCA 203 **Credit Units: 03**

Total Hours: 30

Course Objective:

The objective of the course is to give an overview of different multimedia technologies like audio and video including multimedia devices. The course also includes some practical sessions on these technologies.

Course Contents:

Module I: Introduction (5 Hours)

Multimedia and personalized computing, a tour of emerging applications, multimedia systems, computer communication, and entertainment products, a framework of multimedia systems.

Module II: Digital Audio Representation and Processing (5 Hours)

Uses of audio in computer applications, digital representation of sound, transmission of digital sound, digital audio signal processing, digital audio and the computer.

Module III: Video Technology (5 Hours)

Raster scanning principles, sensors for T.V. cameras, color fundamentals, color video, video equipment, worldwide television standards.

Module IV: Digital Video and Image Compression (5 Hours)

Evaluating a compression system, redundancy and visibility, video compression techniques, the JPEG image compression standards, the MPEG motion video compression standard, DVI technologies, Time Based Media Representation and Delivery.

Module V: Multimedia Devices, Presentation Services and the User Interface (5 Hours)

Introduction Multimedia services and Window systems, client control of continuous media, device control, temporal co ordination and composition, hyper application.

Module VI: Application of Multimedia (5 Hours)

Intelligent multimedia system, desktop virtual reality, multimedia conferencing.

Examination Scheme:

Components	CT1	A/C/Q	Attd	EE
Weightage (%)	10	15	5	70

Text & References:

Multimedia systems John F. Koegal Buford Addison- Wesley

CLOUD COMPUTING AND VIRTUALIZATION LAB

Course Code: MCA 522 **Credit Units: 01**
Total Hours: 20

Course Objectives:
To understand concepts of cloud computing. To learn the design and development process involved in creating a cloud based application

SOFTWARE REQUIREMENTS: VMware

List of experiments/demonstrations:

1. Virtualization in Cloud.**(02 Hours)**
2. Study and implementation of Infrastructure as a Service.**(02 Hours)**
3. Study and installation of Storage as Service.**(02 Hours)**
4. Implementation of identity management.**(02 Hours)**
5. Securing Servers in Cloud.**(02 Hours)**
6. User Management in Cloud.**(02 Hours)**
7. Case study on Amazon EC2.**(02 Hours)**
8. Case study on Microsoft azure.**(02 Hours)**
9. Find a procedure to transfer the files from one virtual machine to another virtual machine.**(02 Hours)**
10. Creating a cloud like social site for institute.**(02 Hours)**

Course Outcomes:
Learner will be able to...

- Appreciate cloud architecture
- Create and run virtual machines on open source OS
- implement Infrastructure , storage as a Service.
- Install and appreciate security features for cloud

Examination Scheme:

IA			**EE**			
A	**PR**	**Practical Based Test**	**Major Experiment**	**Minor Experiment**	**LR**	**Viva**
5	10	15	35	15	10	10

Note: IA –Internal Assessment, EE- External Exam, A- Attendance PR- Performance, LR – Lab Record, V – Viva.

Text & References:

- Enterprise Cloud Computing by Gautam Shroff, Cambridge,2010
- Cloud Security by Ronald Krutz and Russell Dean Vines, Wiley - India, 2010 , ISBN:978-0-470-58987-8
- Getting Started with OwnCloud by Aditya Patawar , Packt Publishing Ltd, 2013

www.openstack.org

MINOR PROJECT-I

Course Code: MMP 260 **Credit Units: 04**

Course objectives:

The objective of Minor project is to enable the student to take up investigative study in the broad field of Engineering, either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on an individual basis or two/three students in a group, under the guidance of a Supervisor.

Methodology:

Topics of project are to be based on the latest trends, verifying engineering concepts /principals and should involve elementary research work. The projects may involve design, fabrications, testing, computer modeling, and analysis of any engineering problem. On completion of the practical training the students are to present a report covering various aspects learnt by them and give a presentation on same.

Course Outcomes:

At the end of the course, students will demonstrate the ability to:

1 Conceive a problem statement either from rigorous literature survey or from the requirements raised from need analysis.
2 Design, implement and test the prototype/algorithm in order to solve the conceived problem.
3 Write comprehensive report on mini project work.

Examination Scheme:

Literature study/ Fabrication/ Experimentation	40
Written Report	20
Viva	15
Presentation	25
Total	**100**

MINOR PROJECT-II

Course Code: MMP 360 **Credit Units: 04**

Course objectives:

The objective of Minor project is to enable the student to take up investigative study in the broad field of Engineering, either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on an individual basis or two/three students in a group, under the guidance of a Supervisor.

Methodology:

Topics of project are to be based on the latest trends, verifying engineering concepts /principals and should involve elementary research work. The projects may involve design, fabrications, testing, computer modeling, and analysis of any engineering problem. On completion of the practical training the students are to present a report covering various aspects learnt by them and give a presentation on same.

Course Outcomes:

At the end of the course, students will demonstrate the ability to:

1 Conceive a problem statement either from rigorous literature survey or from the requirements raised from need analysis.
2 Design, implement and test the prototype/algorithm in order to solve the conceived problem.
3 Write comprehensive report on mini project work.

Examination Scheme:

Literature study/ Fabrication/ Experimentation	40
Written Report	20
Viva	15
Presentation	25
Total	**100**

DISSERTATION

Course Code: **MMP 460** **Credit Units: 30**

GUIDELINES FOR DISSERTATION

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 DISSERTION, 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 secions, 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

Voravuthikunchai SP, Lortheeranuwat A, Ninrprom T, Popaya W, Pongpaichit S, Supawita T. (2002) Antibacterial activity of Thai medicinal plants against enterohaemorrhagic *Escherichia coli* O157: H7. *Clin Microbiol Infect,* **8** (suppl 1): 116–117.

For book

Kowalski,M.(1976) Transduction of effectiveness in *Rhizobium meliloti*. SYMBIOTIC NITROGEN FIXATION PLANTS (editor P.S. Nutman IBP), **7**: 63-67

ASSESSMENT OF THE 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.

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:

Dissertation	50
Viva Voce	50
Total	**100**

Data, leading to production of a structured report.

Selecting the Dissertation Topic

It is usual to give you some discretion in the choice of topic for the dissertation and the approach to be adopted. You will need to ensure that your dissertation is related to your field of specialization.

Deciding this is often the most difficult part of the dissertation process, and perhaps, you have been thinking of a topic for some time.

It is important to distinguish here between 'dissertation topic' and 'dissertation title'. The topic is the specific area that you wish to investigate. The title may not be decided until the dissertation has been written so as to reflect its content properly.

Few restrictions are placed on the choice of the topic. Normally we would expect it to be:

- relevant to business, defined broadly;
- related to one or more of the subjects or areas of study within the core program and specialisation stream;
- clearly focused so as to facilitate an in-depth approach, subject to the availability of adequate sources of information and to your own knowledge;
- of value and interest to you and your personal and professional development.

Planning the Dissertation

This will entail following:

- Selecting a topic for investigation.
- Establishing the precise focus of your study by deciding on the aims and objectives of the dissertation, or formulating questions to be investigated. Consider very carefully what is worth investigating and its feasibility.
- Drawing up initial dissertation outlines considering the aims and objectives of the dissertation. Workout various stages of dissertation
- Devising a timetable to ensure that all stages of dissertation are completed in time. The timetable should include writing of the dissertation and regular meetings with your dissertation guide.

The Dissertation plan or outline

It is recommended that you should have a dissertation plan to guide you right from the outset. Essentially, the dissertation plan is an outline of what you intend to do, chapter wise and therefore should reflect the aims and objectives of your dissertation.

There are several reasons for having a dissertation plan

- It provides a focus to your thoughts.
- It provides your faculty-guide with an opportunity, at an early stage of your work, to make constructive comments and help guide the direction of your research.
- The writing of a plan is the first formal stage of the writing process, and therefore helps build up your confidence.
- In many ways, the plan encourages you to come to terms with the reading, thinking and writing in a systematic and integrated way, with plenty of time left for changes.
- Finally, the dissertation plan generally provides a revision point in the development of your dissertation report in order to allow appropriate changes in the scope and even direction of your work as it progresses.

Keeping records

This includes the following:

- Making a note of everything you read; including those discarded.
- Ensuring that when recording sources, author's name and initials, date of publication, title, place of publication and publisher are included. (You may consider starting a card index or database from the outset). Making an accurate note of all quotations at the time you read them.
- Make clear what is a direct a direct quotation and what is your paraphrase.

Dissertation format

All students must follow the following rules in submitting their dissertation.

- Front page should provide title, author, Name of degree/diploma and the date of submission.
- Second page should be the table of contents giving page references for each chapter and section.
- The next page should be the table of appendices, graphs and tables giving titles and page references.
- Next to follow should be a synopsis or abstract of the dissertation (approximately 500 words)
- Next is the 'acknowledgements'.
- Chapter I should be a general introduction, giving the background to the dissertation, the objectives of the dissertation, the rationale for the dissertation, the plan, methodological issues and problems. The limitations of the dissertation should also be hinted in this chapter.
- Other chapters will constitute the body of the dissertation. The number of chapters and their sequence will usually vary depending on, among others, on a critical review of the previous relevant work relating to your major findings, a discussion of their implications, and conclusions, possibly with a suggestion of the direction of future research on the area.
- After this concluding chapter, you should give a list of all the references you have used. These should be cross - references with your text. For articles from journals, the following details are required e.g.

Draper P and Pandyal K. 1991, The Investment Trust Discount Revisited, Journal of Business Finance and Accounting, Vol18, No6, Nov, pp 791-832.

For books, the following details are required:

Levi, M. 1996, International Financial Management, Prentice Hall, New York, 3rd Ed, 1996

- Finally, you should give any appendices. These should only include relevant statistical data or material that cannot be fitted into the above categories.

The Layout Guidelines for the Dissertation

- A4 size Paper
- Font: Arial (10 points) or Times New Roman (12 points)
- Line spacing: 1.5
- Top and bottom margins: 1 inch/ 2.5 cm; left and right margins: 1.25 inches/ 3 cm

Guidelines for the assessment of the Dissertation

While evaluating the dissertation, faculty guide will consider the following aspects:

1. Has the student made a clear statement of the objective or objective(s).
2. If there is more than one objective, do these constitute parts of a whole?
3. Has the student developed an appropriate analytical framework for addressing the problem at hand.
4. Is this based on up-to-date developments in the topic area?
5. Has the student collected information / data suitable to the frameworks?
6. Are the techniques employed by the student to analyse the data / information appropriate and relevant?
7. Has the student succeeded in drawing conclusion form the analysis?
8. Do the conclusions relate well to the objectives of the project?
9. Has the student been regular in his work?
10. Layout of the written report.

Assessment Scheme:

Continuous Evaluation: 40%

(Based on Abstract, Regularity,

Adherence to initial plan, Records etc.)

Final Evaluation: Based on, 60%

Contents & Layout of the Report, 20

Conceptual Framework,		05
Objectives & Methodology and		05
Implications & Conclusions	10	
Viva & Presentation	20	

AMITY UNIVERSITY
MADHYA PRADESH
(Established by Ritnand Balved Education Foundation)

S.No.	Name of Institute/School	Programme Name	Semester	Course Code	Course Name	1.1.1 Curricula developed and implemented have relevance to the local, national, regional and global developmental needs, which is reflected in the Programme outcomes (POs), Programme Specific Outcomes(PSOs) and Course Outcomes(COs) of the Programmes offered by the University.		
						LOCAL /REGIONAL	NATIONAL	GLOBAL
Amity School of Engineering & Technology								
1	Amity School of Engineering & Technology	MCA	I	MCA 101	Discrete Mathematical Structures			
2				MCA 102	Computer Architecture & Organization			
3				MCA 103	Operating Systems		1	1
4				MCA 104	Problem Solving and Programming Techniques	1	1	1
5				MCA 105	Advanced Data Base Management Systems		1	1
6				MCA 124	Problem Solving and Programming Techniques Lab	1	1	1
7				MCA 125	Advanced Data Base Management Systems Lab		1	1
14			II	MCA 201	Statistics and Optimization Techniques		1	1
15				MCA 202	Advanced Computer Networks		1	1
16				MCA 203	Data Structures and Algorithms		1	1
17				MCA 204	Data Science with Python Programming		1	1
18				MCA 205	Web Technologies	1	1	1
19				MCA 206	Software Engineering and Project Management		1	1
20				MCA 223	Data Structures and Algorithms Lab		1	1
21				MCA 224	Python Programming Lab		1	1
22				MCA 225	Web Technologies Lab		1	1
27			III	MCA 301	Artificial Intelligence & Machine Learning	1	1	1

28				MCA 302	Java Programming		1	1
29				MCA 303	Analysis & Design of Algorithms		1	1
30				MCA 304	Android Application Development	1	1	1
31				MCA 305	Advanced Problem Solving Techniques		1	1
32				MCA 322	Java Programming Lab		1	1
33				MCA 323	Analysis & Design of Algorithms Lab		1	1
34				MCA 324	Android Application Development Lab	1	1	1
35				MCA 325	Advanced Problem-Solving Techniques Lab	1	1	1
46			IV	MMP 460	Dissertation	1	1	1
	ASET	CSE Dept.	Total No of Courses relevance to the local, national, regional and global developmental needs			8	24	24

COURSE OUTCOMES

S.No.	Course Code	Course Title	Course Outcomes
	MCA 101	Discrete Mathematical Structures	• Understand about set theory and their applications. • Understand the computational and algorithmic aspects of mathematical logic. • Understand about the lattice and their types, • Understand various algebraic structures like groups and fields, • Develop the given problem as graph networks and solve with techniques of graph theory. • Able to construct the recurrence relations of various problems and find out their solutions.
	MCA 102	Computer Architecture & Organization	• Ability to understand basic structure of computer. • Ability to perform computer arithmetic operations. • Ability to understand control unit operations. • Ability to design memory organization that uses banks for different word size operations. • Ability to understand the concept of cache mapping techniques. • Ability to understand the concept of I/O organization. • Ability to conceptualize instruction level parallelism.
	MCA 103	Operating Systems	• Analyze various scheduling algorithms. • Understand deadlock, prevention and avoidance algorithms. • Compare and contrast various memory management schemes. • Understand the functionality of file systems.
	MCA 104	Problem Solving and Programming Techniques	• To formulate simple algorithms for arithmetic and logical problems. • To translate the algorithms to programs (in C language). • To test and execute the programs and correct syntax and logical error • To implement conditional branching, iteration and recursion. • To decompose a problem into functions and synthesize a complete program using divide and conquer approach. • To use arrays, pointers and structures to formulate algorithms and programs. • To apply programming to solve matrix addition and multiplication problems and searching and sorting problems. • To apply programming to solve simple numerical method problems, namely rot finding of function,

			differentiation of function and simple integration.
	MCA 105	Advanced Data Base Management Systems	• Describe DBMS architecture, physical and logical database designs, database modeling, relational, hierarchical and network models. • Identify basic database storage structures and access techniques such as file organizations, indexing methods including B-tree, and hashing. • Learn and apply Structured query language (SQL) for database definition and database manipulation. • Demonstrate an understanding of normalization theory and apply such knowledge to the normalization of a database. • Understand various transaction processing, concurrency control mechanisms and database protection mechanisms.
	MCA 124	Problem Solving and Programming Techniques Lab	• To formulate the algorithms for simple problems. • To translate given algorithms to a working and correct program. • To be able to correct syntax errors as reported by the compilers. • To be able to identify and correct logical errors encountered at run time. • To be able to write iterative as well as recursive programs. • To be able to represent data in arrays, strings and structures and manipulate them through a program. • To be able to declare pointers of different types and use them in defining self- referential structures. • To be able to create, read and write to and from simple text files.
	MCA 125	Advanced Data Base Management Systems Lab	• At the end of lab session students would be able to design the Database application for the real-life projects. • Students would be able to perform insertion, deletion and updation operation on Databases.
	MCP 130	Term Paper (Evaluation)	• Carry out intense study on a specific topic related to current development in their field of specialization. • Collect, interpret and analyze the information. • Compare and evaluate the existing solutions for a specific cases study • Develop skills of presentation and report writing
	MCA 201	Statistics and Optimization Techniques	• Learn the statistical and optimization methods, in particular, with reference to probability distribution and test of hypothesis, project management and critical path method, queuing models, inventory models and practical applications of these statistical and optimization methods in the field of Computer Sciences and Applications.

	MCA 202	Advanced Computer Networks	• The course aims to provide information so that at the end of the course, the students find themselves comfortable in taking either the direction- industrial job or further research in networking.
	MCA 203	Data Structures and Algorithms	• Analyse algorithms and algorithm correctness and ability to summarize searching and sorting techniques or ability to describe stack, queue and linked list operation and ability to have knowledge of tree and graphs concepts.
	MCA 204	Data Science with Python Programming	• Understand python library, basic principles of Python programming language, Data Processing in Python, Data Representation. • Implement object-oriented concepts, Implement database and GUI applications. • Ability to create client-server application for real world problems.
	MCA 205	Web Technologies	• Understand different components in web technology and to know about CGI and CMS. • Develop interactive Web pages using HTML/XHTML. • Present a professional document using Cascaded Style Sheets. • Construct websites for user interactions using JavaScript and JQuery. • Develop Web applications using PHP.
	MCA 206	Software Engineering and Project Management	• Understand and Identify Software Engineering paradigms. • Work with software process models. • Various tools and techniques for software Designing, analysis. • How to divide software development cycle into various phases and operations that needed to be done in these phases. • Familiar with software testing, maintenance & assurance • Understand case tools.
	MCA 223	Data Structures and Algorithms Lab	• Have a good understanding of how several fundamental algorithms work, particularly those concerned with sorting and searching. • Have a good understanding of the fundamental data structures used in computer science. • Be able to analyze the space and time efficiency of most algorithms. • Be able to design new algorithms or modify existing ones for new applications and reason about the efficiency of the result.
	MCA 224	Python Programming Lab	• Ability to create client-server applications for real world problems. • Ability to develop multithreaded applications. • Ability to create web application for real world problem.
	MCA 225	Web Technologies Lab	• Design and implement dynamic websites with

			good aesthetic sense of designing and latest technical know-how's. • Have a Good grounding of Web Application Terminologies, Internet Tools, E – Commerce and other web services. • Get introduced in the area of Online Game programming.
	MMP 260	Minor Project- I	• Conceive a problem statement either from rigorous literature survey or from the requirements raised from need analysis. • Design, implement and test the prototype/algorithm in order to solve the conceived problem. • Write comprehensive report on mini project work.
	MCA 301	Artificial Intelligence & Machine Learning	• About Artificial Intelligence and intelligent agents, history of Artificial Intelligence • Building intelligent agents (search, games, logic, constraint satisfaction problems) • Machine Learning and its basics • Applications of AI and ML
	MCA 302	Java Programming	• Express the power of a platform Independent technology. • Explain comparison between java and C++. • Introduce the use of client site programming using Applet. • Explain the Fundamental of Access specifies, constructor and packages. • Express the power of method overloading and method overriding and uses of abstract classes. • Role and Need of Interfaces to develop real time Application. • Creating thread with the thread class and runnable interface • Implement the concept of exception handling Real time Application. • Implement Web Application using Applet. • Implement Window Application using AWT Swing and JDBC • Implement Real World Application by handling mutable objects using file Handling. • Connect a Application to A remote database through JAVA database connectivity • Express the power of java in Distributed Application through Networking, socket and • RMI Programming. • Role of RMI Programming for distributed computing.
	MCA 303	Analysis & Design of Algorithms	• Analyze the asymptotic performance of algorithms. • Write rigorous correctness proofs for algorithms. • Demonstrate a familiarity with major algorithms

			and data structures. • Apply important algorithmic design paradigms and methods of analysis. • Synthesize efficient algorithms in common engineering design situations.
	MCA 304	Android Application Development	• understand Android environment. • understand tools for creating Android applications. • understand Android approach to structuring applications. • understand programming in an event-based model used in application development for mobile devices. • write and deploy a content-based application using a mobile computing software framework.
	MCA 305	Advanced Problem-Solving Techniques	• Demonstrate the basic knowledge of computer hardware and software. • To formulate simple algorithms for arithmetic and logical problems. • To translate the algorithms to programs (in C language). • To test and execute the programs and correct syntax and logical errors. • Ability to apply solving and logical skills to programming in C language and also in other languages.
	MCA 322	Java Programming Lab	• knowledge of the structure and model of the Java programming language, (knowledge) • use the Java programming language for various programming technologies (understanding) • develop software in the Java programming language, (application) • evaluate user requirements for software functionality required to decide whether the Java programming language can meet user requirements (analysis) • propose the use of certain technologies by implementing them in the Java programming language to solve the given problem (synthesis)
	MCA 323	Analysis & Design of Algorithms Lab	• To write programs in java to solve problems using divide and conquer strategy. • To write programs in java to solve problems using backtracking strategy. • To write programs in java to solve problems using greedy and dynamic programming techniques.
	MCA 324	Android Application Development Lab	• Create a Web Application with server controls.
	MCA 325	Advanced Problem-Solving Techniques Lab	• To formulate the algorithms for simple problems. • To translate given algorithms to a working and correct program. • To be able to correct syntax errors as reported by the compilers. • To be able to identify and correct logical errors encountered at run time.

