AMITY SCHOOL OF ENGINEERING & TECHNOLOGY

B.TECH. (Electronics & Communication Engineering) (Eight Semesters)

COURSE OUTCOMES:

FIRST SEMESTER:

S.No.	Course Code	Course Name	Course Outcomes
1	MAT 101	**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

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			• 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.
6	**CHE121**	**Applied Chemistry Lab**	The chemistry laboratory course will consist of experiments illustrating the principles of chemistry relevant to the study of science and engineering. The students will learn to measure:

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			• Molecular/system properties • Surface tension, • Viscosity • Conductance of solutions, • Redox potentials • Chloride content of water, etc.
7	**CSE124**	**Programming for Problem Solving 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.
8	**BME121**	**Engineering Graphics & Design Lab**	• Introduction to engineering design and its place in society • Exposure to the visual aspects of engineering design • Exposure to engineering graphics standards • Exposure to solid modelling • Exposure to computer-aided geometric design • Exposure to creating working drawings • Exposure to engineering communication
9	**BCU141**	**Communication Skills – I**	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

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			Competence in Oral Discourse through Intelligible Pronunciation
10	**EVS142**	**Environmental Studies – I**	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.
11	**BSU143**	**Behavioural Science – I**	• Student will Develop accurate sense of self • Student will nurture a deep understanding of personal motivation • Student will develop thorough understanding of personal and professional responsibility • Student will able to analyse the emotions of others for better adjustment.
12	**FLU144**	**French**	To enable students • to greet someone in French • to present and describe oneself and people • to enter in contact, and begin a

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			conversation • to talk about one's family, tastes and preferences

SECOND SEMESTER:

S.No.	Course Code	Course Name	Course Outcomes
1	MAT201	**Applied Mathematics–II (Ordinary & Partial Differential Equations and Transform)**	• Upon complétion 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++,

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			• 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.
6	**PHY121**	**Applied Physics Lab – I**	After completion of Course, student will develop: Practical understanding and applications of fundamental concept of classical and modern Physics.
7	**ECE121**	**Basic Electrical Engineering Lab**	• Get an exposure to common electrical components and their ratings. • Make electrical connections by wires of appropriate ratings. • Understand the usage of common electrical measuring instruments. • Understand the basic characteristics of transformers and electrical machines. • Get an exposure to the working of power electronic converters.
8	**CSE224**	**Object Oriented Programming Using C++ Lab**	At the end of this course, students will demonstrate ability to: • knowledge of the structure and model of the C++ programming language, (knowledge) • evaluate user requirements for software functionality required to decide whether the C++ programming language can meet user requirements (analysis) • design the object-oriented programs for real world problems.
9	**BME122**	**Workshop/ Manufacturing Practices Lab**	• Upon completion of this laboratory course, students will be able to fabricate components with their own hands. • They will also get practical knowledge of the dimensional accuracies and dimensional tolerances possible with

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			different manufacturing processes. • By assembling different components, they will be able to produce small devices of their interest.
10	**BCU241**	**Communication Skills – II**	The students should be able to : • Apply Verbal and Non-Verbal Communication Techniques in the Professional Environment
11	**EVS242**	**Environmental Studies – II**	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.
12	**BSU243**	**Behavioural Science – II**	• Student will be able to identify, understand, and apply contemporary theories of leadership to a wide range of situations and interactions • Student will be able to understand and respect individual difference, so to enhance the relationship • Learn social responsibility and develop a sense of citizenship • Student will be able to identify and understand the impact of culture on one's leadership style
13	**FLU244**	**French**	To furnish the linguistic tools • to talk about daily activities and sports, to express necessities • to talk about activities in recent future, • to have conversations and perform day to day life tasks like enquiring about time, take an appointment • to enquire about products and place orders in a shop/ restaurant.

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THIRD SEMESTER:

S.No.	Course Code	Course Name	Course Outcomes
1	MAT 301	**Applied Mathematics- III (Probability, Statistics and Numerical Methods)**	• The objective of this course is to familiarize the students with statistical and numerical 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. • 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

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			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	**CSE202**	**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.
7	**ECE 321**	**Electronics Devices Lab**	At the end of the course the students can able to • Measure voltage, frequency and phase of any waveform using CRO. • Generate sine, square and triangular waveforms with required frequency and amplitude using function generator. • Analyze the characteristics of different electronic devices such as diodes, transistors etc., and simple circuits like rectifiers, amplifiers etc.
8	**ECE 322**	**Digital System Design Lab**	At the end of the course the students can able to • Ability to formulate and solve problems in Digital Systems design and implementation.

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			• Consolidation of the design methodologies for combinational and sequential digital systems • Interpret the specifications of programmable reconfigurable device and select the appropriate for the application in hand
9	**ECE 323**	**Network Theory Lab**	At the end of this laboratory course students will demonstrate the ability to • Understand basics electrical circuits with nodal and mesh analysis. • Appreciate and apply electrical network theorems. • Apply Laplace Transform for steady state and transient analysis. • Determine different network functions. • Appreciate the frequency domain techniques.
10	**CSE322**	**Data Structures through C++ lab**	• Ability to identify the appropriate data structure for given problem. • Graduate able to design and analyze the time and space complexity of algorithm or program. • Ability to effectively use compilers includes library functions, debuggers and trouble shooting.
11	**BCU 341**	**Communication Skill-III**	• The students should be able to write correctly and properly with special reference to Letter writing.
12	**BSU 342**	**Behavioural Science-III**	• Student will be able to understand and solve the problems effectively in their personal and professional life. • Students will outline multiple divergent solutions to a problem, • Student will able to create and explore risky or controversial ideas, and synthesize ideas/expertise to generate innovations.
13	**FLU 344**	**French**	To enable the students • To talk about the qualities and defects of people. • To ask/give directions, to enquire about a lodging. • To ask and give information about a

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			certain place. • To describe events in past tense. •

FOURTH SEMESTER:

S.No.	Course Code	Course Name	Course Outcomes
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

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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	**ECE 421**	**Analog and Digital Communication Lab**	Upon completion of this laboratory 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
6	**ECE 422**	**Analog Circuits Lab**	Upon completion of this laboratory course students will demonstrate the ability to

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			• Understand the functioning of OP-AMP and design OP-AMP based circuits such as filters • Design and analyze various rectifier, multivibrator and amplifier circuits • Design sinusoidal and non-sinusoidal oscillators
7	**ECE 423**	**Microcontrollers Lab**	Upon completion of this laboratory course students will demonstrate the ability to • Do assembly language programming • Do interfacing design of peripherals like, I/O, UART, LCD, Keyboard, timer etc. to 8051 • Develop systems using different microcontrollers
8	**CSE 423**	**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)
9	**ECE 325**	**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

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			structures. • Tabulate results and represent data visually. • Use MATLAB development tools to find and correct problems with code.
10	**ECE 425**	**Electronics Workshop Lab**	Upon completion of this laboratory course students will demonstrate the ability to • Perform the Testing of electronic components with the help of Mustimeter, Function generator, Power supply and CRO etc. • Do assembling of electronic circuit/system on general purpose PCB. • Develop different electroinic projects like • Square wave generator, LED blinking circuit etc. using different electronic components.
11	**BCU441**	**Communication Skill-IV**	• Develop a resume for oneself • Ability to handle the interview process confidently Learn the subtle nuances of an effective group discussion
12	**BSU 443**	**Behavioural science - IV**	• Able to answer the question: What do I stand for? • Ability to apply a coherent set of moral principles within professional and specialized contexts • Willing to make unpopular but right decision • Committed to working for justice and peace locally and globally
13	**FLU 444**	**French-IV**	To strengthen the language of the students in both oral and written To revise the grammar in application and the communication asks related to topics covered already To get acquainted with the current social communication skills, oral (dialogue, telephone conversations etc.) and written and perform simple communication tasks such as • Talking about personal habits • Narrating events in the past, marking the stages, using appropriate connectors

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			• Holding conversations on telephone • Asking for/giving a device.