			• To be able to write iterative as well as recursive programs. • To be able to represent data in arrays, strings and structures and manipulate them through a program. • To be able to declare pointers of different types and use them in defining self- referential structures. • To be able to create, read and write to and from simple text files.
	MCA 306	Cyber Security and Digital Forensics	• Understand relevant legislation and codes of ethics. • Computer forensics and digital detective and various processes, policies and procedures. • E-discovery, guidelines and standards, E-evidence, tools and environment. • Email and web forensics and network forensics.
	MCA 307	IoT and Sensor Networks	• Learn the terminology, technology and its applications of IoT. • Analyze Embedded suite widely used in IoT. • Describe the concept of M2M with necessary protocols. • Understand the cloud storage for IoT applications. • To develop wireless sensor systems for different applications using 802.15.4. • Optimize resources for different IoT applications. • Understand Real world IoT Design constraints.
	MCA 308	Distributed Database Systems	• In “Introduction to DDBS” they will learn about basic concepts of DDBS In “DDBS Architecture”, they will learn architectural components of DDBS. • In “Distributed Database Design” they will learn various design concepts to develop • DDBMS. In “Query Optimization” they will learn how to optimize the data retrieval using various • Algorithms In “Transaction Management and Concurrency Control in DDBS” they will learn how to manage transaction and deal with concurrency problems in DDBMS.
	MCA 309	Data Mining and Data Analysis	• To apply concepts of classes and objects in real world scenarios. • Understand object-oriented programming features in C++, • Apply these features to program design and implementation, • Understand object-oriented concepts and how they are supported by C++, • Gain some practical experience of C++.
	MSP 350	Summer Internship Programme (SIP) – Evaluation	• Explore the preferred field of specialization and develop analytical / hardware / software / experimental/ observation skills. • Manage the technical content and work.

			• Learn the various administrative process followed in industry. • Prepare and present technical report.
	MMP 360	Minor Project- II	• Conceive a problem statement either from rigorous literature survey or from the requirements raised from need analysis. • Design, implement and test the prototype/algorithm in order to solve the conceived problem. • Write comprehensive report on mini project work.

AMITY UNIVERSITY

MADHYA PRADESH

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

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR

AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY (CIVIL)

Program Educational Objectives (PEO)

Bachelor of Technology (Civil Engineering)

Academic Year – 2021-22

B Tech Civil Engineering

I. **PEO-1:** To gain knowledge and skills in Civil engineering which will enable them to have a career and professional accomplishment in the public or private sector organizations.

II. **PEO-2:** To become consultants on complex real life Civil Engineering problems related to Infrastructure development especially housing, construction, water supply, sewerage, transport, spatial planning.

III. **PEO-3:** To become entrepreneurs and develop processes and technologies to meet desired infrastructure needs of society and formulate solutions that are technically sound, economically feasible, and socially acceptable.

IV. **PEO-4:** To perform investigation for solving Civil Engineering problems by conducting research using modern equipment and software tools.

V. **PEO-5:** To function in multi-disciplinary teams and advocate policies, systems, processes and equipment to support civil engineering.

AMITY UNIVERSITY

MADHYA PRADESH

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

AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY (CIVIL ENGINEERING)

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Technology (B. Tech.) CE, Academic Year – 2021-22

B.Tech Civil Engineering

[PO. 1]. **Engineering Knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
[PO. 2]. Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
[PO. 3]. Design/Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
[PO. 4]. Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
[PO. 5]. Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
[PO. 6]. The Engineer and Society: Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
[PO. 7]. Environment and Sustainability: Understand the impact of professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
[PO. 8]. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.
[PO. 9]. Individual and Teamwork: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
[PO. 10]. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
[PO. 11]. Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects
[PO. 12]. Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes:

PSO_01: Develop and apply innovative, state-of-the-art practices and technologies and Provide sustainable solutions to the Civil Engineering Problems

PSO_02: Plan, design, construct and operate society economic and social engine that built the environment and also protecting, restoring the natural environment

PSO_03: Apply modern techniques, advanced materials, equipment and management tools so as to complete the civil engineering project within specified time and funds.

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

1: Slight (Low), 2: Moderate (Medium) and 3: If there Substantial (High)is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
ISEM	MAT101	3	2	3	3	3	-	-	-	2	-	2	3	-	-	-
	CHE101	3	3	3	3	-	3	3	3	3	3	3	3	-	-	-
	CSE104															
	BME101															
	CIV101	2	2	2	-	3	-	3	2	-	3	-	3	3	2	1
	CHE121	3	3	3	2	2	3	3	3	3	3	3	3	-	-	-
	CSE124															
	BME121															
	BCU141															
	EVS142															
	BSU143															
	FLU144	1	2	1	2	2	-	-	-	-	-	-	-	2	2	2
IISEM	MAT201															
	PHY101	3	3	1	2	3	3	2	1	2	1	-	3	-	-	-
	ECE101															
	CSE204															
	BME102															
	PHY121	3	3	3	2	2	1	1	1	1	3	3	3	-	-	-
	ECE121															
	CSE224															
	BME122															
	BCU241															
	EVS242															
	BSU243															
	FLU244	1	2	1	2	2	-	-	-	-	-	-	-	2	2	2

PROGRAMME ARTICULATION MATRIX																
2nd Year		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
IIISEM	MAT 301	3	2	1	-	-	-	-	-	-	-	-	2	1	1	1
	CIV 302	3	3	3	2	-	-	-	-	-	-	-	3	3	3	3
	CIV 303	3	2	2	-	-	-	-	-	-	-	-	2	3	-	2
	CIV 308	3	2	2	2	-		-	-	1	1	1	2	2	-	-
	CIV 309	3	3	2	-	-	-	-	-	-	-	-	2	3	-	2
	BME104	1	2	2	1	1	-	-	-	-	-	-	-	2	-	-
	ECE 307	3	3	2	-	-	-	-	-	-	-	-	2	3	-	2
	CIV 322	1	2	2	1	1	-	-	-	-	-	-	-	2	-	-
	ECE 327	3	2	2	-	-	-	-	-	-	-	-	2	3	-	2
	FLU344	1	2	1	2	2	-	-	-	-	-	-	-	2	2	2
	CIV 401	3	2	2	-	2	-	-	3	2	-	-	2	3	-	2

IV SEM	CIV 402	3	2	2	-	-	-	1	-	-	-	-	2	3	-	2
	CIV 403	3	2	2	-	2	-	1	-	-	-	-	2	3	-	2
	CIV 404	3	2	2	-	2	-	-	3	2	-	-	2	3	-	2
	CIV 405	3	2	2	-	2	-	1	3	2	-	1	2	3	-	2
	CIV 407	3	2	2	1	2	-	-	3	2	-	2	2	3	-	2
	ECE 407	3	2	2	-	-	-	-	-	-	-	-	2	3	-	2
	CIV 421	3	2	2	1	2	-	-	3	2	-	2	2	3	-	2
	CIV 422	3	2	2	1	2	-	-	3	2	-	2	2	3	-	2
	CIV 423	3	2	2	1	2	-	-	3	2	-	2	2	3	-	2
	CIV 424	3	2	2	1	2	-	-	3	2	-	2	2	3	-	2
	ECE 427	3	2	2	1	2	-	-	3	2	-	2	2	3	-	2
	FLU 444	1	2	1	2	2	-	-	-	-	-	-	-	2	2	2

ROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
VSEM	CIV 501	3	3	2	3	3	2	2	-	3	2	3	3	3	3	3
	CIV 502	2	2	2	-	3	-	3	2	-	3	-	3	1	2	1
	CIV 503	3	3	1	2	3	3	3	3	3	-	1	3	3	2	2
	CIV 504	2	-	2	-	3	-	3	2	-	3	-	3	3	2	2
	CIV 505	3	3	3	2	2	1	1	-	-	-	-	3	3	3	3
	CIV 506	2	2	2	-	3	-	3	2	-	3	-	3	1	2	1
	CIV 507	3	3	1	2	3	3	3	3	3	-	1	3	3	2	2
	CIV 522	3	3	2	3	3	2	2	-	3	2	3	3	3	3	3
	CIV 524	2	2	2	-	3	-	3	2	-	3	-	3	1	2	1
	CIV 527	3	3	1	2	3	3	3	3	3	-	1	3	3	2	2
	NPT550	3	2	1		1	2	1	-	2	-	1	3	3	3	3
	FLU 544	1	2	1	2	2	-	-	-	-	-	-	-	2	2	2
VISEM	CIV 601	3	3	2	3	3	2	2	-	3	2	3	3	1	2	1
	CIV 602	2	2	2	-	3	-	3	2	-	3	-	3	3	2	2
	CIV 603	3	3	1	2	3	3	3	3	3	-	1	3	3	2	2
	CIV 604	2	2	2	-	3	-	3	2	-	3	-	3	3	3	3
	CIV 622	3	3	1	2	3	3	3	3	3	-	1	3	1	2	1
	CIV 623	2	-	2	-	3	-	3	2	-	3	-	3	3	2	2
	CIV 624	3	3	1	2	3	3	3	3	3	-	1	3	3	3	3
	CIV 605	2	2	2	-	3	-	3	2	-	3	-	3	1	2	1
	CIV 606	3	3	1	2	3	3	3	3	3	-	1	3	3	2	2
	CIV 607	3	3	1	2	3	3	3	3	3	-	1	3	3	2	2
	CIV 625	2	2	2	-	3	-	3	2	-	3	-	3	3	3	3
	CIV 626	3	3	1	2	3	3	3	3	3	-	1	3	1	2	1
	CIV 627	2	2	2	-	3	-	3	2	-	3	-	3	3	2	2
	NMP660	3	1	2	3	3	1	1	-	-	3	3	3	3	3	2
	FLU 644	1	2	1	2	2	-	-	-	-	-	-	-	2	2	2

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
	CIV 701	3	3	2	3	3	2	2	-	3	2	3	3	3	3	3
	CIV 702	2	2	2	-	3	-	3	2	-	3	-	3	1	2	1

VII SEM	CIV 706	2	2	2	-	3	-	3	2	-	3	-	3	1	2	1
	CIV 722	3	3	2	3	3	2	2	-	3	2	3	3	3	3	3
	NPT 750	3	2	1		1	2	1	-	2	-	1	3	3	3	3
	NMP760	3	2	1		1	2	1	-	2	-	1	3	3	3	3
	FLU744	1	2	1	2	2	-	-	-	-	-	-	-	2	2	2
VIII SEM	CIV 801	3	3	2	3	3	2	2	-	3	2	3	3	1	2	1
	CIV 802	2	2	2	-	3	-	3	2	-	3	-	3	3	2	2
	CIV 803	3	3	1	2	3	3	3	3	3	-	1	3	3	2	2
	CIV 823	2	-	2	-	3	-	3	2	-	3	-	3	3	2	2
	NMP860	3	1	2	3	3	1	1	-	-	3	3	3	3	3	2
	FLU844	1	2	1	2	2	-	-	-	-	-	-	-	2	2	2

Amity School of Engineering and Technology

Amity University Madhya Pradesh

PO Mapping of B.Tech (Civil Engineering) syllabus with the SDGs

Sr No	Program Outcome [PO]	Program Outcome	Mapping with SDGs.
1	PO-1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems	SDG 4 Quality Education
2	PO-2	**Problem analysis**: Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences,and engineering sciences.	SDG 9 Industry, Innovation, and Infrastructure
3	PO-3	**Design/development of solutions**: Design solutions for complex engineering problems and designsystem components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural,s ocietal,and environmental considerations	SDG 4 Quality Education
4	PO-4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions	**SDG4** Quality Education
5	PO-5	**Moderntool usage**:Create,select,andapplyappropriatetechniques,resources,andmodernengineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations	SDG 8 Decent work and economic growth
6	PO-6	**The Engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues, and the consequent responsibilities relevant to the professional engineering practice	**SDG 6** Clean Water and Sanitation
7	PO-7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in	**SDG 7:** 7: Affordable and Clean Energy

		societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development	
8	**PO-8**	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practices	**SDG** 10: Reduce Inequalities
9	**PO-9**	**Individual and teamwork**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings	SDG 17 Partnerships for the Goals
10	**PO-10**	**Communication**:Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions	SDG 9: Industry, Innovation, and Infrastructure
11	**PO-11**	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply the set one's own work, as a member and leader in team, to manage projects and in multidisciplinary environments	SDG8: Decent Work and Economic Growth
12	**PO-12**	**Life-long learning**:Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change	SDG16: Peace, Justice, and Strong Institutions

Courses Mapped with various National Missions

Sr. No.	Name of School	Program Name	Semester	Course Code	Course Name	National Mission
1	Amity School of Engineering and Technology	B.tech. (Civil Engineering)	I	EVS-142	ENVIRONMENTAL STUDIES-I	National Mission for Green India
2	Amity School of Engineering and Technology	B.tech. (Civil Engineering)	II	EVS-242	ENVIRONMENTAL STUDIES-I	National Mission for Green India
3	Amity School of Engineering and Technology	B.tech. (Civil Engineering)	I	BCU 141	Communication Skill - I	National Mission for Natural Language Translation
4	Amity School of Engineering and Technology	B.tech. (Civil Engineering)	II	BCU 241	Communication Skill - II	National Mission for Natural Language Translation
5	Amity School of Engineering and Technology	B.tech. (Civil Engineering)	III	BCU341	Communication Skill - III	National Mission for Natural Language Translation
6	Amity Institute of Biotechnology	B.tech. (Civil Engineering)	IV	BCU 441	Communication Skill - IV	National Mission for Natural Language Translation
7	Amity School of Engineering and Technology	B.tech. (Civil Engineering)	V	BCU 541	Communication Skill - V	National Mission for Natural Language Translation
8	Amity School of Engineering and Technology	B.tech. (Civil Engineering)	VI	BCU 641	Communication Skill - VI	National Mission for Natural Language Translation

ENVIRONMENTAL STUDIES-I

Course Code: EVS – 142 **Credit Units: 02**
Total Hours: 20

Course Objectives

The term environment is used to describe, in aggregate, all the external forces, influences and conditions which affect the life, nature, behavior and the growth, development and maturity of living organisms. At present a great number of environmental issues have grown and become complex day by day, threatening the survival of mankind on earth. Environment study is quite essential in all streams of studies including 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 have an adverse effect on the environment.

Course Contents:

Module I: The multidisciplinary nature of environmental studies (6 Hrs)

Definition, scope and importance

Need for public awareness.

Module II: Natural Resources (8 Hrs)
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 (3 Hrs)
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 (3 Hrs)

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
Course Outcome
Upon course completion, students will be able to understand:

- The multidisciplinary nature of environmental studies, including its definition, scope and need for public awareness.
- Our natural resources including renewable and non-renewable resources comprising of forest, water, mineral, food, energy and land resources.
- The ecosystem, their structure and function, energy flow, bio-geochemical cycles,

community ecology, ecological succession, ecological pyramids, forest, grassland, aquatic and tundra ecosystem.

- Biodiversity and its conservation.
- Ecosystem diversity, species diversity and genetic diversity.
- Biological classification of India.
- Value of biodiversity.
- Biodiversity at global national and local level.
- Conservation of biodiversity.
- Characteristic of ideal ecosystem.
- Study of an artificial ecosystem.

Examination Scheme:

Components	CT	HA	S/V/Q	A	ESE
Weightage (%)	15	5	5	5	70

Text & References:

- Chauhan B. S. 2009: Environmental Studies, University Science Press New Delhi.
- Dhameja S.K., 2010; Environmental Studies, Katson Publisher, New Delhi.
- Smriti Srivastava, 2011: Energy Environment Ecology and Society, Katson Publisher, New Delhi.
- Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
- Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad 380 013, India, Email:mapin@icenet.net (R)
- Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)
- Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopaedia, Jaico Publ. House, Mumbai, 1196p
- De A.K., Environmental Chemistry, Wiley Eastern Ltd. Down to Earth, Centre for Science and Environment (R)
- Gleick, H.P. 1993. Water in Crisis, Pacific Institute for Studies in Dev., Environment & Security.

  Stockholm Env. Institute Oxford Univ. Press. 473p
- Hawkins R.E., Encyclopaedia of Indian Natural History, Bombay Natural History Society, Bombay (R) Heywood, V.H & Waston, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press 1140p.
- Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284 p. McKinney, M.L. & School, R.M. 1996. Environmental Science Systems & Solutions, Web enhanced edition. 639p.
- Mhaskar A.K., Matter Hazardous, Techno-Science Publication (TB) Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB)
- Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA, 574p
- Rao M N. & Datta, A.K. 1987. Waste Water treatment. Oxford & IBH Publ. Co. Pvt. Ltd. 345p. Sharma B.K., 2001. Environmental Chemistry. Geol Publ. House, Meerut
- Survey of the Environment, The Hindu (M)
- Townsend C., Harper J, and Michael Begon, Essentials of Ecology, Blackwell Science
- Trivedi R.K., Handbook of Environmental Laws, Rules Guidelines, Compliances and Standards, Vol I and II, Enviro Media (R)
- Trivedi R. K. and P.K. Goel, Introduction to air pollution, Techno-Science Publication (TB) Wanger K.D., 1998 Environmental Management. W.B. Saunders Co. Philadelphia, USA 499p

ENVIRONMENTAL STUDIES-II

Course Code: EVS– 242 **Credit Units: 02**
Total Hours: 20

Course Objectives

- To understand various types of environmental pollution.
- To educate masses, in general and students, about the issues related to degradation of environment and social issues related to environment.
- To understand sustainable development.
- To understand environmental assets, local flora and fauna through field surveys.

Course Contents:

Module I: Environmental Pollution (7 Hrs)
Definition, causes, effects and control measures of:Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, 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 II: Social Issues and the Environment (7 Hrs)

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. Fireworks/Crackers – Introduction, ill effects on environment and humans.
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 III: Human Population and the Environment (4 Hrs)
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 IV: Field Work (2 Hrs)

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.

Course Outcome

Upon course completion, students will be able to:

- Explain various types of environmental pollutions.

- Understand role of individual in abatement of environmental pollution.
- Explain methods to mitigate disasters.
- Learn various environmental protection laws.
- Learn role of IT in environment and human health.