FIFTH SEMESTER:

S.No.	Course Code	Course Name	Course Outcomes
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	Antennas and Propagation	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

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			steady state behavior • Investigate stability of a system using different tests • Design various controllers • Solve liner, non-liner and optimal control problems
5	**CSE 510**	**Advanced programming through Python**	• 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.
6	**ECE 521**	**Electromagnetic Waves Lab**	• 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 • 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
7	**ECE 522**	**Digital Signal Processing Lab**	1. At the end of this course students will demonstrate the ability to 2. Visualize signals in continuous and discrete time and frequency domain 3. Get the response of an LSI system to different signals 4. Design of different types of digital filters for various application
8	**ECE 523**	**Antennas and Propagation Lab**	At the end of the course, students will demonstrate the ability to: • Design different Antennas using simulation software. • 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.

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9	**ECE 524**	**Control Systems Lab**	At the end of this course students will demonstrate the ability to Characterize a system and find its steady state behaviour Investigate stability of a system using different tests Design various controllers.
10	**CSE 530**	**Advanced programming through python lab**	• Ability to create client-server application for real world problems. • Ability to develop multithreaded application. • Ability to create web application for real world problem.
11	**BCU 541**	**Communication skills – V**	• 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.
12	**BSU 543**	**Behavioural Science-V**	• Students will Develop critical and reflective thinking abilities • Students will Demonstrate an understanding of group dynamics and effective teamwork • Student will develop a range of leadership skills and abilities such as effectively leading change, resolving conflict, and motivating others • Student will Gain knowledge and understanding of organization resources, policies, and involvement opportunities. • Student will Develop strategies to recruit, retain, and continually motivate contributing members to the organization
13	**FLU 544**	**French-V**	To strengthen the language of the students in both oral and written To revise the grammar in application and the communication tasks related to topics covered already To get acquainted with the current social communication skills, oral (dialogue, telephone conversations, etc.) and written and perform simple communication tasks such as

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			• Narrating events in the past, marking the stages, using appropriate connectors • Expressing causes and consequences, using appropriate logical connectors • Presenting a biography

SIXTH SEMESTER:

S.No.	Course Code	Course Name	Course Outcomes
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 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	Internet of Things (IOT)	• Ability to develop IOT application.
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.

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6	**CSE 623**	**Internet of Things (IOT) Lab**	• Ability to develop IOT application
7	**CSE 624**	**Problem Solving Techniques – I Lab**	Able to write the program using different data structures. • Able to implement linked list data structure to solve various problems. • Able to 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.
8	**ECE 605**	**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.
9	**ECE 625**	**Microwave theory and techniques lab**	At the end of the course, students will demonstrate the ability to: • Demonstrate the characteristics of Microwave sources • Demonstrate the characteristics of directional Couplers • To test the characteristics of microwave components • To analyze the radiation pattern of antenna • To measure antenna, gain CO6 Practice microwave measurement procedures • Know about the JDBC Principles and can interact with back end database with java programming. • Understand the application server and also understand the enterprise level applications.
11	**BCU 641**	**Communication Skill-VI**	• Student will able demonstrate thorough understanding of stress and its effects • Student will able to learn various coping

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			strategies to deal stress effectively so to overcome the consequences and impact of stress on their health and wellbeing, ultimately it will enhance their performance.
12	**BSU 643**	**Behavioural Science-VI**	• Student will able demonstrate thorough understanding of stress and its effects • Student will able to learn various coping strategies to deal stress effectively so to overcome the consequences and impact of stress on their health and wellbeing, ultimately it will enhance their performance
13	**FLU 644**	**French-VI**	To provide the students with the linguistic tools to enhance social communications kills and be able • To approve or disapprove a behavior • To congratulate somebody • To express possession

SEVENTH SEMESTER:

S.No.	Course Code	Course Name	Course Outcomes
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**	At the end of this course students will demonstrate the ability to: • Understand the concepts of networking thoroughly. • Design a network for a particular

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			application. • Analyze the performance of the network. • To see the function of Transport and Network layer
3	**ECE 721**	**Fiber Optic Communication Lab**	At the end of the course, students will demonstrate the ability to: • Calculate the Numerical Aperture of a multimode Fiber • Measure the coupling losses of the Fiber. • Set up the analog and digital link of optical fiber. • Study Time division Multiplexing. • Study Manchester Coding. • Simulate optical fiber wave guide.
4	**ECE 722**	**Computer Network Lab**	At the end of the course, students will demonstrate the ability to: 1. To Study Different types of Network Topology 2. Demonstrate the Stop and Wait Protocal 3. Study the CSMA-CA Protocal 4. Study of Aloha Protocol 5. To analyze Data encryption and Decryption.
5	**ECE704**	**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.
6	**ECE724**	**CMOS Design Lab**	At the end of the course, students will demonstrate the ability to: • Understand the concepts of digital system design methods through practical domain. • Design of combinational and sequential circuits using CAD • To analyze and layout design of CMOS circuits in micron and submicron level using any platform.
7	**ECE 707**	**Mobile Communications**	At the end of the course, students will demonstrate the ability to:

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			• 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.

EIGHTH SEMESTER:

S.No.	Course Code	Course Name	Course Outcomes
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 & 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 802	**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.

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			• Appreciate engineering constraints like energy dissipation, data exchange speeds etc.
4	**ECE 821**	**Information Theory and Coding lab**	At the end of the course the students can able to • Understand the concept of information and entropy • Understand Shannon's theorem for coding • Calculation of channel capacity • Apply coding techniques
5	**ECE 822**	**Radar & Satellite Communications Lab**	At the end of the course the students can able to • implement the AM Transmitter, FM Transmitter, AM Receiver, FM Receiver, Remote Control etc. • Implement Wireless Mic System and RF portion of satellite receiver.
6	**ECE 823**	**Embedded Systems lab**	At the end of the course the students can able to • Write assembly language programming. • Implement serial communication by interfacing microcontroller with a computer. • Implement parallel data communication by interfacing microcontroller with an LCD.
7	**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.
8	**ECE 824**	**VHDL Programming lab**	At the end of the course, students will demonstrate the ability to: • Write a VHDL code for various combinational and sequential circuits. • Testing of Various digital designs using test bench in VHDL.

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B.TECH. (MECHANICAL ENGINEERING)

Course Outcomes:

FIRST SEMESTER:

S.No.	Course Code	Course Name	Course Outcomes
1	MAT 101	Applied Mathematics – I (Calculus and Linear Algebra)	The students will learn: • To apply differential and integral calculus to 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 tools of differentiation and integration of functions of a complex variable that are used in various techniques dealing engineering problems. • The essential tools of matrices and linear algebra including linear transformations, eigen values, diagonalization.
2	CHE 101	Applied Chemistry	The course will enable the student to: • Analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces. • Rationalise bulk properties and processes using thermodynamic considerations. • Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques • Rationalise periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity. • List major chemical reactions that are used in the synthesis of molecules.
3	ECE 101	Basic Electrical Engineering	• To understand and analyze basic electric and magnetic circuits.

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			• To study the working principles of electrical machines and power converters. • To introduce the components of low voltage electrical installations.
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	CHE 121	Applied Chemistry Lab	The chemistry laboratory course will consist of experiments illustrating the principles of chemistry relevant to the study of science and engineering. The students will learn to measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc.
6	ECE 121	Basic Electrical Engineering Lab	• Get an exposure to common electrical components and their ratings. • Make electrical connections by wires of appropriate ratings. • Understand the usage of common electrical measuring instruments. • Understand the basic characteristics of transformers and electrical machines. • Get an exposure to the working of power electronic converters.
7	BME 121	Engineering Graphics & Design Lab	• Introduction to engineering design and its place in society • Exposure to the visual aspects of engineering design • Exposure to engineering graphics standards • Exposure to solid modeling • Exposure to computer-aided geometric design • Exposure to creating working drawings • Exposure to engineering communication
8	BCU 141	Communication Skills – I	
9	EVS 142	Environmental Studies – I	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

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			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.
10	BSU 143	Behavioural Science – I	Through this course, • The knowledge of self will be utilized by students to resolve their personal, interpersonal and life problems • Rather than extrinsic locus of control, students will acquire an intrinsic approach towards life The heightened awareness of self, attitudes and emotions will help students to work towards removal of obstacles created by self-limitations and enhance their full potential in their education and career.
11	FLU 144	French– I	• To understand basic French. Able to read, write basic French To express basic day to day activities in French

SECOND SEMESTER:

S.No.	Course Code	Course Name	Course Outcomes
1	MAT 201	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 PDEs. • The effective mathematical tools for the solutions of differential equations that model physical processes.
2	PHY 101	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	CSE 104	Programming for Problem Solving	The student will learn

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			• 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 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
5	PHY 121	Applied Physics Lab – I	After completion of course student will develop: Practical understanding and applications of fundamental concept of classical and modern Physics.
6	CSE 124	Programming for Problem Solving 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.
7	BME 122	Workshop/ Manufacturing Practices Lab	• Upon completion of this laboratory course, students will be able to fabricate components with their own hands.

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			• They will also get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes. • By assembling different components, they will be able to produce small devices of their interest.

THIRD SEMESTER:

S.No.	Course Code	Course Name	Course Outcomes
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	PHY 303	Applied Physics – II	After studying through lectures and assignments, students will be able to: Solve relatedEngineering problemsand apply the concepts while designing a project.
3	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. • Apply basic knowledge of math's 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,

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			momentum, work and energy. • Understand and be able to apply Newton's laws of motion.
4	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.
5	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.
6	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
7	PHY 323	Applied Physics Lab – II	After completion of course student will develop • Practical understanding and applications of oscillations and optics.
8	BME 321	Engineering Mechanics Lab	• 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

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			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 energy. • 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.
9	BME 323	Thermodynamics lab	• Apply energy balance to systems and control volumes, in situations involving heat and work interactions. • Evaluate changes in thermodynamic properties of substances. • Evaluate the performance of energy conversion devices. • Differentiate between high grade and low-grade energies. • Understand the working of steam power cycle and related components.
10	ECE 327	Basic Electronics lab	• 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

FOURTH SEMESTER:

S.No.	Course Code	Course Name	Course Outcomes
1	BME 401	Fluid Mechanics	• After completing this course, the students will be able to understand the principles of fluid statics and kinematics, mathematically analyze simple flow situations, measurement of flow rates and dimensional analysis of model studies. • To understand Properties of Fluids and solve hydrostatic problems.

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			• Understand fluid kinematics and Classify fluid flows • Interpret Euler and Navier-Stokes equations and Solve problems using Bernoulli's equation and evaluate energy loses in pipes and sketch energy gradient lines • To understand and apply the concept of boundary layer and its applications • Use dimensional Analysis for model testing.
2	BME 402	Heat and Mass Transfer	• After completing the course, the students will be able to formulate and analyze a heat transfer problem involving any of the three modes of heat transfer. • The students will be able to obtain exact solutions for the temperature variation using analytical methods where possible or employ approximate methods or empirical correlations to evaluate the rate of heat transfer • The students will be able to design devices such as heat exchangers and also estimate the insulation needed to reduce heat losses where necessary. • Analyze and obtain solutions to problems involving various modes of heat transfer and design heat transfer systems such as heat exchangers, fins, radiation shields etc. • Define laminar and turbulent boundary layers and ability to formulate energy equation in flow systems.
3	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

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4	BME 404	Manufacturing Machine	• Select appropriate Manufacturing Processing 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
5	BME 405	Strength of Material	• Determine the stresses, strains and displacements of structures by tensorial and graphical (Mohr's circle) approaches • Analyse 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 • Analyse column buckling and appreciate the theories of failures and its relevance in engineering design
6	BME 422	Heat and Mass Transfer Lab	• After completing the course, the students will be able to formulate and analyze a heat transfer problem involving any of the three modes of heat transfer. • The students will be able to obtain exact solutions for the temperature variation using analytical methods where possible or employ approximate methods or empirical correlations to evaluate the rate of heat transfer • The students will be able to design devices such as heat exchangers and also estimate the insulation needed to reduce heat losses where Necessary. • Analyze and obtain solutions to problems involving various modes of heat transfer and design heat transfer systems such as heat exchangers, fins, radiation shields etc. • Define laminar and turbulent boundary layers and ability to formulate energy equation in flow systems.

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7	BME 423	Kinematic of Machine Lab	• 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.
8	BME 424	Manufacturing Machine Lab	• Select appropriate Manufacturing Processing 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
9	BME 425	Strength of Material & Fluid Mechanics Lab	• After completing this course, the students will be able to understand the principles of fluid statics and kinematics, mathematically analyze simple flow situations, measurement of flow rates and dimensional analysis of model studies. • To understand Properties of Fluids and solve hydrostatic problems. • Understand fluid kinematics and Classify fluid flows • Interpret Euler and Navier-Stokes equations and Solve problems using Bernoulli's equation and evaluate energy loses in pipes and sketch energy gradient lines • To understand and apply the concept of boundary layer and its applications • Use dimensional Analysis for model testing.

FIFTH SEMESTER:

S.No.	Course Code	Course Name	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.

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			• 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.
4	BME 504	Measurement and Control	• Identify and select proper measuring instrument for specific application. • Explain calibration methodology and error analysis related to measuring instruments. • Mathematically model and analyze system/process for standard input responses. • Analyze various machining process and calculate relevant quantities such us velocities, forces and powers • Demonstrate knowledge of the underlying principles of measurement, as they relate to mechanical measurement, electronic instrumentation, and thermal effects.
5	BME 505	Metrology	• Illustrate working principle of measuring instruments and measurement errors. • Apply the procedures to measure length, angles, width, depth, bore diameters, internal and external tapers, tool angles, and surface roughness by using different instruments and by different indirect methods. • Determine limits and fits and allocate tolerances for machine components

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			• Use effective methods of measuring straightness, Squareness, flatness, roundness, profile, screw threads and gear teeth. • Securing knowledge of manufacturing components within the tolerance limit and surface roughness according to given drawings using various machine tools.
6	BME 522	Dynamics of Machine Lab	• 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.
7	BME 524	Measurement and Control Lab	• Identify and select proper measuring instrument for specific application. • Explain calibration methodology and error analysis related to measuring instruments. • Mathematically model and analyze system/process for standard input responses. • Analyze various machining process and calculate relevant quantities such us velocities, forces and powers • Demonstrate knowledge of the underlying principles of measurement, as they relate to mechanical measurement, electronic instrumentation, and thermal effects.
8	BME 525	Metrology lab	• Illustrate working principle of measuring instruments and measurement errors. • Apply the procedures to measure length, angles, width, depth, bore diameters, internal and external tapers, tool angles, and surface roughness by using different instruments and by different indirect methods. • Determine limits and fits and allocate tolerances for machine components • Use effective methods of measuring straightness, Squareness, flatness, roundness, profile, screw threads and gear teeth. • Securing knowledge of manufacturing components within the tolerance limit and surface roughness according to given drawings using various machine tools.

SIXTH SEMESTER:

S.No.	Course Code	Course Name	Course Outcome

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1	BME 601	Fluid Power Systems	• Explain the characteristics of centrifugal and reciprocating pumps • Calculate forces and work done by a jet on fixed or moving plate and curved plates • Explain the working of turbines and Select a turbine for specific application. • Analyze the working of hydraulic power transmission system and Select the suitable one based on application. • Analyze the power hydraulic systems with related components i.e. torque convertor, fluid coupling.
2	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.
3	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.
4	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.