Examination Scheme:

Components	CT	HA	S/V/Q	A	ESE
Weightage (%)	15	5	5	5	70

Text & References:

- Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
- Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad 380 013, India, Email:mapin@icenet.net (R)
- Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)
- Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopaedia, Jaico Publ. House, Mumbai, 1196p
- De A.K., Environmental Chemistry, Wiley Eastern Ltd. Down to Earth, Centre for Science and Environment (R)
- Gleick, H.P. 1993. Water in Crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute Oxford Univ. Press. 473p
- Hawkins R.E., Encyclopaedia of Indian Natural History, Bombay Natural History Society, Bombay (R) Heywood, V.H & Watson, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press 1140p.
- Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284 p. McKinney, M.L. & School, R.M. 1996. Environmental Science Systems & Solutions, Web enhanced edition. 639p.
- Mhaskar A.K., Matter Hazardous, Techno-Science Publication (TB) Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB)
- Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA, 574p
- Rao M N. & Datta, A.K. 1987. Waste Water treatment. Oxford & IBH Publ. Co. Pvt. Ltd. 345p. Sharma B.K., 2001. Environmental Chemistry. Geol Publ. House, Meerut
- Survey of the Environment, The Hindu (M)
- Townsend C., Harper J, and Michael Begon, Essentials of Ecology, Blackwell Science
- Trivedi R.K., Handbook of Environmental Laws, Rules Guidelines, Compliances and Standards, Vol I and II, Enviro Media (R)
- Trivedi R. K. and P.K. Goel, Introduction to air pollution, Techno-Science Publication (TB) Wanger K.D., 1998 Environmental Management. W.B. Saunders Co. Philadelphia, USA 499p

COMMUNICATION SKILL-I

Course Code: BCU 141 **Credit Units: 1**

Course Objective:

The course is intended to familiarize students with the basics of English language and help them to learn to identify language structures for correct English usage.

Prerequisites: NIL

Course Contents / Syllabus:

1.	**Module I Essentials of English Grammar** • Common Errors • Parts of Speech • Collocations, Relative Pronoun • Subject-Verb Agreement • Articles • Punctuation • Sentence Structure- 'Wh' Questions	**30% Weightage**
2.	**Module II Written English Communication** • Paragraph Writing • Essay Writing	**30% Weightage**
3.	**Module III Spoken English Communication** • Introduction to Phonetics • Syllable-Consonant and Vowel Sounds • Stress and Intonation	**30% Weightage**
4.	**Module IV : Prose** "Friends, Romans, Countrymen, lend me your ears" Speech by Marc Antony in Julius Caesar ❖ Comprehension Questions will be set in the End-Semester Exam	**10% Weightage**
5.	**Student Learning Outcomes:** The students should be able to : • Identify Common Errors and Rectify Them • Develop and Expand Writing Skills Through Controlled and Guided Activities • To Develop Coherence, Cohesion and Competence in Oral Discourse through Intelligible Pronunciation.	
6.	**Pedagogy for Course Delivery:** • Workshop • Group Discussions • Presentations • Lectures • Extempore	

Assessment/ Examination Scheme:

Theory L/T (%)	Lab/Practical/Studio (%)	End Term Examination
100%	NA	70%

Theory Assessment (L&T):

Components (Drop down)	CIE	Mid Sem	Attendance	End Term Examination
Weightage (%)	10%	15%	5%	70%

Text: ***Rosenblum, M. How to Build Better Vocabulary, London: Bloomsbury Publication***
Verma, Shalini. Word Power made Handy, S. Chand Publications
High School English Grammar & Composition by Wren & Martin

COMMUNICATION SKILL-II

Course Code: **BCU 241** **Credit Units: 1**

Course Objectives:

To understand the different aspects of communication using the four macro skills – LSRW (Listening, Speaking, Reading, Writing)

Prerequisites: NIL

Course Contents / Syllabus:

1.	**Module I Communication**	**35% Weightage**
	• Process and Importance • Models of Communication (Linear & Shannon Weaver) • Role and Purpose • Types & Channels • Communication Networks • Principles & Barriers	
2.	**Module II Verbal Communication**	**25% Weightage**
	Oral Communication: Forms, Advantages & Disadvantages Written Communication: Forms, Advantages & Disadvantages Introduction of Communication Skills (Listening, Speaking, Reading, Writing)	
3.	**Module III Non-Verbal Communication**	**30% Weightage**
	• Principles & Significance of Nonverbal Communication • KOPPACT (Kinesics, Oculesics, Proxemics, Para-Language, Artifacts, Chronemics, Tactilics) • Visible Code	
4.	**Module IV : Prose**	**10% Weightage**
	TEXT: APJ Abdul Kalam and Arun Tiwari. *Wings of Fire: An Autobiography*, Universities Press, 2011 Comprehension Questions will be set in the End-Semester Exam	
5.	**Student Learning Outcomes:** The students should be able to : • Apply Verbal and Non-Verbal Communication Techniques in the Professional Environment	
6.	**Pedagogy for Course Delivery:** • Extempore • Presentations • Lectures	

7. Assessment/ Examination Scheme:

Theory L/T (%)	Lab/Practical/Studio (%)
100%	NA

Theory Assessment (L&T):

Components (Drop down)	CIE	Mid Sem	Attendance	End Term Examination
Weightage (%)	10%	15%	5%	70%

Text: *Rosenblum, M. How to Build Better Vocabulary, London: Bloomsbury Publication.*
Verma, Shalini. Word Power made Handy, S. Chand Publications.
High School English Grammar & Composition by Wren & Martin.

Reference: *K.K.Sinha , Business Communication, Galgotia Publishing Company.*

COMMUNICATION SKILL-III

Course Code: BCU 341 **CreditUnits: 1**

Course Objective:

To emphasize the essential aspects of effective written communication necessary for professional success.

Prerequisites: NIL

Course Contents / Syllabus:

1. Module I Principles of Effective Writing — **35%Weightage**

- Spellings-100 Most Misspelled Words in English
- Web Based Writing
- Note Taking: Process & Techniques

2. Module II Formal Letter Writing — **35% Weightage**

- Block Format
- Types of Letters
- E-mail
- Netiquette

3. Module III Business Memos — **20% Weightage**

- Format & Characteristics

4. Module IV Short Stories — **10%Weightage**

- Stench of Kerosene-Amrita Pritam
- A Flowering Tree-A.K. Ramanujan
- The Gift of the Magi- O. Henry
- A Fly in Buttermilk-James Baldwin

5. Student Learning Outcomes:

The students should be able to write correctly and properly with special reference to Letter writing.

6. Pedagogy for Course Delivery:

- Workshop
- Group Discussions
- Presentations
- Lectures

7. Assessment/ Examination Scheme:

Theory L/T (%)	Lab/Practical/Studio (%)	EndTerm Examinatio
100%	NA	70%

Theory Assessment (L&T):

Components (Drop down)	ClE	Mid Sem	Attendance	EndTerm Examination
Weightage (%)	10%	15%	5%	70%

Text: ***Rai, Urmila & S.M. Rai. Business Communication, Mumbai: Himalaya Publishing House, 2002.***
K.K.Sinha, Business Communication, Galgotia Publishing Company.

Reference: ***Sanjay Kumar & Pushp Lata, Communication Skills, Oxford University Press.***

Additional Reading: Newspapers and Journals

COMMUNICATION SKILL –IV

Course Code: BCU 441 **Credit Units: 1**

Course Objective:

This course is designed to develop the skills of the students in preparing job search artifacts and negotiating their use in GDs and interviews.

Prerequisites: NIL

Course Contents / Syllabus:

1.	**Module I Employment-Related Correspondence** • Resume Writing • Covering Letters • Follow Up Letters	**35% Weightage**
2.	**Module II Dynamics of Group Discussion** • Significance of GD • Methodology & Guidelines	**35% Weightage**
3.	**Module III Interviews** • Types & Styles of Interviews • Fundamentals of facing Interviews • Interview-Frequently Asked Questions	**20% Weightage**
4.	**Module IV Short Stories** • Proof of the Pudding - O. Henry • "The Lottery" 1948 – Shirley Jackson • The Eyes Have it- Ruskin Bond • Kallu- Ismat Chughtai All the four stories will be discussed in one class. One Long Question will be set in the Exam from the Text.	**10% Weightage**
5.	**Student Learning Outcomes:** • Develop a resume for oneself • Ability to handle the interview process confidently • Learn the subtle nuances of an effective group discussion	
6.	**Pedagogy for Course Delivery:** • Workshop • Group Discussions • Presentations • Lectures	
7.	**Assessment/ Examination Scheme:**	

Theory L/T (%)	Lab/Practical/Studio (%)	End Term Examination
100%	NA	70%

Theory Assessment (L&T):

Components (Drop down)	CIE	Attendance	End Term Examination
Weightage (%)	25%	5%	70%

Text: ***Sharma, R.C. & Krishna Mohan. Business Correspondence and Report Writing: A Practical approach to Business & Technical Communication, New Delhi: Tata McGraw Hill & Co. Ltd., 2002.***
Rai, Urmila & S.M. Rai. Business Communication, Mumbai: Himalaya Publishing House, 2002.
Rizvi, M.Ashraf. Effective Technical Communication, New Delhi: Tata McGraw Hill, 2007.
Reference: ***Brusaw, Charles T., Gerald J. Alred & Walter E. Oliu. The Business Writer's Companion, Bedford: St. Martin's Press, 2010. Lewis, Norman. How to Read Better and Faster. New Delhi: Binny Publishing House.***
Additional Reading: Newspapers and Journals.

COMMUNICATION SKILL-V

Course Code: BCU 541 Credit Units: 1

Course Objective:

- To enable the students to adopt strategies for effective reading and writing skills.
- The course would enhance student's vocabulary, language and fluency. It would also teach the students to deliver professional presentations.

Prerequisites: NIL

Course Contents / Syllabus:

1. Module I Vocabulary — **35% Weightage**

- Define Vocabulary
- Significance of Vocabulary
- One Word Substitution, Synonyms & Antonyms and Idioms & Phrases
- Define and Differentiate Homonyms, Homophones and Homographs
- Vocabulary Drills
- Foreign Words

2. Module II Comprehension Skills — **25% Weightage**

- Reading Comprehension-SQ3R Reading Techniques
- Summarising and Paraphrasing
- Précis Writing
- Listening Comprehension

3. Module III Presentation Skills — **30% Weightage**

- Discussing the Significance of Audio-visual Aids, Audience and Feedback in PresentationSkills.
- Analyzing the Significance of Non-Verbal Communication

4. Module IV Prose — **10% Weightage**

- How Far is the River-Ruskin Bond
- My Wood-E.M.Forster
- I have a Dream-Martin Luther King
- Spoken English and Broken English-G.B. Shaw

5. Student Learning Outcomes:

- Communicate fluently and sustain comprehension of an extended discourse.
- Demonstrate ability to interpret texts and observe the rules of good writing.
- Prepare and present effective presentations aided by ICT tools.

Pedagogy for Course Delivery: Workshop

- Group Discussions
- Presentations

6.

- Lectures

7. Assessment/ Examination Scheme:

Theory L/T (%)	Lab/Practical/Studio (%)	End Term Examination
100%	NA	70%

Theory Assessment (L&T):

Components (Drop down)	CIE	Attendance	End Term Examination
Weightage (%)	25%	5%	70%

Text: Jaffe, C.I. Public Speaking: Concepts and Skills for a Diverse Society, 4th ed. Belmont, CA: Wadsworth, 2004.
Effective English for Engineering Students, B Cauveri, Macmillan India
***Creative English for Communication*, Krishnaswamy N, Macmillan**
Reference: *A Textbook of English Phonetics*, Balasubramanian T, Macmillan
AdditionalReading:NewspapersandJournals

COMMUNICATION SKILLS VI

Course Code: BCU 641 Credit Units: 1

Course Objective: The main emphasis of this course is to enable students to learn the dynamics of social communication and to demonstrate the ability to learn the nuances of informal communication.

Prerequisites: NIL

Course Contents / Syllabus:

1. Module I Social Communication Essentials — **30% Weightage**

- Small talk
- Building rapport
- Expand social and Corporate Associations
- Informal Communication: Grapevine, Chat

2. Module II Workplace Interpersonal Skills — **25% Weightage**

- Understanding Social Communication in Workplace environment.
- Employee feedback: Assess employee performance and satisfaction.
- Simulation
- ➢ **Humour in Communication-Use of 'Puns'**
- ➢ **Entertainment and Communication (Infotainment)**
- Infotainment and Social Media
- Entertainment in Journalism
- ➢ **Social Networking**

3. Module III Visual Code / Social Etiquette — **35% Weightage**

- Power Dressing
- Fine Dining
- Office Party Etiquette
- Business Travel Etiquette
- ➢ **Work Place and Business Etiquette**
- Proper Greetings
- Thank You Notes
- Telephonic Manners/ Voice Mail Etiquette
- Business Salutation Etiquette
- Guest Etiquette
- Cubicle Etiquette
- Business Card Etiquette
- ➢ **Different Cultural Etiquette & Protocol**

4. Module IV Prose — **10% Weightage**

- Secret of Socrates - Dale Carnegie
- My Financial Career-Stephen Leacock
- The Luncheon - W. Somerset Maugham
- The National Flag - Jawahar Lal Nehru

All the four stories will be discussed in one class
One Long Question will be set in the Exam from the Text

5. Student Learning Outcomes:

- To communicate contextually in specific personal and professional situations with courtesy.
- To inject humour in their regular interactions.
- To strengthen their creative learning process through individual expression and collaborative peer activities.

6. Pedagogy for Course Delivery:

- Workshop
- Group Discussions
- Presentations
- Lectures

7. Assessment/ Examination Scheme:

Theory L/T (%)	Lab/Practical/Studio (%)	End Term Examination
100%	NA	70%

Theory Assessment (L&T):

Continuous Assessment/Internal Assessment			End Term Examination
Components (Drop down)	CIE	Attn	
Weightage (%)	25%	5%	70%

Text: *Krizan, Merrier, Logan & Williams. Effective Business Communication, New Delhi: Cengage, 2011*

- *Communication and Organizational Culture*. Keyton. Joann. Sage Publications
- *Social Communication (Frontiers of Social Psychology)*.Fiedler, Klaus. Psychology Press

Reference: *Cypherpunks: Freedom and the Future of the Internet.* Assange, Julian Assange. OR Books.

Additional Reading: Newspapers and Journals

S.No.	Name of Institute/School	Programme Name	Semester	Course Code	Course Name	1.1.1 Curricula developed and implemented have relevance to the local, national, regional and global developmental needs, which is reflected in the Programme outcomes (POs), Programme Specific Outcomes(PSOs) and Course Outcomes(COs) of the Programmes offered by the University.		
						LOCAL /REGIONAL	NATIONAL	GLOBAL
Amity Institute of Biotechnology								
1	Amity School of Engineering and Technology	UG; B.Tech. (Civil Engineering)	I	MAT101	Applied Mathematics – I(Calculus and Linear Algebra)		1	
2				CHE101	Applied Chemistry	1		
3				CSE104	Programming for Problem Solving	1		
4				BME101	Engineering Graphics & Design	1		
5				CIV101	Basic Civil Engineering & Applied Mechanics	1		
6				CHE121	Applied Chemistry Lab		1	
7				CSE124	Programming for Problem Solving Lab	1		
8				BME121	Engineering Graphics & Design Lab	1		
9				BCU141	Communication Skills – I			1
10				EVS 142	Environmental Studies - I	1		
11				BSU 143	Behavioural Science - I	1		
12				FLU 144	French - I			1
13				MAT201	Applied Mathematics–II (Ordinary & Partial Differential Equations and Transform)		1	
14				PHY101	Applied Physics – I		1	
15				ECE101	Basic Electrical Engineering	1		
16				CSE204	Object Oriented Programming Using C++	1		
17				BME102	Workshop/ Manufacturing Practices	1		
18				PHY121	Applied PhysicsLab – I		1	

19				ECE121	Basic Electrical Engineering Lab	**1**		
20			**II**	CSE224	Object Oriented Programming Using C++ Lab	**1**		
21				BME122	Workshop/ Manufacturing Practices Lab	**1**		
22				BCU 241	Communication Skill - II			**1**
23				EVS 242	Environmental Studies - II	**1**		
24				BSU243	Behavioural Science - II	**1**		
25				FLU 244	French - II			**1**
26				MAT 301	Applied Mathematics-III(Probability, Statistics and Numerical Methods)		**1**	
27				CIV 302	Computer-Aided Civil Engineering Drawing	**1**		
28				CIV 303	Engineering Mechanics		**1**	
29				CIV 308	Civil Engineering and Energy Science	**1**		
30				CIV 309	Life Science/Biology for Engineering			**1**
31				BME 104	Mechanical Engineering	**1**		
32				ECE 307	Basic Electronics		**1**	
33			**III**	CIV 322	Computer-aided Civil Engineering Drawing Lab	**1**		
34				ECE 327	Basic Electronics Lab	**1**		
35				BCU 341	Communication Skill - III			**1**
36				BSU343	Behavioural Science - III	**1**		
37				FLU 344	French - III			**1**
38				CIV 401	Materials, Testing & Evaluation			**1**
39				CIV 402	Engineering Geology			**1**
40				CIV 403	Surveying	**1**		
41				CIV 404	Fluid Mechanics	**1**		
42				CIV 405	Solid Mechanics	**1**		
43				CIV 407	Civil Engineering - Societal & Global Impact			**1**

44			**IV**	ECE 407	Instrumentation & Sensor Technologies for Civil Engineering Applications	**1**		
45				CIV 421	Materials Testing and Evaluation Lab		**1**	
46				CIV 422	Engineering Geology Lab		**1**	
47				CIV 423	Surveying lab	**1**		
48				CIV 424	Fluid Mechanics Lab	**1**		
49				ECE 427	Instrumentation & Sensor Technologies for Civil Engineering Applications Lab		**1**	
50				BCU 441	Communication Skill - IV			**1**
51				BSU443	Behavioural Science - IV	**1**		
52				FLU 444	French - IV			**1**
				CIV 501	Mechanics of materials	**1**		
53			**V**	CIV 502	Hydraulic Engineering	**1**		
54				CIV 503	Structural Engineering		**1**	
55				CIV 504	Geotechnical Engineering			**1**
56				CIV 505	Hydrology & Water Resources Engineering		**1**	
58				CIV 506	Environmental Engineering – I			**1**
59				CIV 507	Transportation Engineering	**1**		
60				CIV 522	Hydraulic Engineering Lab	**1**		
61				CIV 524	Geotechnical Engineering Lab		**1**	
62				CIV 527	Transportation Engineering Lab		**1**	
63				BCU 541	Communication Skill - V			**1**
64				BSU 543	Behavioural Science - V	**1**		
65				FLU 544	French - V			**1**
66				NPT 550	**Industrial Practical Training I (Evaluation)**		**1**	

67				CIV 601	Construction Engineering & Management	**1**		
68				CIV 602	Geometric Design of Highways	**1**		
69				CIV 603	Environmental Engineering – II			**1**
70				CIV 604	Estimating and Costing	**1**		
71				CIV 622	Geometric Design of Highways Lab	**1**		
72				CIV 623	Environmental Engineering – II Lab			**1**
73				CIV 624	Estimating and Costing Lab	**1**		
74				CIV 606	Open Channel Flow	**1**		
75				CIV 626	Open Channel Flow Lab	**1**		
76				BCH 620	Engineering Economics	**1**		
77			**VI**	BCU 641	Communication Skill - VI			**1**
78				BSU 643	Behavioural Science - VI	**1**		
79				FLU 644	French - VI			**1**
80				NMP 660	**Minor Project**		**1**	
81				CIV 701	Design of Concrete Structures	**1**		
82				CIV 702	Surface Hydrology	**1**		
83				CIV 706	Pres-Stressed Concrete		**1**	
84				BCU 741	Communication Skills – VII			**1**
85				BSU 743	Behavioural Science – VII	**1**		
86			**VII**	FLU 744	French– VII			**1**
87				NPT 750	**Industrial Practical Training–II (Evaluation)**		**1**	
88				NMP 760	**Major Project – I**		**1**	

89				CIV 801	Design of Steel Structures	**1**		
90				CIV 802	Airport Planning and Design		**1**	
91				CIV 803	Foundation Engineering		**1**	
92				CIV 823	Foundation Engineering Lab		**1**	
93			**VIII**	BCU 841	Communication Skills – VIII			**1**
94				BSU 843	Behavioural Science – VIII	**1**		
95				FLU 844	French– VIII			**1**
96				NMP 860	**Major Project – II**		**1**	
	ASET(Civil)		**Total No of Courses relevance to the local, national, regional and global developmental needs**			**48**	**24**	**24**

COURSE OUTCOMES

FIRST SEMESTER

S. No.	Course Code	Course Title	Course outcome
1	**MAT 101**	**APPLIED MATHEMATICS – I**	• To apply differential and integral calculus tools to the notions of curvature and to improper integrals. Apart from various applications, they will have a basic understanding of Beta and Gamma functions. • The mathematical tools needed in evaluating multiple integrals and their usage. • The essential tools of matrices that are used in various techniques dealing with engineering problems. • The tools of linear algebra including linear transformations, eigen values, diagonalization.
2	**CHE 101**	**APPLIED CHEMISTRY**	• Apply the principles chemical of sciences to understand the very basic bonding mechanism and the application to materials in different engineering situations.
3	**CSE 104**	**PROGRAMMING FOR PROBLEM SOLVING**	• To formulate simple algorithms for arithmetic and logical problems. • To translate the algorithms to programs (in C language). • To test and execute the programs and correct syntax and logical error • To implement conditional branching, iteration and recursion. • To decompose a problem into functions and synthesize a complete program using divide and conquer approach. • To use arrays, pointers and structures to formulate algorithms and programs. • To apply programming to solve matrix addition and multiplication problems and searching and sorting problems. • To apply programming to solve simple numerical method problems,

			namely rot finding of function, differentiation of function and simple integration
4	**BME 101**	**ENGINEERING GRAPHICS & DESIGN**	• To prepare students to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability • To prepare students to use the techniques, skills, and modern engineering tools necessary for engineering practice • To prepare for actual work situations through practical training in a new state-of-the-art computer designed CAD laboratory using engineering software.
5	**CIV 101**	**BASIC CIVIL ENGINEERING & APPLIED MECHANICS**	• Explain concepts and terminologies of building materials, surveying and mechanics. • Apply various methods for surveying and mechanics. • Determine the location, area and volume of objects on ground surface. • Solve the problems of surveying and mechanics by using various methods. • Analyse the effects of system of forces on rigid bodies in static conditions.

Semester II

S. No.	Course Code	Course Title	Course outcome
1	**MAT 201**	**APPLIED MATHEMATICS – II**	• Upon completion of this course, students will be able to solve field problems in engineering involving PDEs. • The effective mathematical tools for the solutions of differential equations that model physical processes. • The students will be able to use Laplace transform to solve differential equations.
2	**PHY 101**	**APPLIED PHYSICS**	• Apply vector calculus to static

		- I	electric-magnetic fields in different engineering situations. • Analyze and Apply Maxwell's equation to diverse engineering problems. • Relate semiconductor material properties to semiconductor devices.
3	**ECE 101**	**BASIC ELECTRICAL ENGINEERING**	• To understand and analyze basic electric and magnetic circuits. • To study the working principles of electrical machines and power converters. • To introduce the components of low voltage electrical installations.
4	**CSE 204**	**OBJECT ORIENTED PROGRAMMING USING C++**	• To apply concepts of classes and objects in real world scenarios. • Understand object-oriented programming features in C++, • Apply these features to program design and implementation, • Understand object-oriented concepts and how they are supported by C++, • Gain some practical experience of C++.
5	**BME 102**	**WORKSHOP/ MANUFACTURING PRACTICES**	• To gain knowledge of the different manufacturing processes which are commonly employed in the industry • To fabricate components using different materials

Semester III

S. No.	Course Code	Course Title	Course outcome
1	**MAT 301**	**APPLIED MATHEMATICS - III (PROBABILITY, STATISTICS AND NUMERICAL METHODS)**	• The objective of this course is to familiarize the students with statistical techniques. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling various problems in the discipline. • The students will learn: The ideas of probability and random variables and various discrete and continuous probability distributions and their properties. • The basic ideas of statistics including

			measures of central tendency, correlation and regression. • The statistical methods of studying data samples. • Numerical techniques to solve simultaneous linear equations, interpolation and extrapolation. • Numerical techniques of differential and integral. • Solution of ordinary differential equation by numerical techniques.
2	**CIV 302**	**COMPUTER-AIDED CIVIL ENGINEERING DRAWING**	• To develop graphical skills for communicating concepts, ideas and designs of engineering products graphically/ visually as well as understand another person's designs, and to get exposure to national standards relating to technical drawings using Computer Aided Design and Drafting practice • Develop Parametric design and the conventions of formal engineering drawing • Produce and interpret 2D & 3D drawings • Examine a design critically and with understanding of CAD - The student learn to interpret drawings, and to produce designs using a combination of 2D and 3D software. • Do a detailed study of an engineering artefact • Develop drawings for conventional structures using practical norms.
3	**CIV 303**	**ENGINEERING MECHANICS**	• Confidently tackle equilibrium equations, moments and inertia problems • Master calculator/computing basic skills to use to advantage in solving mechanics problems. • Gain a firm foundation in Engineering Mechanics for furthering the career in Engineering • Use scalar and vector analytical techniques for analysing forces in statically determinate structures • Apply fundamental concepts of kinematics and kinetics of particles to the analysis of simple, practical problems • Apply basic knowledge of maths and physics to solve real-world problems • Understand measurement error, and propagation of error in processed data • Understand basic kinematics concepts – displacement, velocity and acceleration (and their angular counterparts); • Understand basic dynamics concepts – force, momentum, work and energy;

			Understand and be able to apply Newton's laws of motion;
4	**CIV 308**	**CIVIL ENGINEERING & ENERGY SCIENCE**	• List and generally explain the main sources of energy and their primary applications nationally and internationally • Have basic understanding of the energy sources and scientific concepts/principles behind them • Describe the challenges and problems associated with the use of various energy sources, including fossil fuels, with regard to future supply and the impact on the environment. • List and describe the primary renewable energy resources andtechnologies. • To quantify energy demands and make comparisons among energy uses, resources, and technologies. • Collect and organize information on renewable energy technologies as a basis for further analysis andevaluation. Understand the Engineering involved in projects utilising thesesources
5	**CIV 309**	**LIFE SCIENCE/BIOLOGY FOR ENGINEERS**	• The significance of biological sciences • Develop an understanding of the different life forms from microbes to higher plants and their importance in human life. • Develop an understanding of the ecosystems, community ecology, ecosystem structure etc. • Develop an insight into the various environmental management covering principles environment protection Acts. Environmental Impact Assessment • Cellular structures of living forms. • Classification of biology and biomolecule • About DNA and biological structure • About the species • Exploring Molecular Genetics
6	**BME 104**	**MECHANICAL ENGINEERING**	• Ability to design and conduct experiments, as well as to analyze and interpretdata • Ability to apply modern engineering tools, techniques and resources to solve complex mechanical engineering activities with an understanding of thelimitations. Ability to comprehend the thermodynamics and their corresponding processes that influence the behaviour and response of structuralcomponents
7	**ECE 307**	**BASIC ELECTRONICS**	• Know broadly the concepts and functionalities of the electronic devices,

			tools and instruments • Understand use, general specifications and deploy abilities of the electronic devices, and assemblies • Confidence in handling and usage of electronic devices, tools and instruments in engineering applications

Semester IV

S. No.	Course Code	Course Title	Course outcome
1	**CIV 401**	**MATERIALS, TESTING & EVALUATION**	• Calibrate electronic sensors • Operate a data acquisition system • Operate various types of testing machines. • Configure a testing machine to measure tension or compression behaviour. • Compute engineering values (e.g. stress or strain) from laboratory measures. • Analyze a stress versus strain curve for modulus, yield strength and other related attributes. • Identify modes of failure • Write a technical laboratory report.
2	**CIV 402**	**ENGINEERING GEOLOGY**	• Site characterization and how to collect, analyze, and report geologic data using standards in engineering practice. • The fundamentals of the engineering properties of earth materials and fluids. • Rock mass characterization and the mechanics of planar rock slides and topples. • Soil characterization and the Unified Soil ClassificationSystem. • The mechanics of soils and fluids and their influence on settlement, liquefaction, and soil slope stability.
3	**CIV 403**	**SURVEYING**	• Apply the knowledge, techniques, skills, and applicable tools of the discipline to engineering and surveying activities. • Translate the knowledge gained for the implementation of Civil infrastructure facilities. • Relate the knowledge on Surveying to the new frontiers of science like

			Hydrographic surveying, Electronic Distance Measurement, Global Positioning System, Photogrammetry and Remote Sensing.
4	**CIV 404**	**FLUID MECHANICS**	• properties of fluids, pressure measurement devices, • hydraulic forces on surfaces, bouncy and flotation in fluids, • kinematics and static behaviour of fluids, dimension and model analysis, laminar and turbulent flow, • flow through pipes and orifices, boundary layer theory.
5	**CIV 405**	**SOLID MECHANICS**	• Simple Stresses and Strains • Compound Stresses and Strains • Bending moment and Shear Force Diagrams • They will develop skills to problem solving in solid mechanics.
6	**CIV 407**	**CIVIL ENGINEERING – SOCIETAL & GLOBAL IMPACT**	• The impact which Civil Engineering projects have on the Society at large and on the global arena and using resources efficiently and effectively. • The extent of Infrastructure, its requirements for energy and how they are met: past, present and future. • The Sustainability of the Environment, including its Aesthetics. • The potentials of Civil Engineering for Employment creation and its Contribution to the GDP The Built Environment and factors impacting the Quality of Life
7	**ECE 407**	**INSTRUMENTATION & SENSOR TECHNOLOGIES FOR CIVIL ENGINEERING APPLICATIONS**	• To analyse the errors during measurements • To specify the requirements in the calibration of sensors and instruments • To describe the noise added during measurements and transmission. • To describe the measurement of electrical variables • To describe the requirements during the transmission of measured signals • To construct Instrumentation/Computer Networks • To suggest proper sensor technologies for specific applications • To design and set up measurement systems and do the studies.

Semester V

S. No.	Course Code	Course Title	Course outcome
1	CIV 501	MECHANICS OF MATERIALS	• Understand the deformation and strains under different load action and response in terms of forces and moments • Understand the behaviour under different loading actions
2	CIV 502	**HYDRAULIC ENGINEERING**	• The students will be able to apply their knowledge of fluid mechanics in addressing problems in open channels
3	CIV 503	**STRUCTURAL ENGINEERING**	• The students will be able to apply their knowledge of structural mechanics in addressing design problems of structural engineering.
4	CIV 504	GEOTECHNICAL ENGINEERING	• Specify a strategy for site investigation to identify the soil deposits and determine the depth and spatial extent within the ground.
5	CIV 505	**HYDROLOGY & WATER RESOURCES ENGINEERING**	• Understand the interaction among various processes in the hydrologic cycle ¬ Apply the application of fluid mechanics and use of computers in solving problems.
6	CIV 506	**ENVIRONMENTAL ENGINEERING – I**	• Understand the impact of humans on environment and environment on humans ¬ Be able to identify and value the effect of the pollutants on the environment: atmosphere, water.
7	CIV 507	**TRANSPORTATION ENGINEERING**	• Carry out surveys involved in planning and highway alignment ¬ design the geometric elements of highways and expressways

Semester VI

S. No.	Course Code	Course Title	Course outcome
1	CIV 601	**CONSTRUCTION ENGINEERING & MANAGEMENT**	• An ability to apply Stages of project planning • An idea of how structures are built and projects are developed on the field • An understanding of modern construction practices • A good idea of basic construction dynamics- various stakeholders,

			project objectives, processes, resources required and project economics an ability to develop plans and schedules an ability to apply Common building construction methods
2	CIV 602	**GEOMETRIC DESIGN OF HIGHWAYS**	• An ability to apply Stages of project planning • An idea of how structures are built and projects are developed on the field • An understanding of modern construction practices • A good idea of basic construction dynamics- various stakeholders, project objectives, processes, resources required and project economics an ability to develop plans and schedules an ability to apply Common building construction methods
3	CIV 603	**ENVIRONMENTAL ENGINEERING – II**	• Able to make students gain insight into how the water and wastewater gets transported through conduits and open channels, and use the same for the design, operation and maintenance of these systems, able to provide an in depth understanding of physical and physico-chemical processes used for water and wastewater treatment systems and to provide capability to design such systems. • Develop understanding of basics of microbiology, metabolism and energetic, bio kinetic parameter, reactors and reactor analyses.
4	CIV 604	**ESTIMATING AND COSTING**	• Have an idea of Economics in general, Economics of India particularly for public sector agencies and private sector businesses • Be able to perform and evaluate present worth, future worth and annual worth analyses on one of more economic alternatives. • Be able to carry out and evaluate benefit/cost, life cycle and breakeven analyses on one or more

			economic alternatives. • Be able to understand the technical specifications for various works to be performed for a project and how they impact the cost of a structure. • Be able to quantify the worth of a structure by evaluating quantities of constituents, derive their cost rates and build up the overall cost of the structure. Be able to understand how competitive bidding works and how to submit a competitive bid proposal
5	CIV 606	OPEN CHANNEL FLOW	• After successfully studying this course, the students will be able to apply their knowledge of fluid mechanics in addressing problems in open channels.
6	BCH 620	ENGINEERING ECONOMICS	• The students will be able to apply their knowledge of engineering economics. They will possess the skills to solve problems in uniform, gradually and rapidly varied social and economical problems of engineering economy.

Semester VII

S. No.	Course Code	Course Title	Course outcome
1	CIV 701	**DESIGN OF CONCRETE STRUCTURES**	• By learning this course, the students will be able to design different RCC structures such as beam, columns, slabs and foundations. The students will learn the behaviour of different RCC structures upon action of different types of loads
2	CIV 702	SURFACE HYDROLOGY	• This course will provide students with a strong understanding of how water moves across Earth's surface. Students will gain an in-depth knowledge of surface hydrology. Students will be able to apply hydrologic principles in considering management of water resources to achieve social objectives
3	CIV 706	**PRE-STRESSED CONCRETE**	• By learning this course, the students will be able to learn about prestressed concrete used in the field. The students will learn how the pre-tensioning and post-tensioning are carried out in the field. The dstudents students will learn different types of losses occured in pre-stressing. Students will learn design of different prestressed concrete

			members such as beams, slabs etc.

Semester VIII

S. No.	Course Code	Course Title	Course outcome
1	CIV 801	**DESIGN OF STEEL STRUCTURES**	• Ability to design and analyze steel structures. • The students will be able to apply their knowledge of steel structural mechanics in addressing design problems of steel structural engineering. • They will possess the skills to solve problems dealing with different loads and steel. • They will have knowledge in steel structural engineering.
2	CIV 802	**AIRPORT PLANNING AND DESIGN**	• Ability to design and analyze airports. • They will possess the skills to solve problems dealing with different airport design problems.
3	CIV 803	**FOUNDATION ENGINEERING**	• Learn about types and purposes of different foundation systems and structures. • Have an exposure to the systematic methods for designing foundations. • Be able evaluate the feasibility of foundation solutions to different types of soil conditions considering the time effect on soil behaviour. • Have necessary theoretical background for design and construction of foundation systems.

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

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR
AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

PROGRAMME EDUCATIONAL OBJECTIVE(PEOs)

B.Tech(Electronics & Communication Engineering)

Academic Year – 2021-22

PEO - 1: To provide our graduates strong foundation and enhance skill in the field of electronics & communication engineering by strengthening their core competencies.

PEO2: To train our graduates such that they must be employable in private sector/public sector/research organizations or work as an entrepreneur.

PEO3: To prepare our graduates for providing solutions to complex and challenging problems by applying knowledge of electronics & communication engineering.

PEO4: To train our graduates who can be future leaders and work as team member in multidisciplinary environment.

PEO5: To develop professional and ethical attitude for solving global challenges and make positive impact on the society.

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Bachelor of Technology (B. Tech.) ECE, Academic Year 2021-22

Programme Outcomes:

[PO.1]. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems

[PO.2]. **Problem analysis**: Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences

[PO.3]. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations

[PO.4]. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions

[PO.5]. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modernengineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations

[PO.6]. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues, and the consequent responsibilities relevant to the professional engineering practice

[PO.7]. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development

[PO.8]. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practices

[PO.9]. **Individual and teamwork**: Function effectively as an individual, and as a member or leader indiverse teams, and in multidisciplinary settings

[PO.10]. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions

[PO.11]. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leaderin a team, to manage projects and in multidisciplinary environments

[PO.12]. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage inindependent and life-long learning in the broadest context of technological change

Programme Specific Outcomes:

PSO1. Professional Skills: An ability to apply the knowledge to understand, analyze and develop complex Engineering solutions in the field of Electronic Devices, Electronics Networks, Analog and Digital circuits, and Telecommunication Communication networks.

PSO2. Problem-solving skills: An ability to apply standard practices and strategies in hardware and software project development using necessary hardware skills and open-ended programming environments to deliver a quality product in multidisciplinary domain.

PSO3. Successful career and Entrepreneurship: An ability to employ modern technology and software platforms in creating innovative career paths in Industry, as an Entrepreneur and a zest for higher studies.

PSO4.Research and Development: An ability to undertake research for the development of new ideas, technology and Engineering solutions for societal benefit.