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			• Illustrate and differentiate various super finishing operations. • Explain and distinguish different welding processes. • Comprehend and classify various nonconventional machining.
5	BME 621	Fluid Power Systems Lab	• Explain the characteristics of centrifugal and reciprocating pumps • Calculate forces and work done by a jet on fixed or moving plate and curved plates • Explain the working of turbines and Select a turbine for specific application. • Analyze the working of hydraulic power transmission system and Select the suitable one based on application. • Analyze the power hydraulic systems with related components i.e. torque convertor, fluid coupling.
6	BME 622	IC Engine & Gas Turbine Lab	• Identify the various types of I.C. Engines and Cycles of operation. • Express the effect of various operating variables on engine performance • Demonstration of fuel metering and fuel supply systems for different types of engines • Analyze & Justify the suitability of conventional and non-conventional fuels for IC engines • Understand the effects of emission formation of IC engines, its effects and the legislation standards.
7	BME 623	Machine Design Lab – 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.
8	BME 606	Mechatronics	• Identify key elements of mechatronics and its representation by block diagram. • Understand the concept of sensors and use of interfacing systems. • Understand the concept and applications of different actuators • Illustrate various applications of mechatronic systems. • Develop PLC ladder programming and implementation in real life problem.

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9	BME 626	Mechatronics Lab	• Identify key elements of mechatronics and its representation by block diagram. • Understand the concept of sensors and use of interfacing systems. • Understand the concept and applications of different actuators • Illustrate various applications of mechatronic systems. • Develop PLC ladder programming and implementation in real life problem.

SEVENTH SEMESTER:

S.No.	Course Code	Course Name	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

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			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.
4	BME 721	Operations Research (Programming) Lab	• 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
5	BME 722	Computer Aided Manufacturing Lab	• 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.
6	BME 704	Automotive Engineering	• To understand different automotive systems and subsystems performance. • Describe the different clutch systems and gear box • Analyze different steering mechanism used in automobile • Explain the different suspension systems and factors affecting alignment of vehicles • Analyze different brakes systems used in automobile
7	BME 724	Automotive Engineering Lab	• To understand different automotive systems and subsystems performance. • Describe the different clutch systems and gear box

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			• Analyze different steering mechanism used in automobile • Explain the different suspension systems and factors affecting alignment of vehicles • Analyze different brakes systems used in automobile
8	BME 708	Power Plant Practices	After completion of this course, the students should be able to: • Discuss the energy resources and energy conversion methods available for the production of electric power in India. • Determine the efficiency and output of a modern Rankine cycle steam power plant from given data, including superheat, reheat, regeneration, and irreversibility • Calculate the heat rate, fan power consumption, flame temperature and combustion air requirements of conventional steam generators (boilers). • Select the heat transfer tubes needed for condensers and feed water heaters • Explain the blade shapes, and calculate work output of typical turbine stages.

EIGHTH SEMESTER:

S.No.	Course Code	Course Name	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

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			• Students should be able to estimate the condition of steam and performance of vapour power cycle and vapour compression cycle.
3	BME 822	Refrigeration & Air-conditioning Lab	• 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.
4	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.
5	BME 824	Gear Technology Lab	• 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.

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AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY

B.TECH. (CIVIL ENGINEERING) (Eight Semesters)

Course Outcomes:

FIRST SEMESTER

S. No.	Course Code	Course Title	Course Outcomes
1.	**MAT101**	**: APPLIED MATHEMATICS – I (CALCULUS AND LINEAR ALGEBRA)**	• 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**	• 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**	• 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

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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 AND 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.
6.	**CHE121**	**APPLIED CHEMISTRY LAB**	The students will learn to measure molecular/system properties such as: • Surface tension. • Viscosity. • Conductance of solutions. • Redox potentials. • ResidualChlorine, dissolved oxygen content, BOD, COD, pH of water etc.
7.	**CSE124**	**PROGRAMMING FOR PROBLEM SOLVING 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

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			• 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.
8.	**BME121**	**Engineering Graphics & Design Lab**	• Introduction to engineering design and its place in society • Exposure to the visual aspects of engineering design • Exposure to engineering graphics standards • Exposure to solid modeling • Exposure to computer-aided geometric design • Exposure to creating working drawings • Exposure to engineering communication
9.	**BCU141**	**Communication Skills I**	• Identify Common Errors and Rectify Them • Develop and Expand Writing Skills through Controlled and Guided Activities • Develop Coherence, Cohesion and Competence in Oral Discourse through Intelligible Pronunciation • Adopt strategies for effective reading and writing skills • Develop Coherence, Cohesion and Competence in Oral Discourse through Intelligible Pronunciation
10.	**EVS142**	**ENVIRONMENTAL STUDIES - I**	• 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 types; Value of Biodiversity & Biodiversity Hot Spots; Biodiversity at Global, National and Local Levels & Threats to Biodiversity and Conservation of Biodiversity.
11.	**BSU143**	**Behavioural Science – I**	• Student will Develop accurate sense of self • Student will nurture a deep understanding of personal motivation • Student will develop thorough understanding of personal and professional responsibility • Student will able to analyse the emotions of others for

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			better adjustment.
12.	**FLU144**	**French-I**	• Familiarize students with the French language, with its phonetic system and its accents • Enable students to greet someone in French • Enable students to present and describe oneself and people, • Enable students to enter in contact, and begin a conversation • Enable students to talk about one's family, tastes and preferences

SECOND SEMESTER

S.No.	Course Code	Course Title	Course Outcomes
1.	**MAT201**	**APPLIED MATHEMATICS – II (ORDINARY & PARTIAL DIFFERENTIAL EQUATIONS AND TRANSFORM)**	• Solve the problems of real life applications using ordinary differential equations. • Come to know the applications of basics of partial differential equations and related concepts in real problems. • Come to know the applications of Laplace Transform and Fourier series to solve various differential equations. • Solve problems of various complex variable functions associated to differentiation. • Use complex variable function integration to get various special type of real and complex integrals.
2.	**PHY101**	**APPLIEDPHYSICS – I**	• Solvetheproblems related to time varying electric and magnetic field, and apply its concept in day to day applications. • Students will develop understanding of relativistic motion and its applications. • Students will acquire understanding of mechanics involved at microscopic levels • Students willdevelop understanding of fundamental components of any electronic devices and its applications.

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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++**	• Describe the ideas of streams, classes, functions, data, and objects in the procedural and object-oriented paradigm. • Apply OOP features to program design and implementation. • Categorize inheritance with the understanding of early and late binding, generic program-ming • Experiment with the concept of function overloading, operator overloading, virtual functions, and polymorphism. • Develop real-world problems in file handling and exception handling.
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
6.	**PHY121**	**APPLIEDPHYSICS LAB-1**	• Apply the fundamentals of semiconductors to understand the conceptenergy band gap. • Apply the fundamentals of physical sciences to understand the importance resonance,and its applications in day to day life. • Apply the understanding of varying fieldand determine parameters of significance. • Apply the fundaments of semiconductors to understand working of basic electronic devices • Apply the fundaments understandings of different types of semiconductors to understand working of basic electronic devices . • Apply the fundaments of semiconductors to understand working of basic electronic devices • Apply the working principles of electronic components to different types of cct arrangements involved in day to day life.

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			• Apply the principles of semiconductor devices as a voltage regulator • Apply the principles of semiconductor devices in designing solar cells. • Apply the principles of varying electric and magnetic field in day to day life.
7.	**ECE121**	**Basic Electrical Engineering Lab**	• Get an exposure to common electrical components and their ratings. • Make electrical connections by wires of appropriate ratings. • Understand the usage of common electrical measuring instruments. • Understand the basic characteristics of transformers and electrical machines. • Get an exposure to the working of power electronic converters.
8.	**CSE224**	**OBJECT ORIENTED PROGRAMMING USING C++ Lab**	• Understand the basics of Programming concepts like structured, unstructured & Object-oriented programming concepts. • Implement the Inheritance and functions to various problems. • Implement the pointer to class and nested classes. • Demonstrate the programs for constructors and destructors. • Evaluate the problems based on polymorphism and file handling.
9.	**BME122**	**Workshop / Manufacturing Practices Lab**	• Upon completion of this laboratory course, students will be able to fabricate components with their own hands. • They will also get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes. • By assembling different components, they will be able to produce small devices of their interest.
10.	**BCU241**	**Communication Skills II**	• Identify & use different communication networks to communicate with diverse audience • Apply Verbal Techniques in the Professional Environment • Apply Non-Verbal Communication Techniques in the Professional Environment

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			• Use literary text to improve English language
11.	**EVS242**	**ENVIRONMENTAL STUDIES – II**	• 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.
12.	**BSU243**	**Behavioural Science – II**	• Student will be able to identify, understand, and apply contemporary theories of leadership to a wide range of situations and interactions • Student will be able to understand and respect individual difference, so to enhance the relationship • Learn social responsibility and develop a sense of citizenship • Student will be able to identify and understand the impact of culture on one's leadership style
13.	**FLU244**	**French-II**	• Talk about daily activities and sports. • Express necessities. • Talk about activities in recent future. • Have conversations and perform day to day life tasks like enquiring about time, take an appointment. • Enquire about products and place orders in a shop/ restaurant.

THIRD SEMESTER

S.N.	Course Code	Course Title	Course Outcomes
1.	**MAT 301**	**APPLIED MATHEMATICS – III (PROBABILITY, STATISTICS AND NUMERICAL METHODS)**	• Solve the problems of real life applications using measures of central tendency and to find out the correlation between various factors. • Come to know the applications of probability and probability distribution functions in various sampling methods. • Solve problems of sampling for large and small sampling using test of significance based on normal and chi-square statistics. • Find the interpolated values of dependent variable, derivative at certain point, solution of equations and solution of simultaneous equations.

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			• Use the tools of numerical methods to solve definite integration and ordinary differential equations.
2.	**CIV 302**	**COMPUTER-AIDED CIVIL ENGINEERING DRAWING**	• Applying software's in design and drawings of Civil Engineering structures. • Able to proficiency, including the ability to use industry-standard computer software to generate 2D and 3D drawings. • Understanding of the theory of orthographic projection and the conventions associated with Civil engineering drawings
3.	**CIV 303**	**ENGINEERING MECHANICS**	• Able to know the importance of seismic activity consideration in terrain. • Able to understand various techniques to determine engineering properties of rocks and distinguish different types of rocks and minerals.
4.	**CIV 308**	**CIVIL ENGINEERING & ENERGY SCIENCE**	• Understand the basics of ancient and modern architecture, modern construction and materials. • Analyze the difference between different types of energy sources their origin and usage.
5.	**CIV 309**	**LIFE SCIENCE/BIOLOGY FOR ENGINEERS**	• Understand basic biological principles and organizational structure of living systems at molecular level. • Comprehend basic biological principles and organizational structure of living systems at Cellular level. • To provide the students an appreciation of how biological systems can be re-designed as substitute products for natural systems. • Appreciate biological process with engineering perspective. • Impart knowledge about the common corridors of biology and engineering and Biologically inspired technologies.
6.	**BME104**	**MECHANICAL ENGINEERING**	○ Ability to design and conduct experiments, as well as to analyze and interpret data. ○ Ability to apply modern engineering tools, techniques and resources to solve complex mechanical engineering activities with an understanding of the limitations. • Ability to comprehend the thermodynamics and their corresponding processes that influence the behaviour and response of structural components.

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7.	**ECE 307**	**BASIC ELECTRONICS**	○ Understand and 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. ○ Analyse usage of electronic devices, tools and instruments in engineering applications.
8.	**CIV 322**	**COMPUTER-AIDED CIVIL ENGINEERING DRAWING LAB**	• Application of software's in design and drawings of Civil Engineering structures. • Able to proficiency, including the ability to use industry-standard computer software to generate 2D and 3D drawings • Understanding of the theory of orthographic projection and the conventions associated with Civil engineering drawings.
9.	**ECE 327**	**BASIC ELECTRONICS LAB**	• Understand 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
10.	**FLU344**	**French-III**	• Enable the students to talk about the qualities and defects of people. • Enable students to ask/give directions. • Enable students to enquire about lodging. • Enable students to ask and give information's about a certain place. • Enable students to describe events in past tense
11.	**BCU341**	**Communication Skills III**	• Define vocabulary and use it in proper context • Differentiate between Homonyms, Homographs, Homophones • Write correctly and properly with special reference to Letter writing • Use Business Memos in a professional environment • Use literature to learn English language
12.	**BSU343**	**Behavioural Science – III**	• Student will be able to understand and solve the problems effectively in their personal and professional life. • Students will outline multiple divergent solutions to a

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			problem, • Student will able to create and explore risky or controversial ideas, and synthesize ideas/expertise to generate innovations.
13.	**NTP 330**	**Term Paper (Evaluation)**	• After successful completion of this course, students will be able to • 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

FOURTH SEMESTER

S.No.	Course Code	Course Title	Course Outcomes
1.	**CIV 401**	**MATERIALS, TESTING & EVALUATION**	• Understand the electronic sensors, Operate a data acquisition system. • Analyse various types of testing machines, Configure a testing machine to measure tension or compression behaviour. • Apply and 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
2.	**CIV 402**	**ENGINEERING GEOLOGY**	• Understand the 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. • The mechanics of soils and fluids and their influence on settlement, liquefaction, and soil slope stability. • Analyse Rock mass characterization and the mechanics of planar rock slide sand topples. • Apply Soil characterization and the Unified Soil Classification System.
3.	**CIV 403**	**SURVEYING**	• Apply the knowledge, techniques, skills, and applicable tools of the discipline to engineering and surveying activities. • Relate the knowledge on Surveying to the new frontiers of science like Hydrographic surveying,

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			Electronic Distance Measurement, Global Positioning System, Photo grammetry and Remote Sensing
4.	**CIV 404**	**FLUID MECHANICS**	• Understand the properties of fluids, pressure measurement devices, hydraulic forces on surfaces, bouncy and flotation in fluids. • Analyse kinematics and static behavior of fluids, dimension and model analysis, laminar and turbulent flow. • Understand low through pipes and orifices, boundary layer theory.
5.	**CIV 405**	**FLUID MECHANICS**	• Understand the properties of fluids, pressure measurement devices, hydraulic forces on surfaces, bouncy and flotation in fluids. • Analyse kinematics and static behavior of fluids, dimension and model analysis, laminar and turbulent flow. • Understand low through pipes and orifices, boundary layer theory
6.	**CIV 407**	**CIVIL ENGINEERING – SOCIETAL & GLOBAL IMPACT**	• Understand the impact which Civil Engineering projects have on the Society at large and on the global arena and using resources efficiently and effectively. • Understand extent of Infrastructure, its requirements for energy and how they are met: past, present and future, the Sustainability of the Environment, including its Aesthetics. • Analyse 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**	○ Apply the concepts and functionalities of the electronic devices, tools and instruments. • Understand use, general specifications and deploy abilities of the electronic devices, and assemblies. ○ Understand handling and usage of electronic devices, tools and instruments in engineering applications.

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8.	**CIV 421**	**MATERIAL TESTING AND EVALUATION LAB**	• Understand the Gradation of coarse and fine aggregates ,Different corresponding tests and need/application of these tests in design and quality control. • Apply Tensile Strength of materials &concrete composites. • Analyse Compressive strength test on aggregates.
9.	**CIV 422**	**ENGINEERING GEOLOGY LAB**	• To understand the various types of rocks (Igneous Petrology), Identification of rocks (Sedimentary Petrology) • Analyze the difference of rocks (Metamorphic Petrolody), Minerals and crystallography
10.	**CIV 423**	**SURVEYING LAB**	• Understand the Chain survey - Traversing and plotting of details.Chain survey – Measurement of Area by offsetting. • Analyze the Compass survey - Traversing with compass and calculation of Interior angles. The use of advance survey instrument, Total station, theodolite etc.
11.	**CIV 424**	**FLUID MECHANICS LAB**	• Understand the different types of fluid exists in nature their behaviour and characteristics. • Analyze the various types of losses and different types of flow conditions, calculate different types of forces observed by moving bodies in different flow conditions.
12.	**ECE 427**	**INSTRUMENTATION & SENSOR TECHNOLOGIES FOR CIVIL ENGINEERING APPLICATIONS LABORATORY**	• Understand the different types of sensors exist and their use in advanced technology. To analyze the errors during measurements • Analyze the various types of losses and Measure the resolution and sensitivity of thermocouple, thermistor and LVDT To specify the requirements in the calibration of sensors and instruments. To describe the measurement of electrical variables.
13.	**FLU 444**	**French IV**	• Strengthen the language of the students in both oral and written ○ Use grammar in application and communication tasks related to topics Covered already. • Get acquainted with the current social communication skills, oral (dialogue, telephone conversations, etc.) And written and perform Simple communication tasks.