	PROGRAMME ARTICULATION MATRIX ECE 2021-2022																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
I SEM	MAT101	3	3	1	3	1				2		2	1	-	-	-	
	CHE101	2	3	1	-	-	2	3	-	-	-	-	-	-	-	-	
	CSE104	3	2	3	3	3	2	1	-	1	2	3	3	3	2	2	2
	BME101	3	3	1	2	3	3	2	1	2	1	-	3	-	-	-	
	CIV101	3	3	1	3	1	-	-	-	2		2	1	-	-	-	
	CHE121	2	3	1	-	-	3	3	-	-	-	-	-	-	-	-	
	CSE124	3	2	3	3	3	2	1	-	1	2	3	3	3	2	2	2
	BME121	3	3	1	2	3	3	2	1	2	1	-	3	-	-	-	
	BCU141									2	3	3		3	1	1	
	EVS142	3	3	1	3	1				2		2	1	-	-	-	
	BSU143									3	3	3					
	FLU144	1	2	1	2	2				3	2	2					
II SEM	MAT201	3	3	2	3	2						2		-	-	-	
	PHY101	3	3	1	2	3	3	2	1	2	1	-	3	-	-	-	
	ECE101	3	3	3	3	3	2	1	-	1	2	3	3	3	2	2	2
	CSE204	3	2	3	3	3	2	1	-	1	2	3	3	3	2	2	2
	BME102	3	3	1	2	3	3	2	1	2	1	-	3	-	-	-	
	PHY121	3	3	3	2	2	1	1	1	1	3	3	3	-	-	-	
	ECE121	3	2	2	-	-	-	-	-	-	-	-	-	2	2	2	2
	CSE224	3	2	3	3	3	2	1	-	1	2	3	3	3	2	2	2
	BME122	3	3	1	2	3	3	2	1	2	1	-	3	-	-	-	
	BCU241									2	3	3		3	2	3	
	EVS242	3	3	1	3	1				2		2	1	-	-	-	
	BSU243									3	3	3					
	FLU244	1	2	1	2	2				1	2	3					
III SEM	MAT 301	3	3	2	3	2						2		**3**	**2**	**1**	2
	ECE 301	3	2	2	2	2				2		1	1	1	2	1	
	ECE 302	3	3	1	3	1				2		2	1	1	2	1	
	ECE 303	3	3	3	2	-	-	-	-	-	-	-	-	3	3	-	1
	ECE 304	3	2	2	2	2	-	-	-	2	-	1	1	-	2	1	-
	CSE 202	3	2	3	3	3	2	1	-	1	2	3	3	3	2	2	2
	ECE 321	3	2	2	2	2				2		1	1	1			2
	ECE 322	3	2	2	2	2				2		1	1		2	1	
	ECE 323	3	3	1	3	1				2		2	1		2	1	3
	CSE 222	3	2	3	3	3	2	1	-	1	2	3	3	3	2	2	2
	BCU 341	1	3	2	1	2				2			3	3	2	3	
	BSU 343									3	3	3					
	FLU344	1	2	1	2	2				1	2	3		1	2	3	1
IV SEM	ECE 401	3	3	2	1	2	2	1	1	2	3	1	3	3	2	2	3
	ECE 402	3	3	3	3	1	1	-	-	-	2	1	1	2	2	2	2
	ECE 403	3	3	3	3	3	**2**	-	**1**	2	**3**	2	3	**3**	**3**	**3**	**3**
	CSE 403	3	2	3	2	3	**2**	-	**1**	2	**3**	2	2	**3**	**3**	**3**	**3**
	ECE 421	3	2	1	3	-	2	2	-	-	1	2	1	3	2	2	2
	ECE 422	2	2	2	1	-	-	-	-	-	-	1	3	2	2	2	2

	ECE 423	3	3	3	3	3	**2**	**-**	**1**	2	**3**	2	3	**3**	**3**	**3**	**3**
	CSE 423	3	2	3	3	3	2	1	-	1	2	3	3	3	2	2	2
	ECE 325	3	2	2	2	2	-	-	-	2	-	1	1	-	2	1	-
	ECE 425	3	2	2	2	2				2		1	1		2	1	
	BCU 441	1	3	2	1	2				2			3	3	2	3	
	BSU 443									3	3	3					
	FLU444	1	2	1	2	2				1	2	3		1	2	3	1
V SEM	ECE 501	3	2	1	2	1	1	-	-	-	-	1	1	2	2	2	3
	ECE 502	3	2	1	1	3	2	-	-	1	3	2	1	3	2	3	3
	ECE 503	3	2	2	2	-	1	1	-	-	1	1	1	3	2	2	2
	ECE 504	3	3	2	3	2			**1**	1	**2**	3	3	**3**	**3**	**3**	**3**
	CSE 302	3	2	3	3	3	2	1	-	1	2	3	3	3	2	2	2
	ECE 521	3	3	2	3	-	-	-	-	-	-	1	2	2	2	2	3
	ECE 522	3	2	2	3	3	-	-	-	-	-	-	-	2	2	2	3
	ECE 523	3	2	2	1	-	-	-	-	-	-	-	3	2	1	1	3
	ECE 524	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	CSE 322	3	2	3	3	3	2	1	-	1	2	3	3	3	2	2	2
	BCU 541	1	3	2	1	2				2			3	3	2	3	
	BSU 543									3	3	3					
	FLU 544	1	2	1	2	2				1	2	3		1	2	3	1
VI SEM	ECE 601	3	3	1	3	1				2		2	1	**3**	**2**	**3**	**3**
	ECE 602	3	2	1	1	3	2	-	-	1	3	2	1	3	2	3	3
	ECE 603	3	3	2	3	2						1		**1**	**1**	**1**	1
	CSE 603	3	2	2	2	2				3		3	1	**3**	**3**	**2**	**3**
	CSE 604	3	2	3	2	3	**2**	**-**	**1**	2	**3**	2	2	**3**	**3**	**3**	**3**
	CSE 623	3	2	2	2	2				3		3	1	**3**	**3**	**2**	**3**
	CSE 624	3	2	3	2	3	**2**	**-**	**1**	2	**3**	2	2	**3**	**3**	**3**	**3**
	ECE 605	3	1	2	3	-	-	-	-	1		2	3	**3**	**1**	**2**	**3**
	ECE 625	3	3	1	3	1				2		2	1		2	1	1
	BCU 641	1	3	2	1	2				2			3	3	2	3	
	BSU 643								3	3	3						
	FLU 644	1	2	1	2	2				1	2	3		1	2	3	1
VII SEM	ECE 701	3	1	-	-	-	1	3	1	2	3	3	3	3	3	3	3
	ECE 702	3	2	1	-	-	**1**	**1**	**-**	-	**-**	1	3	**3**	**3**	**2**	**3**
	ECE 721	3	1	2	3	1	2	1	-	-	2	2	1	3	3	2	2
	ECE 722	3	2	1	-	-	**1**	**1**	**-**	-	**-**	1	3	**3**	**3**	**2**	**3**
	ECE 704	3	2	2	2	2				2		1	1		2	1	2
	ECE 724	3	2	2	2	2				2		1	1		2	1	2

	ECE 707	3	1	2	3	-	-	-	-	1		2	3	**3**	**1**	**2**	**3**
	BCU 741	1	3	2	1	2				2			3	3	2	3	
	BSU 743									3	3	3					
	FLU 744	1	2	1	2	2				3	2	2		3	2	2	2
	ECE 801	3	2	2	2	2				3		3	1	**3**	**3**	**2**	**3**
	ECE 802	3	3	2	2	2	2	-	-	1	2	3	3	3	2	2	2
	ECE 803	3	3	1	3	1				2		2	1	3	3	3	3
	ECE 821	3	2	2	2	2				3		3	1	**3**	**3**	**2**	**3**
	ECE 822	2	2	2	2	2	2	-	-	-	-	1	1	2	2	2	2
	ECE 823	3	3	1	3	1				2		2	1		2	1	
	ECE 805	3	2	2	2	2				2		1	1	1	2	1	2
	ECE 825	3	2	2	2	2				2		1	1	1			2
	BCU 841	1	3	2	1	2				2			3	3	2	3	
	BSU 843									3	3	3					
	FLU 844	1	2	1	2	2				3	2	2		3	2	2	1

PO Mapping of B.Tech.(ECE) syllabus with the SDGs

Sr No	Program Outcome [PO]	Program Outcome	Mapping with SDGs.
1	**[PO.1]**.	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems	Goal 4:Quality Education
2	**[PO.2]**.	**Problem analysis**: Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences	Goal 4:Quality Education Goal9:Industry,Innovation and Infrastructure
3	**[PO.3]**.	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations	Goal 4:Quality Education Goal9:Industry,Innovation and Infrastructure Goal11:Sustainable Cities and Communities
4	**[PO.4]**.	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions	Goal 4:Quality Education Goal9:Industry,Innovation and Infrastructure
5	**[PO.5]**.	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modernengineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations	Goal 4:Quality Education Goal9:Industry,Innovation and Infrastructure Goal11:Sustainable Cities and Communities
6	**[PO.6]**.	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues, and the consequent responsibilities relevant to the professional engineering practice	Goal 4:Quality Education Goal11:Sustainable Cities and Communities Goal16:Peace Justice and strong Institutions
7	**[PO.7]**.	**Environment and sustainability**: Understand the impact of the professional engineering solutions in	Goal7 :Affordable and clean Energy Goal11:Sustainable Cities and Communities

		societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development	
8	**[PO.8]**.	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practices	Goal17:Partnerships for the goals
9	**[PO.9]**.	**Individual and teamwork**: Function effectively as an individual, and as a member or leader indiverse teams, and in multidisciplinary settings	Goal17:Partnerships for the goals Goal11:Sustainable Cities and Communities
10	**[PO.10]**.	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions	Goal17:Partnerships for the goals Goal11:Sustainable Cities and Communities
11	**[PO.11]**.	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leaderin a team, to manage projects and in multidisciplinary environments	Goal 4:Quality Education Goal 8:Decent work and Economic Growth Goal9:Industry,Innovation and Infrastructure Goal11:Sustainable Cities and Communities
12	**[PO.12]**.	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage inindependent and life-long learning in the broadest context of technological change	Goal 4:Quality Education Goal9:Industry,Innovation and Infrastructure Goal11:Sustainable Cities and Communities

Courses Mapped with various National Missions

Sr. No.	Name of School	Program Name	Semester	Course Code	Course Name	National Mission
1.	**ASET**		**IV**	ECE403	Microcontrollers	**Digital India**

						Make in India
			V	ECE 502	Digital Signal Processing	**Digital India** **Make in India**
			VI	CSE 603	Internet of Things (IOT)	**Digital India** **Make in India**
			VI	ECE 605	Microwave Theory & Techniques	**Digital India** **Make in India**
			VII	ECE 704	CMOS Design	**Digital India** **Make in India**
		B. Tech (Electronics & Communication Engineering)	**VIII**	ECE 801	Information theory and Coding	**Digital India** **Make in India**
			VIII	ECE 803	C based Embedded Systems Design	**Digital India** **Make in India**
			VIII	**ECE 806**	Verilog Programming	**Digital India** **Make in India**
			VI	**NMP660**	**Minor Project**	**Digital India** **Make in India**
			VII	**NMP760**	**Major Project-I**	**Digital India** **Make in India**
			VIII	**NMP860**	**Major Project-II**	**Digital India** **Make in India**

Academic Year: 2021-2022

MICROCONTROLLERS

Course Code: ECE 403 **Credit Units: 03**

Total Hours: 30

Course Objective:

This course deals with the systematic study of the Architecture and programming issues of 8085-microprocessor and 8051 microcontroller family. The aim of this course is to give the students basic knowledge of the above microprocessor needed to develop the systems using it.

Course Contents:

Module 1: Overview of Microprocessor Systems: (08 Hours)

Overview of microcomputer systems and their building blocks, memory interfacing, concepts of interrupts and Direct Memory Access, instruction sets of microprocessors (with examples of 8085 and 8086);Interfacing with peripherals - timer, serial I/O, parallel I/O, A/D and D/ A converters; Arithmetic Coprocessors; System level interfacing design;

Module II: Advanced Microprocessor and Memory Systems: (06 Hours)

Concepts of virtual memory, Cache memory, Advanced coprocessor Architectures- 286, 486, Pentium; Introduction to RISC processors;

Module III: 8051 Microcontroller: (08 Hours)

Features, architecture, Pin Diagram, Interrupts, Interrupt structure and priorities, Port structure and operation, memory organization, external memory interfacing, instruction syntax, data types, subroutines, addressing Modes, instruction set, ALP of 8051

Module IV: 8051 Microcontroller Interfacing and Applications: (08 Hours)

Programming 8051 Timers and Serial port programming, 8051 interfacing to ADC and DAC, stepper motor and Sensors. Serial Communication,Modes and Programming, ARM microcontrollers interface designs.

Course Outcomes:

At the end of this course students will demonstrate the ability to

- Do assembly language programming
- Do interfacing design of peripherals like, I/O, A/D, D/A, timer etc.
- Develop systems using different microcontrollers
- Understand RISC processors and design ARM microcontroller based systems

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

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

Suggested Text/Reference Books

- R. S. Gaonkar, Microprocessor Architecture: Programming and Applications with the 8085/8080A, Penram International Publishing, 1996
- D A Patterson and J H Hennessy, "Computer Organization and Design The hardware and software interface. Morgan Kaufman Publishers.
- Douglas Hall, Microprocessors Interfacing, Tata McGraw Hill, 1991.
- Kenneth J. Ayala, the 8051 Microcontroller, Penram International Publishing, 1996.

DIGITAL SIGNAL PROCESSING

Course Code: ECE 502 **Credit Units: 03**
Total Hours: 30

Course Objective:

The objective of the course in Digital signal processing is to provide the student with significant skills in general as well as advanced theories and methods for modification, analysis, detection and classification of analog and digital signals. Furthermore the objective is to give the student a broad knowledge of central issues regarding design, realization and test of analog and in particular digital signal processing systems consisting of hardware and/or software components. The specialization in signal processing makes it possible to study practical or theoretic fields, ranging from mathematics/signal theory over algorithmic design to development of instruments based on hardware and/or software for real time signal.

Course Contents:

Module I: Introduction to Discrete Time Signals & Systems: (6 Hours)
Sampling and Reconstruction of continuous time signals: Periodic sampling, Reconstruction of a band limited signal from its samples, Sampling Theorem.
Characterization and properties of discrete time signals and systems: Discrete time signals and systems, Linear convolution, Eigen functions for linear time-invariant systems, Linear constant-coefficient difference equations.

Module II: DFT and its Implementation: (7 Hours)
Review of Z Transform and DTFT, The Discrete Fourier Transform (DFT) and its properties, Circular and linear convolution using the Discrete Fourier Transform.
Efficient computation of the Discrete Fourier Transform, Decimation -in-Time FFT Algorithm, Decimation-in-Frequency FFT Algorithm.

Module III: Frequency Response & Filter Structures: (6 Hours)
The frequency response of LTI systems, All pass and minimum-phase systems.
Digital Filter Structure: Filter structures for IIR and FIR filters, direct form I and II, parallel and cascade forms, frequency sampling structure for FIR filters.
Ladder structures: continued fraction expansion of H (z), example of continued fraction, realization of a ladder structure, example of a ladder realization.

Module IV: FIR Digital Filter Design: (4 Hours)
Design of FIR Digital filters by Windowing: Windowing and the Rectangular Window, Other Commonly Used Windows, Examples of Filter Designs Using Windows, The Kaiser Window.

Module V: IIR Digital Filter Design: (5 Hours)
Design of IIR Digital Filters from Continuous-time Filters Butterworth and Chebyshev, Impulse invariant and bilinear transformation techniques.

Module VI: Multirate Signal Processing: (2 Hours)
Introduction to Multirate Signal Processing, Applications of DSP

Course Outcomes:

- At the end of this course students will demonstrate the ability to
- Represent signals mathematically in continuous and discrete time and frequency domain
- Get the response of an LSI system to different signals
- Design of different types of digital filters for various applications

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

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

Text/Reference Books:

- S.K.Mitra, Digital Signal Processing: A computer based approach.TMH
- A.V. Oppenheim and Schafer, Discrete Time Signal Processing, Prentice Hall, 1989.
- John G. Proakis and D.G. Manolakis, Digital Signal Processing: Principles, Algorithms and Applications, Prentice Hall, 1997.
- L.R. Rabiner and B. Gold, Theory and Application of Digital Signal Processing, Prentice Hall, 1992.
- J.R. Johnson, Introduction to Digital Signal Processing, Prentice Hall, 1992.
- D.J.DeFatta, J. G. Lucas andW.S.Hodgkiss, Digital Signal Processing, John Wiley& Sons, 1988.

INTERNET OF THINGS

Course Code: CSE 603 **Credit Units: 02**

Total Hours: 20

Course Objectives:

The objective of the course is to:Vision and Introduction to IOT, Understand IOT Market perspective, Data and Knowledge Management and use of Devices in IOT Technology, Understand State of the Art – IOT Architecture, Real World IOT Design Constraints, Industrial Automation and Commercial Building Automation in IOT.

Course Contents:

Module I: Introduction to the Internet of Things: (07 Hours)

Key Features, advantages, disadvantages, Wearable electronics, The Basics of Sensors & Actuators, Introduction to Cloud Computing, IOT Software.

Module II: IoT-An Architectural Overview: (06 Hours)

Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations. IoT Technology Fundamentals- Devices and gateways, Local and wide area networking, Data management, Business processes in IoT, Everything as a Service(XaaS), M2M and IoT Analytics, Knowledge Management.

Module III: The Arduino Platform:(06 Hours)

What is Arduino, Why Arduino, Driver installation, programming &Burning ,Coding in wiring language, Compiling in Arduino, The Arduino Open-Microcontroller Platform, Arduino Basics, Arduino Board Layout & Architecture Reading from Sensors.

Module IV: Arduino Programming & Interface of Sensors: (05 Hours)

LED display, PUSH button to array of LED, Communicating to and from computer, GSM, GPS and Zigbee interfacing ,Interface sensor with arduino, Programming arduino, Reading from sensor, Connecting Arduino with Mobile Device. The Android Mobile OS, Using the Bluetooth Module.

Module V: Projects: (06 Hours)

1. Creating own Android App using MIT App Inventor & controlling Arduino connected devices. 2. Use Arduino to Upload free data from Environmental Sensors to Cloud Server. 3. Receive Automatic Call Notification on Mobile Phone for Burglar Alarm using IoT Platform4.Control Electronic Devices from anywhere across the world using Internet & Mobile App.

Course Outcome:.

- Ability to develop IOT application.

Examination Scheme:

Components	A	CT	S/V/Q/HA	ESE
Weightage (%)	5	15	10	70

A: Attendance, CT: Class Test,:, S/V/Q/HA: Seminar/Viva/Quiz/ Home Assignment, ESE: End Semester Examination;

Text & References:

Text:

- Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, StamatisKarnouskos, David Boyle, **"From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence",** 1st Edition, Academic Press, 2014.

Reference Books:

- Vijay Madisetti and ArshdeepBahga, **"Internet of Things (A Hands-on-Approach)",** 1stEdition, VPT, 2014.
- Francis daCosta, **"Rethinking the Internet of Things: A Scalable Approach to Connecting Everything",** 1st Edition, Apress Publications, 2013

MICROWAVE THEORY AND TECHNIQUES

Course Code: ECE 605 **Credit Units: 03**
Total Hours: 30

Course Objective:
This course deals with the microwaves. Microwaves are important when we are going to the high frequency regime. By studying this course students will be able to know about the microwave components and devices, microwave generators and their characteristics, microwave applications and measurement. Also they will be familiar about the rectangular and circular waveguides, their equations and the modes existing in these waveguides.

Course Contents:

Module 1: Introduction to Microwaves: (4 Hours)

History of Microwaves, Microwave Frequency bands; Applications of Microwaves: Civil and Military, Medical, EMI/ EMC.

Mathematical Model of Microwave Transmission: Concept of Mode, Features of TEM, TE and TM Modes, Losses associated with microwave transmission, Concept of Impedance in Microwave transmission.

Module II: Analysis of RF and Microwave Transmission Lines: **(4 Hours)**
Coaxial line, Rectangular waveguide, Circular waveguide, Strip line, Micro strip line.

Microwave Network Analysis: Equivalent voltages and currents for non-TEM lines, Network parameters for microwave circuits, Scattering Parameters.

Module III: Passive and Active Microwave Devices: (6 Hours)

Microwave passive components: Directional Coupler, Power Divider, Magic Tee, Attenuator, Resonator. Microwave active components: Diodes, Transistors, Oscillators, Mixers. Microwave Semiconductor Devices: Gunn Diodes, IMPATT diodes, Schottky Barrier diodes, PIN diodes. Microwave Tubes: Klystron, TWT, Magnetron.

Module IV: Microwave Design Principles: (5 Hours)

Impedance transformation, Impedance Matching, Microwave Filter Design, RF and Microwave Amplifier Design, Microwave Power Amplifier Design, Low Noise Amplifier Design, Microwave Mixer Design, Microwave Oscillator Design. Microwave Antennas- Antenna parameters, Antenna for ground based systems, Antennas for airborne and satellite borne systems, Planar Antennas.

Module V: Microwave Measurements: (5 Hours)

Power, Frequency and impedance measurement atmicrowave frequency, Network Analyzer and measurement of scattering parameters, Spectrum Analyzer and measurement of spectrum of a microwave signal, Noise at microwave frequency and measurement of noise figure. Measurement of Microwave antenna parameters.

Module VI: Microwave Systems: (6 Hours)

Radar, Terrestrial and Satellite Communication, Radio Aidsto Navigation, RFID, GPS. Modern Trends in Microwaves Engineering- Effect of Microwaves on human body, Medical and Civil applications of microwaves, Electromagnetic interference and Electromagnetic Compatibility (EMI & EMC), Monolithic Microwave ICs, RFMEMS for microwave components, Microwave Imaging.

Course Outcomes

At the end of the course, students will demonstrate the ability to:

- Understand various microwave system components their properties.
- Appreciate that during analysis/ synthesis of microwave systems, the different mathematical treatment is required compared to general circuit analysis.
- Design microwave systems for different practical application.

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

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

Suggested Text/Reference Books

- R.E. Collins, Microwave Circuits, McGraw Hill
- K.C. Gupta and I.J. Bahl, Microwave Circuits, Artech house
- Microwave Devices and Circuits, Liao
- Microwave Principles, Herbert J Reich
- Microwaves, K.C. Gupta
- Microwave Techniques, D C Agrawal
- Elements of Microwave Engg, Chatterjee

MINOR PROJECT

Course Code: NMP 660 **Credit Units: 02**

Course objectives: The objective of Minor project is to enable the student to take up investigative study in the broad field of Engineering, either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on an individual basis or two/three students in a group, under the guidance of a Supervisor.

Methodology:

Topics of project are to be based on the latest trends, verifying engineering concepts /principals and should involve elementary research work. The projects may involve design, fabrications, testing, computer modeling, and analysis of any engineering problem. On completion of the practical training the students are to present a report covering various aspects learnt by them and give a presentation on same.

Examination Scheme:

Literature study/ Fabrication/ Experimentation	40
Written Report	20
Viva	15
Presentation	25

Total	**100**

Course Outcomes:

At the end of the course, students will demonstrate the ability to:

1. Conceive a problem statement either from rigorous literature survey or from the requirements raised from need analysis.

2. Design, implement and test the prototype/algorithm in order to solve the conceived problem.

3. Write comprehensive report on mini project work.

CMOS DESIGN

Course Code: ECE 704 **Credit Units: 03**

Total Hours: 30

Course Objective:

In the recent years, IC manufacturing technology has gone through dramatic evolution and changes, continuously scaling to ever smatter dimensions. This scaling has a double impact on the design of ICs. First, the complexity of the designs that can be put on a single die has increased dramatically which led to new design methodologies. At the same time, this plunge into deep submicron space causes devices to behave differently and brings challenging issues to forefront. This course along with the course of Digital Circuits and Systems II and Analog CMOS IC design will give you many of the basic essentials to work in the area of Circuit Design. Since this course takes the latest trends in the industry into account, you will find yourself at a definite edge.

Course Contents:

Module I: Introduction to VLSI design: (8 Hours)

VLSI Design Concepts, Moor's Law, Scale of Integration (SSI, MSI, LSI, VLSI, ULSI – basic idea only), Types of VLSI Chips (Analog & Digital VLSI chips, General purpose, ASIC, PLA, FPGA), Design principles (Digital VLSI –Concept of Regularity, Granularity etc), Design Domains (Behavioral, Structu1) ,Design hierarchy, VLSI Design style: Full custom, Gate array, standard-cell, Macro cell based design, Field programmable devices.

Module II: Basics of MOSFET: (8 Hours)

MOS transistor theory: MOS Capacitor(Accumulation, Depletion, Inversion) ,Fundamentals of Enhancement Mode MOSFETs, Depletion Mode MOSFETs, Weak & strong Inversion Conditions , Ideal Current-Voltage (IV) Characteristics of a MOSFET, non ideal I-V effects(Channel Length Modulation, Body effect, Sub threshold conduction, velocity saturation), Threshold Voltage Concept in

MOSFETs and its physical significance ,Trends & Projections in VLSI Design & Technology, Scaling in MOS devices.MOS capacitances. Comparison of equations for PMOS and NMOS.

Module III: CMOS for Digital VLSI Circuits: (6 Hours)

General CMOS logic structure, VTC of an ideal inverter, noise margin, Different types of inverter (resistive load, and CMOS), DC transfer Characteristics of CMOS, Switching characteristic (propagation delay like High to low & low to high), Different types of Power dissipation in CMOS, power and delay trade-off, tri state inverter.

Module IV: Combinational circuit & sequential Circuit design: (4 Hours)

Series and parallel N and P switches, : Good 0 and Poor 0 transmission by Pass transistor logic, Implementation of NAND & NOR using CMOS, Design of complex logics by using CMOS, TGL, Pseudo NMOS logic design, Dynamic logic(Pre-charge & Evaluation),concept of charge sharing , Domino Logic, concept of Bi CMOS. Principle of Bi-stability, NAND and NOR based SR latch, and clocked SR Latch, JK latch

Module V: Integrated Circuit Layout: (4 Hours)

Introduction to CMOS Process technology, Latch up and its prevention, Stick Diagrams, Physical Design Rules, stick diagrams of CMOS NAND and NOR gates and stick diagrams for functions like (AB+E+CD)*.

Design Rules, Parasitics. Delay: RC Delay model, linear delay model, logical path efforts. Power, interconnect and Robustness in CMOS circuit layout

Course Outcomes:

At the end of the course, students will demonstrate the ability to:

- Design different CMOS circuits using various logic families along with their circuit layout.
- Use of tools for VLSI IC design.

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

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

Text & References:

- Jan M Rabaey: Digital Integrated Circuits
- David Hodges et al: Analysis and Design of Digital ICs

- Kang: CMOS Digital ICs
- Weste and Harris: CMOS VLSI design
- Weste and Eshragian: Principles of CMOS VLSI Design

INFORMATION THEORY AND CODING

Course Code: ECE 801 **Credit Units: 03**

Module I:Information Theory

Introduction to uncertainty, information, entropy and its properties, entropy of binary memory less source and its extension to discrete memory less source, coding theorem, data

compression, prefixcoding, HUFFMAN coding, Lempel-Ziv Coding

Module II:Channels and Capacity

Discrete memory less channels, Binary symmetric channel, mutual information & its properties,channel capacity, channel coding theorem, and its application to BSC, Shannon's theorem on channelcapacity, capacity of channel of infinite bandwidth, Bandwidth signal to noise Trade off, Practicalcommunication system in light of shannon's theorem, Fading Channel.

Module III:Galois Fields

Group and field of Binary system Galois field and its construction in GF (2m) and its basic properties,vector spaces and matrices in GF(2), Linear Block Codes, Systematic codes, and its encodingcircuits, syndrome and error detection ,minimum distance, error detecting and correcting capabilitiesof block code, Decoding circuits, Probability of undetected error for linear block code in BSC,Hamming code and their applications.

Module IV:Cyclic Codes

Cyclic codes and its basic properties, Generator & parity check matrix of cyclic codes, encoding & decoding circuits, syndrome computation & error detection, cyclic Hamming codes.

Module V:BCH and Convolution codes

Introduction to BCH codes, its encoding & decoding, error location & correction. Introduction to convolution codes, its construction & viterbi algorithm for maximum likelihood decoding.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att:

Attendance

Text and Reference Books:

1. Digital Communication by Haykins Simon Wiley Publ.
2. Error control Coding: Theory and Application, by Shu Lin and Cosstlello,PHI
3. Modern analog and Digital Communication system, by B.P. Lathi
4. Digital Communication by Sklar, Pearson Education
5. Principal of Communication system by Taub & Schilling, TMH
6. Error Correcting Codes by Peterson W., MIT Press
7. Digital Communication By Das , Mullick, Chatterjee,

EMBEDDED SYSTEMS

Course Code: ECE 802 **Credit Units: 03**

Course Objective:

The syllabus is divided into two parts, the first one deals with 8051 architecture and its interfacing with other devices. Second part of the syllabus deals with the basic embedded system and it's design. A microcontroller is an integrated circuit that is programmable. The syllabus makes student perfect in assembly language programming, addressing modes etc apart from it input-output programming is discussed in detail. In the second part Embedded systems and it's application is discussed. Real Time Operating System is also explained at length.8051 C programming is also incorporated in the syllabus.

Course Contents:

Module I: Introduction to an embedded systems design & RTOS

Introduction to Embedded system, Processor in the System, Microcontroller, Memory Devices, Embedded System Project Management, ESD and Co-design issues in System development Process, Design cycle in the development phase for an embedded system, Use of target system or its emulator and In-circuit emulator, Use of software tools for development of an ES.Inter-process Communication and Synchronization of Processes, Tasks and Threads, Problem of Sharing Data by Multiple Tasks, Real Time Operating Systems: OS Services, I/O Subsystems, Interrupt Routines in RTOS Environment, RTOS Task Scheduling model, Interrupt Latency and Response times of the tasks.

Module II: Overview of Microcontroller

Microcontroller and Embedded Processors, Overview of 8051 Microcontroller family: Architecture, basic assembly language programming concepts, The program Counter and ROM Spaces in the 8051, Data types, 8051 Flag Bits ad PSW Register, 8051 Register Banks and Stack Instruction set, Loop and Jump Instructions, Call Instructions, Time delay generations and calculations, I/O port programming Addressing Modes, accessing memory using various addressing modes, Arithmetic instructions and programs, Logical instructions, BCD and ASCII application programs, Single-bit instruction programming, Reading input pins vs. port Latch, Programming of 8051 Timers, Counter Programming.

Module III: Communication with 8051

Basics of Communication, Overview of RS-232, I2C Bus, UART, USB, IEEE 488 (GPIB). Parallel input output applications. (Stepper motor Sequencer program, Strobed input/output). Interrupt driven applications (real time clock, serial input/output with interrupt). Analog-digital interfacing (Pulse width modulator, 8-bit ADC).

Module IV: Basics of 8051 C Programming

Introduction to 8051 C, 8051 memory constitution, Constants, variables and data types. Arrays structures and unions, pointers, Loops and decisions, Functions, Modules and programs.

Module V: 8051 C Programming

Data interface, Timer control, Interrupt operations, Digital operations, A/D and D/A conversions, Common control problem examples (Centronics parallel interface, Printer interace, Memory access, Key matrix scanning, Stepper motor control and digital clock.).

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

Text:

- Raj Kamal, 2004, "Embedded Systems", TMH.
- James W. Stewart and Kai X. Miao, 2en Edition. "The 8051 microcontroller" Pearson Edu. Prentice Hall.
- M.A. Mazidi and J. G. Mazidi, 2004 "The 8051 Microcontroller and Embedded Systems", PHI.

References:

- David E. Simon,1999, "An Embedded Software Primer", Pearson Education
- K.J. Ayala, 1991, "The 8051 Microcontroller", Penram International.
- Dr. Rajiv Kapadia, "8051 Microcontroller & Embedded Systems", Jaico Press
- Dr. Prasad, 2004, "Embedded Real Time System", Wiley Dreamtech.

VERILOG PROGRAMMING

Course Code: **ECE 806** **Credit Units: 03**

Course Objective:

This course discuss fundamental Verilog concepts of today's most advanced digital design techniques. it offers broad coverage of Verilog HDL from a practical design perspective. Introduces students to gate, dataflow (RTL), behavioural, and switch level modeling, describes leading logic synthesis methodologies; explains timing and delay simulation; and introduces many other essential techniques for creating tomorrows complex digital designs

Course Contents:

Module I: Introduction to Verilog HDL and Basic Concepts Emergence of HDL, typical design flow, trends in HDL, Modeling concept

Design methodologies, modules, instances, simulation, design block and stimulus block Lexical conventions, Data Types. System Tasks and Compiler Directives, Modules and Ports

Module II: Gate-Level Modeling and Dataflow Modeling

Gate Types. Gate Delays, Continuous Assignments. Delays. Expressions, Operators, and Operands. Operator Types. Examples for combinational and sequential circuit using Gate level and Data-flow modeling

Module III: Behavioural Modeling

Structured Procedures. Procedural Assignments. Timing Controls. Conditional Statements. Multiway Branching. Loops. Sequential and Parallel Blocks. Generate Blocks. Examples

Module IV: Tasks and Functions and Useful Modeling Techniques Difference between Tasks and Functions. Tasks. Functions.

Procedural Continuous Assignments. Overriding Parameters. Conditional Compilation and Execution. Time Scales. Useful System Tasks

Module V: Advanced Verilog Topics

Timing and Delays. Switch Level Modeling,User-Defined Primitives, Logic Synthesis with Verilog HDL, Advanced Verification Techniques

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att:

Attendance

Text & References:

- Samir Palnitkar, “Verilog HDL”, Pearson Education (2nd edition).
- Donald Thomas, Philip moorby, “The Verilog hardware Description language” 5th Edition, Kluwer Academic publishers
- Vivek Sagdeo,” The Complete Verilog Book”
- Parag K. Lala, Self-Checking and Fault-Tolerant Digital Design, Academic Press
- J. Bhasker, Verilog HDL Synthesis: A Practical Primer,1998

MAJOR PROJECT- I

Course Code: NMP 760 **Credit Units: 06**

Course Objectives:

The object of Major Project I is to enable the student to extend further the investigative study taken up under NMP 660, either fully theoretical/ practical or involving both theoretical and practical work, under the guidance of a Supervisor from the Department alone or jointly with a Supervisor drawn from R&D laboratory/Industry. This is expected to provide a good training for the student(s) in R&D work and technical leadership. The aim is to provide students an opportunity to exercise their creative and innovative qualities in a group project environment and to excite the imagination of aspiring engineers, innovators and technopreneurs.

Methodology:

Topics of project are to be based on the latest trends, verifying engineering concepts /principals and should involve elementary research work. The projects may involve design, fabrications, testing, computer modeling, and analysis of any engineering problem. On completion of the practical training the students are to present a report covering various aspects learnt by them and give a presentation on same.

Course Outcomes:

On successful completion of the course students will be able to:

- Demonstrate a sound technical knowledge of their selected project topic.
- Undertake problem identification, formulation and solution.
- Design engineering solutions to complex problems utilising a systems approach.
- Conduct an engineering project
- Communicate with engineers and the community at large in written an oral forms.
- Demonstrate the knowledge, skills and attitudes of a professional engineer.
- Write comprehensive report on project work.

Examination Scheme:

Literature study/ Fabrication/ Experimentation	40
Written Report	20

Viva	15
Presentation	25
Total	**100**

MAJOR PROJECT – II

Course Code: NMP 860 **Credit Units: 09**

Course Objectives:

The objective of Major project is to enable the student to take up investigative study in the broad field of Engineering, either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on an individual basis or two/three students in a group, under the guidance of a Supervisor. The aim is to provide students an opportunity to exercise their creative and innovative qualities in a group project environment and to excite the imagination of aspiring engineers, innovators and technopreneurs.

Methodology:

Topics of project are to be based on the latest trends, verifying engineering concepts /principals and should involve elementary research work. The projects may involve design, fabrications, testing, computer modeling, and analysis of any engineering problem. On completion of the practical training the students are to present a report covering various aspects learnt by them and give a presentation on same.

Course Outcomes:

On successful completion of the course students will be able to:

- Apply critical and creative thinking in the design of engineering projects
- Plan and manage time effectively as a team.
- Consider the business context and commercial positioning of designed devices or systems.
- Apply knowledge of the ‘real world’ situations that a professional engineer can encounter.
- Use fundamental knowledge and skills in engineering and apply it effectively on a project.
- Design and develop a functional product prototype while working in a team.
- Use various tools and techniques to study existing systems.
- Achieve precision in uses of the tools related to their experiments/fabrication.
- Timely reflect on peers’ technical and non-technical learning.
- Orally present and demonstrate your product to peers, academics, general and industry community.
- Write comprehensive report on project work.

Examination Scheme:

Literature study/ Fabrication/ Experimentation	40
Written Report	20
Viva	15
Presentation	25
Total	**100**

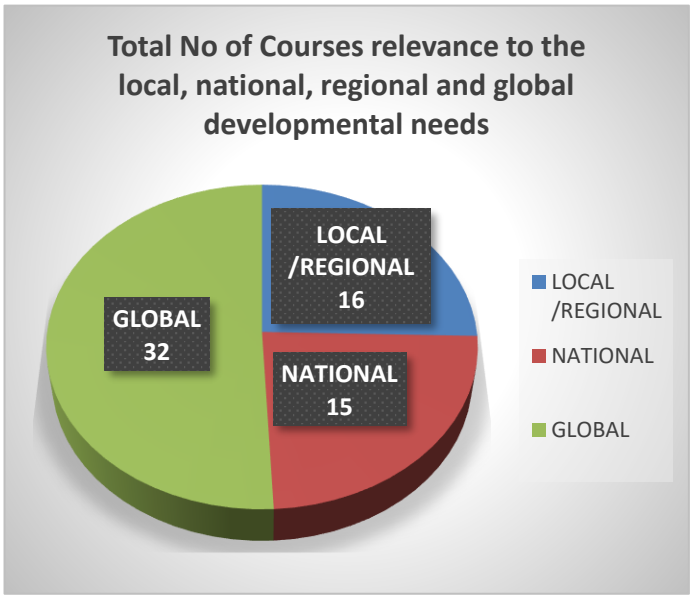
S.No.	Name of Institute/School	Programme Name	Semester	Course Code	Course Name	1.1.1 Curricula developed and implemented have relevance to the local, national, regional and global developmental needs, which is reflected in the Programme outcomes (POs), Programme Specific Outcomes(PSOs) and Course Outcomes(COs) of the Programmes offered by the University.		
						LOCAL /REGIONAL	NATIONAL	GLOBAL
Amity School of Engineering and Technology								
1	Amity School of Engineering and Technology	UG; B.Tech (Electronics & Communication Engineering)	I	MAT101	Applied Mathematics – I (Calculus and Linear Algebra)			
2				CHE101	Applied Chemistry	1		
3				CSE104	Programming for Problem Solving	1		
4				BME101	Engineering Graphics & Design	1		
5				CIV101	Basic Civil Engineering & Applied Mechanics			

6				CHE121	Applied Chemistry Lab		**1**	
7				CSE124	Programming for Problem Solving Lab			
8				BME121	Engineering Graphics & Design Lab	**1**		
9				BCU141	Communication Skills – I			
10				EVS142	Environmental Studies – I			**1**
11				BSU143	Behavioural Science – I	**1**		
12				FLU 144	French - I			**1**
13				MAT201	Applied Mathematics–II (Ordinary & Partial Differential Equations and Transform)			
14				PHY101	Applied Physics – I		**1**	
15				ECE101	Basic Electrical Engineering	**1**		
16				CSE204	Object Oriented Programming Using C++			
17				BME102	Workshop/ Manufacturing Practices			
18				PHY121	Applied Physics Lab – I		**1**	
19			**II**	ECE121	Basic Electrical Engineering Lab			
20				CSE224	Object Oriented Programming Using C++ Lab	**1**		
21				BME122	Workshop/ Manufacturing Practices Lab			
22				BCU 241	Communication Skill - II			**1**
23				EVS 242	Environmental Studies - II	**1**		
24				BSU243	Behavioural Science - II	**1**		
25				FLU 244	French - II			**1**
26				MAT 301	Applied Mathematics-III(Probability, Statistics and Numerical Methods)	**1**		
27				ECE 301	Electronic Devices			
28				ECE 302	Digital System Design	**1**		
29				ECE 303	Network Theory			
30				ECE 304	Signals and Systems			
31			**III**	CSE 202	Data Structures through C++		**1**	
32				ECE 321	Electronics Devices Lab			
33				ECE 322	Digital System Design Lab	**1**		
34				ECE 323	Network Theory Lab			
35				CSE 222	Data Structures through C++ Lab			
36				NTP 330	Term Paper (Evaluation)			