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			• Talking about personal habits, narrating events in the past, marking the Stages, using appropriate connectors. • Holding conversations on telephone, asking for/ giving advices.
14.	**BCU441**	**Communication Skills IV**	• Develop a resume for oneself • Learn the subtle nuances of an effective group discussion • Handle the interview process confidently • Learn language through literature
15.	**BSU443**	**Behavioral Science – IV**	• Able to answer the question: What do I stand for? • Ability to apply a coherent set of moral principles within professional and specialized contexts • Willing to make unpopular but right decision • Committed to working for justice and peace locally and globally

FIFTH SEMESTER

S.No	Course Code	Course Title	Course Outcomes
1.	**CIV 501**	**MECHANICS OF MATERIALS**	• Understand the fundamental concepts of stress and strain • Evaluate the problems relating to pure and uniform bending of beams and other simple structures • Examine the deflection of beams under various loading condition. • Understand the concept of crushing and buckling • Analyse the structural elements using Energy methods
2.	**CIV 502**	**HYDRAULIC ENGINEERING**	• Analyse various hydraulic systems by applying the fundamental laws of fluid statics and • Solve the fluid flow governing equations by taking suitable constraints and assumptions • Evaluate major and minor losses in pipes and analyse the practical significance of open channel flows and Interpret the boundary layer aspects of laminar and turbulent flows • Perform dimensional analysis on any real life problems

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			• Experimentally determine the fluid properties and flow parameters using various experimental setups.
3.	**CIV 503**	**STRUCTURAL ENGINEERING**	• Apply the usage of IS codes in design of reinforced concrete structures and Identify the types and design of beams and slabs • Design the uniaxial and biaxial bending of column. And Design the simple footings and combined footings • Develop skills in design of different types of steel connections • Design the compression and tension member • Design the prestress concrete elements
4.	**CIV 504**	**GEOTECHNICAL ENGINEERING**	• Compare the various engineering and index properties of soil. • Explain the hydraulic conductivity of the soil and seepage actions • Examine the stress distribution at any point below the ground level. • Evaluate the shear strength of the soil using Mohr Soil. • Discuss the soil investigation techniques for advanced explorations and to conduct the field test like SPT & PLT. • Evaluate the safe bearing capacity of shallow foundations
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**	• Examine the type and size of reactor required for various unit operations and processes involved in water and wastewater treatment • Able to design individual unit operation or process appropriate to the situation by applying physical, chemical, biological and engineering principles. • Able to identify the type of unit operations and processes involved in water and wastewater treatment plants based on the water quality

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			• Prepare the layout of water and wastewater treatment plants and evaluate the water and wastewater treatment plants • Investigate the performance of various unit operations and processes to meet the desired health and environment related goals.
7.	**CIV 507**	**TRANSPORTATION ENGINEERING**	• Classify basic design of highway geometry according to the design specifications. • Design a flexible pavement using IRC method and Describe various components of railways and their functions. • Design a railway geometry according to the design specifications. • Classify various components of an airport and identify the alignment and the required length of a runway. • Identify various components of a harbor and their functions.
8.	**CIV 522**	**HYDRAULIC ENGINEERING LAB**	• Analyse various hydraulic systems by applying the fundamental laws of fluid statics. • Solve the fluid flow governing equations by taking suitable constraints and assumptions • Evaluate major and minor losses in pipes • Analyse the practical significance of open channel flows • Perform dimensional analysis on any real life problems • Interpret the boundary layer aspects of laminar and turbulent flows and experimentally determine the fluid properties and flow parameters using various experimental setups.
9.	**CIV 524**	**GEOTECHNICAL ENGINEERING LAB**	• To impart the fundamental concepts of soil mechanics and understand the bearing capacity • To understand the concept of compaction and consolidation of soils • To understand the design aspects of foundation • To evaluate the stress developed in the soil medium

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10.	**CIV 527**	**TRANSPORTATION ENGINEERING LAB**	• Understand the properties of materials used for construction of highways and airports. • Understand the transportation characteristics, operations, design, planning, and maintenance.
11.	**BCU541**	**Communication Skills V**	• Adopt strategies for effective reading and writing skills • Deliver professional presentations • Prepare and present effective presentations aided by ict tools • Demonstrate ability to interpret texts and observe the rules of good writing • Communicate fluently and sustain comprehension of an extended discourse
12.	**NPT550**	**INDUSTRIAL PRACTICAL TRAINING – I**	• 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 and prepare and present technical report
13.	**FLU 544**	**French-V**	• Strengthen the language of the students in both oral and written. • Use grammar in application and the communication tasks related to topics covered already. • Get acquainted with the current social communication skills,oral(dialogue, telephone conversations, etc.) And written and perform simple communication tasks • Narrating events in the past, marking the stages, using appropriate connectors, • Expressing causes and consequences, using appropriate logical connectors, presenting a biography.
14.	**BSU**	**Behavioural Science – V**	• Students will Develop critical and reflective thinking abilities • Students will Demonstrate an understanding of group dynamics and effective teamwork • Student will develop a range of leadership skills and abilities such as effectively leading change, resolving conflict, and motivating others • Student will Gain knowledge and understanding of

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			organization resources, policies, and involvement opportunities. • Student will Develop strategies to recruit, retain, and continually motivate contributing members to the organization.
15.	**NPT 550**	**Industrial Practical Training - I (Evaluation)**	• After successful completion of the course, the students will be able to • 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

SIXTH SEMESTER

S.No.	Course Code	Course Title	Course Outcomes
1.	**CIV 601**	**CONSTRUCTION ENGINEERING & MANAGEMENT**	• Able to describe the requirement of planning and management. • .Able to recognize the critical path and pert suitability for research projects and able to determine projects schedule and estimate the activity time of CPM. • Able to illustrate various construction equipments, machinery and their utility • Able to discuss resource scheduling and planning of civil engineering. Projects • Perform rate analysis as required in preparing specifications, detailed estimate and tender documents etc
2.	**CIV 602**	**: GEOMETRIC DESIGN OF HIGHWAYS**	• Gain knowledge about highways, and able to design the roads & bridges by geometric method • Know the different types of points and crossings used in railway track and Knowledge of signalling systems in railway stations and yards. • Design and orient airport runways and apply various visual aids in the designing of airport
3.	**CIV 603**	**ENVIRONMENTAL ENGINEERING – II**	• Know about sewerage system and its drainage. • Implement technology related with purification of waste water according to IS parameters and low cost

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			sanitation systems. • Understand various fundamental scientific processes underlying the design and operation of waste water treatment plants. • Understand chemical and biological principles behind unit processes used in waste water treatment unit processes.
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 • Perform and evaluate present worth, future worth and annual worth analyses on one of more economic alternatives. • Quantify the worth of a structure by evaluating quantities of constituents, derive their cost rates and build up the overall cost of the structure. • Understand how competitive bidding works and how to submit a competitive bid proposal.
5.	**CIV 622**	**GEOMETRIC DESIGN OF HIGHWAYS LAB**	• Use the features of microstation, GEOPAK, and engineering judgment to design one side of a grade-separated, Two-Quadrant, Partial Cloverleaf A Interchange as depicted in AASHTO 2004. • Learn to work on a team and make effective project presentations and recognize the value of interactions with other professional disciplines.
6.	**CIV 623**	**ENVIRONMENTAL ENGINEERING – II LAB**	• Determine different parameters of water and waste water. • Examine biochemical oxygen demand and chemical oxygen demand of given samples. • Understand the technologies required for domestic and industrial wastewater treatment
7.	**CIV 624**	**ESTIMATING AND COSTING LAB**	• Understand the technical specifications for various works to be performed for a project and how they impact the cost of a structure. • Quantify the worth of a structure by evaluating quantities of constituents, derive their cost rates and build up the overall cost of the structure.