37				BCU 341	Communication Skill - III			**1**
38				BSU 343	Behavioural Science - III	**1**		
39				FLU 344	French - III			**1**
40				ECE 401	Analog and Digital Communication			**1**
41				ECE 402	Analog Circuits			
42				ECE 403	Microcontrollers			1
43				CSE 403	Java Programming		**1**	
44				ECE 421	Analog and Digital Communication Lab			
45				ECE 422	Analog Circuits Lab			
46			**IV**	ECE 423	Microcontrollers Lab			1
47				CSE 423	Java Programming Lab		**1**	
48				ECE 325	MATLAB and SIMULINK Lab		1	
49				ECE 425	Electronics Workshop Lab			1
50				BCU 441	Communication Skill - IV			**1**
51				BSU 443	Behavioural Science - IV	**1**		
52				FLU 444	French - IV			**1**
53				ECE 501	Electromagnetic Waves			
54				ECE 502	Digital Signal Processing			1
55				ECE 503	Antennas and Propagation			
56				ECE 504	Control Systems			
57				CSE 510	Advanced Programming through Python			1
58				ECE 521	Electromagnetic Waves Lab			
59				ECE 522	Digital Signal Processing Lab			1
60			**V**	ECE 523	Antennas and Propagation Lab			
61				ECE 524	Control Systems Lab			
62				CSE 530	Advanced Programming through Python Lab			
63				BCU 541	Communication Skill - V			**1**
64				BSU 543	Behavioural Science - V	**1**		
65				BSB 544	French - V		**1**	
66				FLU 550	Industrial Practical Training - I (Evaluation)		1	
67				ECE 601	Computer Architecture			
68				ECE 603	Quantitative Aptitude and Reasoning			
69			**VI**	CSE 603	Internet of Things (IOT)			1
70				CSE 604	Problem Solving Techniques – I			

71				CSE 623	Internet of Things (IOT) Lab			**1**
72				CSE 624	Problem Solving Techniques – I Lab	**1**		
74				ECE 605	Microwave Theory and Techniques			1
78				ECE 625	Microwave Theory and Techniques lab			1
81				BCU 641	Communication Skills – VI			
82				BSU 643	Behavioural Science – VI			
83				FLU 644	French - VI			**1**
84				NMP 660	Minor Project		**1**	
85				ECE 701	Fiber Optic Communication			
86				ECE 702	Computer Network			1
87				ECE 721	Fiber Optic Communication Lab		**1**	
88				ECE 722	Computer Network Lab			
90				ECE 704	CMOS Design			1
94				ECE 724	CMOS Design Lab			1
95			**VII**	ECE 725	Artificial Neural Networks Lab			
96				ECE 726	Analog CMOS IC Design Lab			
99				ECE 707	Mobile Communications			
103				NPT 750	Industrial Practical Training – II (Evaluation)		1	
104				NMP 760	Major Project – I			**1**
105				ECE 801	Information Theory and Coding			1
106				ECE 802	Radar & Satellite Communications		**1**	
107				ECE 803	Embedded Systems			1
108				ECE 821	Information Theory and Coding Lab			1
109				ECE 822	Radar & Satellite Communications Lab		**1**	
110			**VIII**	ECE 823	Embedded Systems Lab			1
112				ECE 804	VHDL Programming			1
113				ECE 805	Verilog Programming			1
116				ECE 824	VHDL Programming Lab			
117				ECE 825	Verilog Programming Lab			
120				NMP 860	Major Project – II			1
	ASET(ECE)		**Total No of Courses relevance to the local, national, regional and global developmental needs**			**16**	**15**	**32**

LOCAL /REGIONAL	**NATIONAL**	**GLOBAL**
16	**15**	**32**



Course Outcomes

FIRST SEMESTER

Sr No	Course Code	Course Title	Course Outcome
1	MAT101	APPLIED MATHEMATICS – I (CALCULUS AND LINEAR ALGEBRA)	The students will learn: • To apply differential and integral calculus tools to the notions of curvature and to improper integrals. Apart from various applications, they will have a basic understanding of Beta and Gamma functions. • The mathematical tools needed in evaluating multiple integrals and their usage. • The essential tools of matrices that are used in various techniques dealing with engineering problems. • The tools of linear algebra including linear transformations, eigen values, diagonalization.

2	CHE101	APPLIED CHEMISTRY	After successful completion of the course students will have the knowledge and skill to: • Apply the principles chemical of sciences to understand the very basic bonding mechanism and the application to materials in different engineering situations.
3	CSE104	PROGRAMMING FOR PROBLEM SOLVING	The student will learn • To formulate simple algorithms for arithmetic and logical problems. • To translate the algorithms to programs (in C language). • To test and execute the programs and correct syntax and logical error • To implement conditional branching, iteration and recursion. • To decompose a problem into functions and synthesize a complete program using divide and conquer approach. • To use arrays, pointers and structures to formulate algorithms and programs. • To apply programming to solve matrix addition and multiplication problems and searching and sorting problems. • To apply programming to solve simple numerical method problems, namely rot finding of function, differentiation of function and simple integration
4	BME101	ENGINEERING GRAPHICS & DESIGN	To prepare students to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability To prepare students to use the techniques, skills, and modern engineering tools necessary for engineering practice To prepare for actual work situations through practical training in a new state-of-the-art computer designed CAD laboratory using engineering software.
5	CIV101	BASIC CIVIL ENGINEERING & APPLIED MECHANICS	Upon completion of the course, the students will be able to: • Explain concepts and terminologies of building materials, surveying and mechanics. • Apply various methods for surveying and mechanics. • Determine the location, area and volume of objects on ground surface. • Solve the problems of surveying and mechanics by using various methods. • Analyse the effects of system of forces on rigid bodies in static conditions.

SECOND SEMESTER

Sr No	Course Code	Course Title	Course Outcome
1	MAT201	APPLIED MATHEMATICS – II (ORDINARY & PARTIAL DIFFERENTIAL EQUATIONS AND TRANSFORM)	• Upon completion of this course, students will be able to solve field problems in engineering involving ODEs, PDEs. • The effective mathematical tools for the solutions of differential equations that model physical processes.

			• The students will be able to use Laplace transform to solve differential equations. • The student will be able to solve PDEs by using the concept of Fourier series. • The concept of functions of complex variables with respect to differentiation and integration. • The computation of some special real integrations using complex integration.
2	PHY101	APPLIED PHYSICS - I	After successful completion of the course students will have the knowledge and skill to: • Apply vector calculus to static electric-magnetic fields in different engineering situations. • Analyze and Apply Maxwell's equation to diverse engineering problems. • Relate semiconductor material properties to semiconductor devices
3	ECE101	BASIC ELECTRICAL ENGINEERING	• To understand and analyze basic electric and magnetic circuits. • To study the working principles of electrical machines and power converters. • To introduce the components of low voltage electrical installations.
4	CSE204	OBJECT ORIENTED PROGRAMMING USING C++	At the end of this course, students will demonstrate ability to: • To apply concepts of classes and objects in real world scenarios. • Understand object-oriented programming features in C++, • Apply these features to program design and implementation, • Understand object-oriented concepts and how they are supported by C++, • Gain some practical experience of C++.
5	BME102	WORKSHOP/ MANUFACTURING PRACTICES	• To gain knowledge of the different manufacturing processes which are commonly employed in the industry • To fabricate components using different materials

THIRD SEMESTER

Sr No	Course Code	Course Title	Course Outcome

1	MAT 301	APPLIED MATHEMATICS - III PROBABILITY, STATISTICS AND NUMERICAL METHODS	• The objective of this course is to familiarize the students with statistical techniques. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling various problems in the discipline. • The students will learn: The ideas of probability and random variables and various discrete and continuous probability distributions and their properties. • The basic ideas of statistics including measures of central tendency, correlation and regression. • The statistical methods of studying data samples. • Numerical techniques to solve simultaneous linear equations, interpolation and extrapolation. • Numerical techniques of differential and integral. • Solution of ordinary differential equation by numerical techniques.
2	ECE 301	ELECTRONIC DEVICES	At the end of this course students will demonstrate the ability to • Understand the principles of semiconductor Physics • Understand and utilize the mathematical models of semiconductor junctions and MOS transistors for circuits and systems. • To understand and analyze basic electronic device circuits. • To study the applications of electrical devices and practical aspects. • To introduce the fabrication process of IC's. •
3	ECE 302	DIGITAL SYSTEM DESIGN	At the end of this course students will demonstrate the ability to • Design and analyze combinational logic circuits • Design & analyze modular combinational circuits with MUX/DEMUX, Decoder, Encoder • Design & analyze synchronous sequential logic circuits
4	ECE 303	NETWORK THEORY	At the end of this course students will demonstrate the ability to • Understand basics electrical circuits with nodal and mesh analysis. • Appreciate electrical network theorems. • Apply Laplace Transform for steady state and transient analysis. • Determine different network functions. • Appreciate the frequency domain techniques.
5	ECE 304	SIGNALS AND SYSTEMS	At the end of this course students will demonstrate the ability to • Analyze different types of signals • Represent continuous and discrete systems in time and frequency domain using different transforms Investigate whether the system is stable Sampling and reconstruction of a signal
6	CSE 202	DATA STRUCTURES THROUGH C++	• Ability to choose appropriate data structures to represent data items in real world problems. • Ability to analyze the time and space complexities of algorithms. • Ability to design programs using a variety of data structures such as stacks, queues, hash tables, binary trees, search trees, heaps, graphs, and B-trees. • Able to analyze and implement various kinds of searching and sorting techniques.

FOURTH SEMESTER

Sr No	Course Code	Course Title	Course Outcome
1	ECE 401	ANALOG AND DIGITAL COMMUNICATION	• At the end of this course students will demonstrate the ability to • Analyze and compare different analog modulation schemes for their efficiency and bandwidth • Analyze the behavior of a communication system in presence of noise • Investigate pulsed modulation system and analyze their system performance • Analyze different digital modulation schemes and can compute the bit error performance
2	ECE 402	ANALOG CIRCUITS	At the end of this course students will demonstrate the ability to • Understand the characteristics of diodes and transistors • Design and analyze various rectifier and amplifier circuits • Design sinusoidal and non-sinusoidal oscillators • Understand the functioning of OP-AMP and design OP-AMP based circuits • Design ADC and DAC •
3	ECE 403	MICROCONTROLLERS	At the end of this course students will demonstrate the ability to • Do assembly language programming • Do interfacing design of peripherals like, I/O, A/D, D/A, timer etc. • Develop systems using different microcontrollers • Understand RISC processors and design ARM microcontroller based systems
4	CSE 403	JAVA PROGRAMMING	The student will learn: • Students can perform object oriented programming solution and develop solutions to problems demonstrating usage of control structure, modularity, classes, I/O and the scope of the class members • Students can demonstrate adeptness of object oriented programming in developing solution to problems demonstrating usage of data abstraction, encapsulation and inheritance • Students can demonstrate ability to implement one or more patterns involving dynamic binding and utilization of polymorphism in the solution of problems • Students can demonstrate ability to implement multithreading in the programming. • To learn syntax and features of exception handling • Students can demonstrate the ability to implement solution to various I/O manipulation operations and the ability to create two-dimensional graphic components using Swings. • To demonstrate the ability to handle Events in the Programming
5	ECE325	MATLAB AND SIMULINK LAB	At the end of this course, a student would: • Learn basics of MATLAB programming. • Get introduced to numerical methods for engineering problems and will be able to use MATLAB and Simulink to solve computational problems. • Translate mathematical methods to MATLAB code. • Break a complex task up into smaller, simpler tasks using MATLAB and Simulink.

			• Represent mathematical objects as data structures. • Tabulate results and represent data visually. • Use MATLAB development tools to find and correct problems with code.

FIFTH SEMESTER

Sr No	Course Code	Course Title	Course Outcome
1	ECE 501	ELECTROMAGNETIC WAVES	At the end of this course students will demonstrate the ability to: • Understand characteristics and wave propagation on high frequency transmission lines • Carryout impedance transformation on TL • Use sections of transmission line sections for realizing circuit elements • Characterize uniform plane wave • Calculate reflection and transmission of waves at media interface • Analyze wave propagation on metallic waveguides in modal form • Understand principle of radiation and radiation characteristics of an antenna
2	ECE 502	DIGITAL SIGNAL PROCESSING	• At the end of this course students will demonstrate the ability to • Represent signals mathematically in continuous and discrete time and frequency domain • Get the response of an LSI system to different signals • Design of different types of digital filters for various applications •
3	ECE 503	ANTENNA AND PROPOGATION	At the end of the course, students will demonstrate the ability to: • Understand the properties and various types of antennas. • Analyze the properties of different types of antennas and their design. • Operate antenna design software tools and come up with the design of the antenna of required specifications.
4	ECE 504	CONTROL SYSTEMS	At the end of this course students will demonstrate the ability to: • Characterize a system and find its steady state behavior • Investigate stability of a system using different tests • Design various controllers • Solve liner, non-liner and optimal control problems
5	CSE 302	PYTHON PROGRAMMING	• Ability to create client-server application for real world problems. • Ability to apply Regular Expression, CGI and Database. • Ability to apply GUI Programming in real world problems.

SIXTH SEMESTER

Sr No	Course Code	Course Title	Course Outcome
1	ECE 601	COMPUTER ARCHITECTURE	At the end of this course students will demonstrate • The ability to learn how computers work know basic principles of computer's working. • Analyze the performance of computers. • know how computers are designed and built. • Understand issues affecting modern processors (caches, pipelines etc.).
2	ECE 602	PROBABILITY THEORY AND STOCHASTIC PROCESSES	At the end of this course students will demonstrate the ability to • Understand representation of random signals • Investigate characteristics of random processes • Make use of theorems related to random signals • To understand propagation of random signals in LTI systems. •
3	ECE 603	QUANTITATIVE APTITUDE AND REASONING	The student will be able: • Understand the basic concepts of QUANTITATIVE ABILITY • Understand the basic concepts of LOGICAL REASONING Skills • Acquire satisfactory competency in use of VERBAL REASONING • Solve campus placements aptitude papers covering Quantitative Ability, Logical Reasoning and Verbal Ability. • Compete in various competitive exams like CAT, CMAT, GATE, GRE, GATE, UPSC, GPSC etc.
4	CSE 603	PYTHON PROGRAMMING	• Ability to create client-server application for real world problems. • Ability to apply Regular Expression, CGI and Database. • Ability to apply GUI Programming in real world problems.
5	CSE 604	PROBLEM SOLVING TECHNIQUES – I	• Able to understand the concepts of data structure, data type and array data structure. • Able to implement linked list data structure to solve various problems. • Able to understand and apply various data structure such as stacks, queues, trees and graphs to solve various computing problems using C/C++ -programming language. • To apply concepts and techniques for implementation.

6	ECE605	MICROWAVE THEORY AND TECHNIQUES	At the end of the course, students will demonstrate the ability to: • Understand various microwave system components their properties. • Appreciate that during analysis/ synthesis of microwave systems, the different mathematical treatment is required compared to general circuit analysis. • Design microwave systems for different practical application. •
7	NMP660	MINOR PROJECT	At the end of the course, students will demonstrate the ability to: 1. Conceive a problem statement either from rigorous literature survey or from the requirements raised from need analysis. 2. Design, implement and test the prototype/algorithm in order to solve the conceived problem. 3. Write comprehensive report on mini project work.

SEVENTH SEMESTER

Sr No	Course Code	Course Title	Course Outcome
1	ECE 701	FIBER OPTIC COMMUNICATION	At the end of the course, students will demonstrate the ability to: • Understand the principles fiber-optic communication, the components and the bandwidth advantages. • Understand the properties of the optical fibers and optical components. • Understand operation of lasers, LEDs, and detectors • Analyze system performance of optical communication systems • Design optical networks and understand non-linear effects in optical fibers
2	ECE 702	COMPUTER NETWORK	**Course Outcomes:** At the end of this course students will demonstrate the ability to: • Understand the concepts of networking thoroughly. • Design a network for a particular application. • Analyze the performance of the network. • To see the function of Transport and Network layer •
3	ECE 704	CMOS DESIGN	At the end of the course, students will demonstrate the ability to: • Design different CMOS circuits using various logic families along with their circuit layout. • Use of tools for VLSI IC design.
4	ECE 707	MOBILE COMMUNICATIONS	At the end of the course, students will demonstrate the ability to:

			• Explain the basic physical and technical settings functioning of mobile communications systems, • Describe the basic principles of mobile communication system,. • Describe the development and implementation of mobile communication systems,
5	NMP760	MAJOR PROJECT- I	On successful completion of the course students will be able to: • Demonstrate a sound technical knowledge of their selected project topic. • Undertake problem identification, formulation and solution. • Design engineering solutions to complex problems utilising a systems approach. • Conduct an engineering project • Communicate with engineers and the community at large in written an oral forms. • Demonstrate the knowledge, skills and attitudes of a professional engineer. • Write comprehensive report on project work.

EIGHTH SEMESTER

Sr No	Course Code	Course Title	Course Outcome
1	ECE 801	INFORMATION THEORY AND CODING	At the end of the course, students will demonstrate the ability to: • Understand the concept of information and entropy • Understand Shannon's theorem for coding • Calculation of channel capacity • Apply coding techniques
2	ECE 802	RADAR AND SATELLITE COMMUNICATIONS	At the end of this course students will demonstrate the ability to • Visualize the architecture of different types of Radar systems and satellite systems as a means of high speed, high range communication system. • State various aspects related to satellite systems such as orbital equations, sub-systems in a satellite, link budget, modulation and multiple access schemes. • Solve numerical problems related to orbital motion and design of link budget for the given parameters and conditions. •
3	ECE 803	EMBEDDED SYSTEMS	At the end of this course students will demonstrate the ability to • Suggest design approach using advanced controllers to real-life situations. • Design interfacing of the systems with other data handling / processing systems. • Appreciate engineering constraints like energy dissipation, data exchange speeds etc.

4	ECE 804	VHDL PROGRAMMING	At the end of the course, students will demonstrate the ability to: • Design synchronous and asynchronous sequential circuits • Translate real world problems into digital logic formulations. • Construct test and debug digital networks using VHDL.
5	NMP860	MAJOR PROJECT – II	On successful completion of the course students will be able to: • Apply critical and creative thinking in the design of engineering projects • Plan and manage time effectively as a team. • Consider the business context and commercial positioning of designed devices or systems. • Apply knowledge of the 'real world' situations that a professional engineer can encounter. • Use fundamental knowledge and skills in engineering and apply it effectively on a project. • Design and develop a functional product prototype while working in a team. • Use various tools and techniques to study existing systems. • Achieve precision in uses of the tools related to their experiments/fabrication. • Timely reflect on peers' technical and non-technical learning. • Orally present and demonstrate your product to peers, academics, general and industry community. • Write comprehensive report on project work.

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

AMITY UNIVERSITY MADHYA PRADESH, GWALIOR

AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY (CIVIL)

Program Educational Objectives (PEO)

Master of Technology (structural Engineering)
Academic Year – 2021-22

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

Graduates of the programme M Tech Civil Engineering will

I. Gain in-depth knowledge to identify and formulate challenging environmental andwater resources problems, apply appropriate research methodologies, use modern engineering tools and provide technically sound,economical and sustainable solutions.

II. Graduates will have ability for higher studies and undertake high value research on environmental,water resources and other related issues.

III. Graduates of programme will have sound analytical and lateral thinking ability to engage in lifelong learning for professional advancement to cope up with multidisciplinary and changing technologies in environmental and water resources engineering.

IV. Graduates of the programme will have sense of social responsibility, will demonstrate ability to communicate and work effectively as a team member in an ethical way, and will play leadership roles in their profession, public services and community.