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8.	**CIV 606**	**Open Channel Flow**	• Calibrate various flow measuring devices in pipe and open channel flow. • Understand their knowledge of fluid mechanics in addressing problems in open channels. • Classify the flow in open channel and various momentum principles in open channels
9.	**CIV 626**	**OPEN CHANNEL FLOW LAB**	• Understand knowledge of fluid mechanics in addressing problems in open channels. • Solve problems in uniform, gradually and rapidly varied flow in steady state conditions.
10.	**BCH620**	**ENGINEERING ECONOMICS**	○ Know the Scope and Method of Managerial economics along with Fundamental Economics and help them to develop a thorough understanding on engineering decision making. ○ Analyse the demand and supply adopting market strategy ○ Understand the production function and factors affecting it with various economy conditions of the firm. ○ Study the different types of market structure and strategies
11.	**BCU641**	**Communication Skills VI**	• Communicate contextually in specific personal and professional situations with courtesy • Inject humour in their regular interactions • Strengthen their creative learning process through individual expression and collaborative peer activities • Enhance their verbal ability • Polish their language skills through literature
12.	**NPT660**	**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
13.	**FLU 644**	**French-VI**	• Provide the students with the linguistic tools to enhance social communication skills • Be able to approve or disapprove a behaviour • Be able to congratulate somebody • Be able to express possession • Be able to express given theme

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14.	**BSU643**	**Behavioural Science – VI**	• Student will able demonstrate thorough understanding of stress and its effects • Student will able to learn various coping strategies to deal stress effectively so to overcome the consequences and impact of stress on their health and wellbeing, ultimately it will enhance their performance.
15.	**NMP 660**	**Minor Project**	• 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.

SEVENTH SEMESTER

S.No	Course Code	Course Title	Course Outcomes
1	**CIV 701**	**DESIGN OF CONCRETE STRUCTURES**	• Apply the usage of IS codes in design of reinforced concrete structures • Identify the types and design of beams and slabs • Design the uniaxial and biaxial bending of column • Design the simple footings and combined footings • Design the structural members for shear, bond and development length
2	**CIV 702**	**SURFACE HYDROLOGY**	• Understand the process and mathematical representation of hydrologic cycle • Differentiate the measure and apply precipitation for hydrologic design • Understand the importance of catchment characteristics for runoff estimation • Comprehend unit hydrograph theory and its applications to hydrologic design
3	**CIV 706**	**PRE-STRESSED CONCRETE**	• Learn the principles, materials, methods and systems of prestressing • Know the different types of losses and deflection of prestressed members • Design of prestressed concrete beams for flexural, shear and tension and to • Calculate ultimate flexural strength of beam • Design of anchorage zones, composite beams

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4	**CIV 722**	**SURFACE HYDROLOGY LAB**	• Understand the process and mathematical representation of hydrologic cycle • Understand the importance of catchment characteristics for runoff estimation • Evaluate the hydrologic abstractions and also learn about the factors affecting various • Hydrologic abstractions • Implementing the knowledge of precipitation and runoff measurement in hydrologic design
5	**NPT 750**	**: INDUSTRIAL PRACTICAL TRAINING – II**	• 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 and prepare and present technical report.
6	**NMP760**	**MAJORPROJECT -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 major project work.
7	**FLU744**	**French-VII**	• Provide the students with the linguistic tools to enhance social communication skills • Be able to describe an object • Be able to compare objects and evaluate • Be able to ask for information, precision • Be able to make claims
8	**BCU741**	**Communication Skills VII**	• Conduct all business activities related to the workplace with technical efficiency. • Contribute positively to the overall growth of the organization • Carry out day to day communication at the work place by adequate understanding of various types of communication
9	**BSU743**	**Behavioural Science – VII**	• Students develop the ability to identify suitable career options and to create a suitable career plan based on the utilization of the counseling process, assessment tools, and other resources. • Students will know how to assess their skills,

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			interests and values. • Students will know how to make informed career choices based on their self- assessment. • Students will know how to explore relevant career options and build skills pertinent to those of greatest interest.
10	**NPT 750**	**Industrial Practical Training – 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. • Prepare and present technical report.
11	**NMP 760**	**Major Project – I**	• 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

S.No	Course Code	Course Title	Course Outcomes
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**	• Design and analyze airports. • Understand the skills to solve problems dealing with different airport design problems.

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			• Identify the alignment and length of airport runway and draw an airport layout.
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.
4	**CIV 823**	**Foundation Engineering Lab**	• 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. •
5	**NMP860**	**Major Project II**	• 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. •
6	**FLU844**	**French-VIII**	• Provide the students with the linguistic tools to enhance social communication skills • Be able to express an intention, announce news • Be able to enquire about an event • Be able to speak about the future

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			• Be able to discuss the media
7	**BCU841**	**COMMUNICATION SKILLS - VIII**	• Conduct all business activities related to the workplace with technical efficiency. • Contribute positively to the overall growth of the organization • Carry out day to day communication at the work place by adequate understanding of various types of communication
8	**BSU843**	**Behavioural Science – VIII**	• Students develop the ability to identify and regulate positive emotions for personal and professional excellence. • Students will know how to develop resilience. • Students will know how to role of happiness to attain wellbeing. • Students will know how to nurture personality by positivity.
9	**NMP 860**	**Major Project – II**	• 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.

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AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY

B.TECH. (CSE) (Eight Semesters)

COURSE OUTCOMES:

FIRST SEMESTER

S. No.	Course Code	Course Title	Outcome
1.	MAT 101	Applied Mathematics – I (Calculus and Linear Algebra)	• 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	• 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.	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.

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			• 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	• 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.
6.	CHE 121	Applied Chemistry Lab	• The students will learn to measure: • Molecular/system properties • Surface tension, • Viscosity • Conductance of solutions, • Redox potentials • Chloride content of water, etc

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7.	CSE 124	Programming for Problem Solving 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.
8.	BME 121	Engineering Graphics & Design Lab	• Introduction to engineering design and its place in society • Exposure to the visual aspects of engineering design • Exposure to engineering graphics standards • Exposure to solid modeling • Exposure to computer-aided geometric design • Exposure to creating working drawings • Exposure to engineering communication
9.	BCU 141	Communication Skills –I	• 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

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10.	EVS 142	Environmental Studies – I	• 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
11.	BSU 143	Behavioural Science – I	• Student will Develop accurate sense of self • Student will nurture a deep understanding of personal motivation • Student will develop thorough understanding of personal and professional responsibility • Student will able to analyse the emotions of others for better adjustment.
12.	FLU 144	French – I	• To familiarize students with the French language, with its phonetic system and its accents. • To enable students • to greet someone in French • to present and describe oneself and people • to enter in contact, and begin a conversation • to talk about one's family, tastes and preferences

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SECOND SEMESTER

S. No.	Course Code	Course Title	Outcome
1.	MAT 201	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.	PHY 101	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.	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++	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.	BME 102	Workshop / Manufacturing	• To gain knowledge of the different manufacturing processes which are commonly employed in the industry

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		Practices	• To fabricate components using different materials
6.	PHY 121	Applied Physics Lab – I	• After completion of course student will develop: Practical understanding and applications of fundamental concept of classical and modern Physics.
7.	ECE 121	Basic Electrical Engineering Lab	• Get an exposure to common electrical components and their ratings. • Make electrical connections by wires of appropriate ratings. • Understand the usage of common electrical measuring instruments. • Understand the basic characteristics of transformers and electrical machines. • Get an exposure to the working of power electronic converters.
8.	CSE 224	Object Oriented Programming Using C++ Lab	At the end of this course, students will demonstrate ability to: • knowledge of the structure and model of the C++ programming language, (knowledge) • evaluate user requirements for software functionality required to decide whether the C++ programming language can meet user requirements (analysis) • design the object-oriented programs for real world problems.
9.	BME 122	Workshop / Manufacturing Practices Lab	• Upon completion of this laboratory course, students will be able to fabricate components with their own hands. • They will also get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes. • By assembling different components, they will be able to produce small devices of their interest.
10.	BCU 241	Communication Skills – II	The students should be able to : • Apply Verbal and Non-Verbal Communication Techniques in the Professional Environment
11.	EVS 242	Environmental Studies – II	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.