AMITY UNIVERSITY

MADHYA PRADESH

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

AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY (CIVIL ENGINEERING)

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Master of Technology (M. Tech.) Structure , Academic Year – 2021-22

PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Master of Technology (M. Tech.) CE (Structural Engineering), Academic Year – 2021-23

Programme Outcomes:

[PO. 1]. **Engineering Knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
[PO. 2]. Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
[PO. 3]. Design/Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
[PO. 4]. Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
[PO. 5]. Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
[PO. 6]. The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
[PO. 7]. Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
[PO. 8]. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
[PO. 9]. Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
[PO. 10]. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
[PO. 11]. Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects
[PO. 12]. Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes:

PSO_01: Develop and apply innovative, state-of-the-art practices and technologies and Provide sustainable solutions to the Civil Engineering Problems

PSO_02: Plan, design, construct and operate society economic and social engine that built the environment and also protecting, restoring the natural environment

PSO_03: Apply modern techniques, advanced materials, equipment and management tools so as to complete the civil engineering project within specified time and funds.

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

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

If there is no correlation, put "- "

PROGRAMME ARTICULATION MATRIX																
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I SEM	CEM 101	3	3	2	3	3	2	2	-	3	2	3	3			
	CEM 102	2	2	2	-	3	-	3	2	-	3	-	3			
	CEM 103	3	3	1	2	3	3	3	3	3	-	1	3			
	CEM 105	2	-	2	-	3	-	3	2	-	3	-	3			
	CEM 120	3	3	3	2	2	1	1	-	-	-	-	3			
	CEM 123	2	2	2	-	3	-	3	2	-	3	-	3			
	CEM 124	3	3	1	2	3	3	3	3	3	-	1	3			
II SEM	CEM 104	3	3	2	3	3	2	2	-	3	2	3	3			
	CEM 203	2	2	2	-	3	-	3	2	-	3	-	3			
	CEM 207	3	3	1	2	3	3	3	3	3	-	1	3			
	CEM 204	2	-	2	-	3	-	3	2	-	3	-	3			
	CEM 220	3	3	3	2	2	1	1	-	-	-	-	3			
	CEM 222	2	2	2	-	3	-	3	2	-	3	-	3			
	CEM 223	3	3	1	2	3	3	3	3	3	-	1	3			
	CEM 301	3	3	2	3	3	2	2	-	3	2	3	3			

III SEM	CEM 302	2	2	2	-	3	-	3	2	-	3	-	3			
	CEM 303	3	3	1	2	3	3	3	3	3	-	1	3			
	CEM 306	2	-	2	-	3	-	3	2	-	3	-	3			
	CEM 322	3	3	3	2	2	1	1	-	-	-	-	3			
	CEM 323	2	2	2	-	3	-	3	2	-	3	-	3			
	CEM 324	3	3	1	2	3	3	3	3	3	-	1	3			
IV SEM	MMP 460	3	3	2	3	3	2	2	-	3	2	3	3			

Amity School of Engineering and Technology

Amity University Madhya Pradesh

PO Mapping of M.Tech
(Structure) syllabus with the SDGs

Sr No	Program Outcome [PO]	Program Outcome	Mapping with SDGs.
1	PO-1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems	SDG 4 Quality Education
2	PO-2	**Problem analysis**: Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences,and engineering sciences.	SDG 9 Industry, Innovation, and Infrastructure
3	PO-3	**Design/development of solutions**: Design solutions for complex engineering problems and designsystem components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural,s ocietal,and environmental considerations	SDG 4 Quality Education
4	PO-4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions	**SDG4** Quality Education
5	PO-5	**Moderntool usage**:Create,select,andapplyappropriatetechniques,resources,andmodernengineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations	SDG 8 Decent work and economic growth
6	PO-6	**The Engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues, and the consequent responsibilities relevant to the professional engineering practice	**SDG 6** Clean Water and Sanitation
7	PO-7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in	**SDG 7:** 7: Affordable and Clean Energy

		societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development	
8	**PO-8**	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practices	**SDG** 10: Reduce Inequalities
9	**PO-9**	**Individual and teamwork**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings	SDG 17 Partnerships for the Goals
10	**PO-10**	**Communication**:Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions	SDG 9: Industry, Innovation, and Infrastructure
11	**PO-11**	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply the set one's own work, as a member and leader in team, to manage projects and in multidisciplinary environments	SDG8: Decent Work and Economic Growth
12	**PO-12**	**Life-long learning**:Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change	SDG16: Peace, Justice, and Strong Institutions

Courses Mapped with various National Missions

Sr. No.	Name of School	Program Name	Semester	Course Code	Course Name	National Mission
1	Amity School of Engineering and Technology	M.tech. (Structural Engineering)	I	BCP 141	Advanced Communication – I	National Mission for Natural Language Translation
3	Amity School of Engineering and Technology	M.tech. (Structural Engineering)	II	BCP 241	Advanced Communication – II	National Mission for Natural Language Translation
	Amity School of Engineering and Technology	M.tech. (Structural Engineering)	III	BCP 341	Advanced Communication – III	National Mission for Natural Language Translation

Course Structure: ADVANCED COMMUNICATION-I- BCP 141

Course Title: ADVANCED COMMUNICATION-I **Credit Units: 1**

Course Level: PG Level **Course Code: BCP 141**

Course Objectives:

- The Course is designed to enhance vocabulary skills and make students fluent, thereby improving receptive and expressive skills.

Pre-requisites: NIL.

Course Contents/Syllabus:

	Weightage (%)
Module I Fundamentals of Communication	**30**
Descriptors/Topics • Role and Purpose of Communication,7 C's of Communication • Barriers to Effective Communication • Forms of Communication: One-to-One, Informal and Formal	
Module II Oral Communication	**20**
Descriptors/Topics • Effective Listening: Principles and Barriers • Effective Speaking: Pronunciation and Accent	
Module III Advanced Vocabulary Building	**20**
Descriptors/Topics • Word Formation; Synonyms; Antonyms; Eponyms; Homonyms, Homophones & Homographs • One Word Substitution; Phrasal Verbs, Idiomatic Expressions & Proverbs • Foreign Words in English	

Module IV Non Verbal Communication	**30**
Descriptors/Topics • Principles & Significance • Kinesics, Oculesics, Proxemics,, Para-Language, Artifacts, Chronemics, Tactilics	

Student Learning Outcomes:

- The students will be able to use the LSRW Skills to communicate effectively in a professional environment.
- Will be able to develop fluency

Pedagogy for Course Delivery: Workshop, Presentation, Group Discussion & Lectures

List of Professional Skill Development Activities(PSDA): N/A.

Assessment/ Examination Scheme:

Theory L/T (%)	**Lab/ Practical/ Studio (%)**	**End Term Examination**
100%	NA	70%

Theory Assessment (L&T):

End Term Examination				
Components (Drop down)	CIE	Mid Sem	Attendance	**End Term Examination**
Weightage (%)	10%	15%	5%	70%

Text Reading:

- Jones, Working in English, 1st ed. Cambridge, CUP 2001
- Raman Prakash, Business Communication, 2nd ed. Delhi OUP 2006
- Butterfield, Jeff Soft skills for Everyone, Cengage Learning 2011
- Reference: Guffey, Ellen Mary, Business Communication, Thomson (South Western)
- Dale Carnegie: Quick and Easy Way of Public Speaking

References:

- Business Communication Today – Courtland L Bovee, John V Thill Mukesh Chaturvedi, Pearson 2009
- Additional Reading: Newspapers and Journals

Course Structure: ADVANCED COMMUNICATION-II - BCP 241

Course Title: ADVANCED COMMUNICATION-II **Credit Units: 1**

Course Level: PG Level **Course Code: BCP 241**

Course Objectives:

- The Course is designed to enhance vocabulary skills and make students fluent, thereby improving receptive and expressive skills.

Pre-requisites: NIL.

Course Contents/Syllabus:

	Weightage (%)
Module I Job Correspondence **Descriptors/Topics** • Job Applications • Resume & Profile Writing for Social Media • Follow Up Letter	**20**
Module II Dynamics of Group Discussion **Descriptors/Topics** • Methodology • Guidelines	**30**
Module III Speaking for Employment **Descriptors/Topics** • Types of Interview (Technical & HR Rounds) • Fundamentals of Facing Interviews • Question Answer on Various Dimensions • Non-Verbal Communication Component • Interview Etiquettes	**50**

Student Learning Outcomes:

- The student will be able to write an impressive resume and face the interview confidently

Pedagogy for Course Delivery: Workshop, Presentation, Group Discussion & Lectures

List of Professional Skill Development Activities (PSDA): N/A.

Assessment/ Examination Scheme:

Theory L/T (%)	**Lab/Practical/Studio (%)**	**End Term Examination**
100%	NA	70%

Theory Assessment (L&T):

End Term Examination				
Components (Drop down)	**CIE**	**Mid Sem**	**Attendance**	**End Term Examination**
Weightage (%)	10%	15%	5%	70%

Text Reading:

- Bovee, L Courtland, Mukeshchaturvedi, and John U Thill, Business Communication Today, Pearson
- Raman Prakash, Business Communication, 2nd ed. Delhi OUP 2006
- Comfort ,Jermy Speaking Effectively, Jermy, et.al, Cambridge, CUP, 1994
- Reference: Guffey, Ellen Mary, Business Communication, Thomson (South Western)
- Stay Hungry, Stay Foolish: Rashmi Bansal
- Business Maharajas: Gita Piramal
- How to Make Friends in Digital Age: Dale Carnegie
- Kathryn Rentz, NeerjaPande, Mc Graw Hill, 2009

References:

- Business Communication Today – Courtland L Bovee, John V Thill Mukesh Chaturvedi, Pearson 2009
- Additional Reading: Newspapers and Journals

Course structure: ADVANCED COMMUNICATION-III – BCP 341

Course Title: ADVANCED COMMUNICATION-III **Credit Units: 1**

Course Level: PG Level **Course Code: BCP 341**

Course Objectives:

- The course is designed to develop competence in communication skills related to production & presentation of messages in multiple formats & understand the importance of body language.

Pre-requisites: N/A

Course Contents/Syllabus:

	Weightage (%)
Module I Written Communication	**40**
Descriptors/Topics • D Coherence and Structure • Précis Writing • Writing Paragraphs & Essays	
Module II Developing Writing Skills	**30**

Descriptors/Topics • Business Letter/Official Correspondence • Social Correspondence • Emails & Netiquette	
Module III Business Presentations	**30**
Descriptors/Topics • Planning, Design and Layoutof Presentation • Contents : Information Packaging & Delivery • Personal Branding	

Student Learning Outcomes:

- The student will be able to write impressive official correspondence and also learn to make and give effective presentations in a professional environment.

Pedagogy for Course Delivery: Workshop, Presentation, Group Discussion and Lectures

List of Professional Skill Development Activities (PSDA): N/A

Assessment/Examination Scheme:

Theory L/T (%)	Lab/Practical/Studio (%)	End Term Examination
100%	NA	70%

Theory Assessment (L&T):

Components (Drop down)	CIE	Mid Sem	Attendance	End Term Examination
Weightage (%)	10%	15%	5%	70%

IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva

Text Reading:

- Raman Prakash, Business Communication, 2nd ed. Delhi OUP 2006
- Comfort ,Jermy Speaking Effectively, Jermy, et.al, Cambridge, CUP, 1994
- Lesikar&Flatley, Basic Business Communication, Tata McGraw- Hill Edition

References:

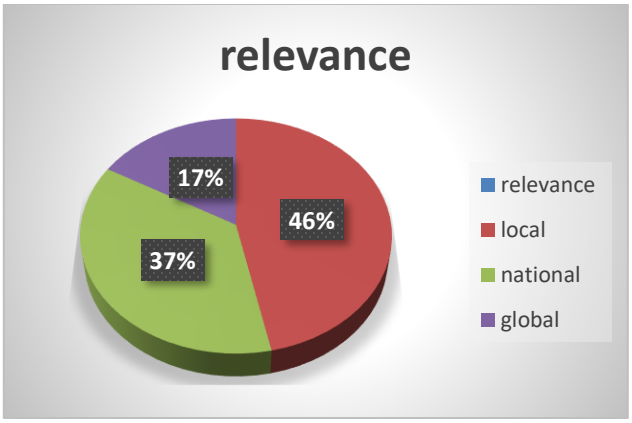
- Guffey, Ellen Mary, Business Communication, Thomson (South Western)
- Business Communication for Managers, PayalMehra Pearson 2012
- Additional Reading: Newspapers and Journal

S.No.	Name of Institute/School	Programme Name	Semester	Course Code	Course Name	1.1.1 Curricula developed and implemented have relevance to the local, national, regional and global developmental needs, which is reflected in the Programme outcomes (POs), Programme Specific Outcomes(PSOs) and Course Outcomes(COs) of the Programmes offered by the University.		
						LOCAL /REGIONAL	NATIONAL	GLOBAL
Amity School of Engineering and Technology (M.Tech Structure)								
1	Amity School of Engineering and Technology	PG; M.Tech. (Structural Engineering)	I sem	CEM 101	Numerical Analysis and Computer Programming	1		
2				CEM 102	Concrete Technology	1		
3				CEM 103	Advanced Structural Analysis		1	
4				CEM 105	Bridge Engineering	1		

5				CEM 120	Numerical Analysis Lab	**1**		
6				CEM 123	Advanced Concrete Lab		**1**	
7				CEM 124	Computer Aided Design Lab	**1**		
8				BCP 141	Advanced Communication – I			**1**
9				BSP 143	Behavioral Science – I			**1**
10				MTP 130	Term Paper	**1**		
11			II sem	CEM 104	Structural Dynamics and Earthquake Resistant Building	**1**		
12				CEM 203	Finite Element Method	**1**		
13				CEM 207	Structural Health Monitoring		**1**	

14				CEM 205	Design of Pre-Stressed Structures		**1**	
15				CEM 220	Structural Engineering Lab	**1**		
16				CEM 222	Finite Element Method Lab	**1**		
17				CEM 223	Non-Destructive Testing Lab		**1**	
18				BCP 241	Advanced Communication – II			**1**
19				BSP 243	Behavioral Science – II			**1**
20				MMP 260	Minor Project I		**1**	
21			III sem	CEM 301	Research Methodology		**1**	
22				CEM 302	Advanced RCC Design		**1**	
23				CEM 303	High Rise Buildings analysis	**1**		

24				CEM 306	Evaluation and Retrofitting of Building		**1**	
25				CEM 322	Structural Material Testing Lab-II	**1**		
26				CEM 323	Structural Dynamics Lab	**1**		
27				CEM 324	Advanced Structural Detailing Lab	**1**		
28				MSP 350	Summer Internship Programme (SIP)		**1**	
29				MMP 360	Minor Project II		**1**	
30			IV Sem	MMP 460	Dissertation			**1**
	ASET(Civil)		**Total No of Courses relevance to the local, national, regional and global developmental needs**			**14**	**11**	**5**



M.Tech. Course outcome Table

S. No.	Course Code	Course Title	Course outcome
1	CEM 101	Numerical Analysis and Computer Programming	• • After the completion of this subject course, the students can develop the algorithm and program in the various field of structural Engineering. The knowledge of numerical techniques will be very helpful in their dissertation work.
2	CEM 102	Concrete Technology	• On the completion of this subject course, the students can apply the basic knowledge of concrete in the development of more smart concrete composites.
3	CEM 103	Advanced Structural Analysis	• Skill of computer aided analysis & design of the Civil Engineering structures.
4	CEM 105	Bridge Engineering	• On the completion of this subject course, the students can apply the basic knowledge of Bridge engineering in their M. Tech dissertation like optimization in design of bridges,

			Health monitoring of bridges and reliability of bridges.
5	CEM 120	Numerical Analysis Lab	• Practice of solving Small problems of Structural Engineering will help in solving the major Civil Engineering problems.
6	CEM 123	Advanced Concrete Lab	• On the completion of this subject course, the students can apply the basic knowledge of concrete in the development of more smart concrete.
7	CEM 124	Computer Aided Design Lab	• With this back ground, students can do the modeling in the various phases of analysis & Design of the structures.
8	BCP 141	Advanced Communication – I	• The students will be able to use the LSRW Skills to communicate effectively in a professional environment. • • Will be able to develop fluency
9	BSP 143	Behavioral Science – I	• The students will be able to use the LSRW Skills to communicate effectively in a professional environment.
10	MTP 130	Term Paper	
11	CEM 104	Structural Dynamics and Earthquake Resistant Building	• Basic knowledge of this course will create a skill of designing the earthquake resistance Civil engineering structures using IS: 1893-2002 and ductile detailing using IS: 13920-2016.
12	CEM 203	Finite Element Method	• On the completion of this subject course, the students can apply the elemental approach of analysis & design in the various

			field of structural Engineering. The knowledge of numerical techniques will be very helpful in their dissertation work.
13	CEM 207	Structural Health Monitoring	• Suggest repairs and rehabilitation measures of the structure
14	CEM 205	Design of Pre-Stressed Structures	• After the completion of this subject course, the students can develop their skill in the field of Pre-cast construction and pre-stressed construction. The knowledge of pre-stressed design can help in their dissertation work.
15	CEM 220	Structural Engineering Lab	• After the completion of this subject course, the students can develop their skill in the field of quality control of materials and various causes of failure of structures.
16	CEM 222	Finite Element Method Lab	• After the completion of this subject course, the students can develop the algorithm and program in the various field of structural Engineering. The knowledge of numerical techniques will be very helpful in their dissertation work.
17	CEM 223	Non- Destructive Testing Lab	• Diagnosis the distress in the structure understanding the causes and factors. • • Assess the health of structure using static field methods.
18	BCP 241	Advanced Communication – II	• The student will be able to write an impressive resume and face the interview confidently

19	BSP 243	Behavioral Science – II	• The students will be able to use the LSRW Skills to communicate effectively in a professional environment.
20	MMP 260	Minor Project I	• Develop aptitude for research and independent learning. • **2.** Demonstrate the ability to carry out literature survey and select unresolved problems in the domain of the selected project topic. • **3. Gain expertise to use new tools and techniques for design and development.** • **4.** Acquire the knowledge and awareness to carry out cost-effective and environment friendly designs. • **5.** Develop the ability to write good technical reports, make oral presentations of the work, and publish the work in reputed conferences/journals. •
21	CEM 301	Research Methodology	• To develop the algorithm and program in the various field of structural Engineering. The knowledge of numerical techniques will be very helpful in their dissertation work.
22	CEM 302	Advanced RCC Design	• To design the advanced R.C.C Structures. • Various design philosophy of R.C.C design of members.
23	CEM 303	High Rise Buildings analysis	• Analysis of Analysis & Design of various components of High Rise Buildings (HRB). Design the various foundations of HRBs
24	CEM 306	Evaluation and Retrofitting of Building	• Students can understand the various deficiencies in R.C.C. buildings & its evaluation. • Deficiency-based retrofit methods

25	CEM 322	Structural Material Testing Lab-II	• After the completion of this subject course, the students can work as quality Engineer at site
26	CEM 323	Structural Dynamics Lab	• Students can use the various control schemes in the research work
27	CEM 324	Advanced Structural Detailing Lab	• After the completion of this subject course, the students can execute the construction sites easily.
28	MSP 350	Summer Internship Programme (SIP)	Explore the preferred field of specialization and develop analytical / hardware / software / experimental / observation skills. 2. Manage the technical content and work. 3. Learn the various administrative process followed in industry. 4. Experience gained from the 'Industrial Internship' in classroom will be used in classroom discussions. 5. Create conditions conducive to quest for knowledge and its applicability on the job. 6. Prepare and present technical report.
29	MMP 360	Minor Project II	1. Understand the issues related with the recent trends in the field of engineering/science and its applications 2. Formulate the problem definition, analyze and do functional simulation of the same. 3. Design, Implement, test and verify the engineering solution related to problem definition. 4. Compile, Comprehend and Present the work carried out. 5. Manage Project 6. Develop the ability to write good technical reports, make oral presentations of the work, and publish the work in reputed conferences/journals.

30	MMP 460	Dissertation