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	BSU 243	Behavioural Science – II	• Student will be able to identify, understand, and apply contemporary theories of leadership to a wide range of situations and interactions • Student will be able to understand and respect individual difference, so to enhance the relationship • Learn social responsibility and develop a sense of citizenship • Student will be able to identify and understand the impact of culture on one's leadership style
12.	FLU 244	French – II	• to talk about daily activities and sports, to express necessities • to talk about activities in recent future, • to have conversations and perform day to day life tasks like enquiring about time, take an appointment • to enquire about products and place orders in a shop/ restaurant

THIRD SEMESTER

S. No.	Course Code	Course Title	Outcomes
1.	MAT 301	Applied Mathematics – III (Probability, Statistics and Numerical Methods)	• The objective of this course is to familiarize the students with statistical and numerical 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. • 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.	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.

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			• 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.
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.	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.
5.	ECE 306	Digital Electronics and Logic Design	• At the end of this course, students will demonstrate the ability to • Understand working of logic families and logic gates. • Design and implement Combinational and Sequential logic circuits. • Understand the process of Analog to Digital conversion and Digital to Analog conversion. • Be able to use PLDs to implement the given logical problem.
6.	CSE 222	Data Structures through C++ Lab	• Ability to identify the appropriate data structure for given problem. • Graduate able to design and analyze the time and space complexity of algorithm or program. • Ability to effectively use compilers includes library functions, debuggers and trouble shooting.
7.	CSE 322	Python	• Ability to create client-server application for real world problems.

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		Programming Lab	• Ability to develop multithreaded application. • Ability to create web application for real world problem.
8.	CSE 324	Database 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.
9.	ECE 326	Digital Electronics and Logic Design Lab	After studying this course the students would gain enough knowledge. • To have thorough understanding of the fundamental concepts and techniques used in digital electronics. • To understand and examine the structure of various number systems and its application in digital design. • The ability to understand, analyze and design various combinational and sequential circuits. • Ability to identify basic requirements for a design application and propose a cost-effective solution. • To develop skill to build and troubleshoot digital circuits.
10.	BCU 341	Communication Skills – III	• The students should be able to write correctly and properly with special reference to Letter writing.
11.	BSU 343	Behavioural Science – III	• Student will be able to understand and solve the problems effectively in their personal and professional life. • Students will outline multiple divergent solutions to a problem, • Student will able to create and explore risky or controversial ideas, and synthesize ideas/expertise to generate innovations.
12.	FLU 344	French – III	• To enable the students • To talk about the qualities and defects of people. • To ask/give directions, to enquire about a lodging. • To ask and give information about a certain place. • To describe events in past tense.
13.	NTP 330	**Term Paper (Evaluation)**	• After successful completion of this course, students will be able to • 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

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FOURTH SEMESTER

S. No.	Course Code	Course Title	Outcomes
1.	CSE 401	Discrete Mathematics	• For a given logic sentence express it in terms of predicates, quantifiers, and logical connectives • For a given a problem, derive the solution using deductive logic and prove the solution based on logical inference. • For a given a mathematical problem, classify its algebraic structure • Evaluate Boolean functions and simplify expressions using the properties of Boolean algebra. • Develop the given problem as graph networks and solve with techniques of graph theory.
2.	CSE 402	Computer Organization and Architecture	• 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
3.	ECE 406	Analog Electronic Circuits	At the end of this course, students will demonstrate the ability to • Understand the characteristics of 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.
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

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			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.	CSE 404	Operating Systems	At the end of the course, the students should be able to: • Analyze various scheduling algorithms. • Understand deadlock, prevention and avoidance algorithms. • Compare and contrast various memory management schemes. • Understand the functionality of file systems.
6.	ECE 426	Analog Electronic Circuits Lab	Students will be able to: • Design and test rectifiers, clipping circuits, clamping circuits and voltage regulators. • Compute the parameters from the characteristics of JFET and MOSFET devices. • Design, test and evaluate BJT amplifiers in CE configuration. • Design and test JFET/MOSFET amplifiers
7.	CSE 423	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)
8.	CSE 424	Operating Systems Lab	• Identify the basic Unix general purpose commands. • Apply and change the ownership and file permissions using advance Unix commands. • Use the awk, grep, perl scripts. • Implement shell scripts and sed. • Apply basic of administrative task.

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9.	BCU 441	Communication Skills – IV	• Develop a resume for oneself • Ability to handle the interview process confidently • Learn the subtle nuances of an effective group discussion
10.	BSU 443	Behavioral Science – IV	• Able to answer the question: What do I stand for? • Ability to apply a coherent set of moral principles within professional and specialized contexts • Willing to make unpopular but right decision • Committed to working for justice and peace locally and globally
11.	FLU 444	French – IV	• To strengthen the language of the students in both oral and written • To revise the grammar in application and the communication asks related to topics covered already • To get acquainted with the current social communication skills, oral (dialogue, telephone conversations, etc.) and written and perform simple communication tasks such as • Talking about personal habits • Narrating events in the past, marking the stages, using appropriate connectors • Holding conversations on telephone • Asking for/giving advices

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FIFTH SEMESTER

S. No.	Course Code	Course Title	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.	CSE 501	Theory of Computation	At the end of this course, students will be able to do the following: • Students will demonstrate knowledge of basic mathematical models of computation and describe how they relate to formal languages. • Students will understand that there are limitations on what computers can do, and learn examples of unsolvable problems. • Students will learn that certain problems do not admit efficient algorithms, and identify such problems.
3.	CSE 503	Introduction to Android Application Development	• At the end of the course the participant will. Create a Web Application with server controls.
4.	CSE 504	Advanced Java Programming	The student will learn: • Can develop Java Applets, Beans programming. • Can Understand Advanced Java Networking concepts and develop server side application. • Can learn Server Side Programming Concepts and create Dynamic web Application. • Know about the JDBC Principles and can interact with back end database with java programming. • Understand the application server and also understand the enterprise level applications.
5.	CSE 505	Introduction to Web Technologies	The student will be able to • Understand different components in web technology and to know about CGI and CMS.

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			• 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.
6.	CSE 323	Design and Analysis of Algorithms Lab	• To write programs to solve problems using divide and conquer strategy. • To write programs to solve problems using backtracking strategy. • To write programs to solve problems using greedy and dynamic programming techniques
7.	CSE 523	Introduction to Android Application Development Lab	• At the end of the course the participant will. Create a Web Application with server controls.
8.	CSE 524	Advanced Java Programming Lab	• Ability to design and develop Java Applets, Beans programming. • Ability to design and structure the Server Side Programming Concepts. • Ability to Create and design Dynamic web Application. • Write the structured code for JDBC (back end database). • Ability to develop and design the enterprise level applications.
9.	CSE 525	Web Technologies Lab	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.
10.	BCU 541	Communication Skills – V	• 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.
11.	BSU 543	Behavioural Science – V	• Students will Develop critical and reflective thinking abilities • Students will Demonstrate an understanding of group dynamics and effective teamwork

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			• Student will develop a range of leadership skills and abilities such as effectively leading change, resolving conflict, and motivating others • Student will Gain knowledge and understanding of organization resources, policies, and involvement opportunities. • Student will Develop strategies to recruit, retain, and continually motivate contributing members to the organization.
12.	FLU 544	French – V	• To strengthen the language of the students in both oral and written • To revise the grammar in application and the communication asks related to topics covered already • To get acquainted with the current social communication skills, oral (dialogue, telephone conversations, etc.) and written and perform simple communication tasks such as narrating events in the past, marking the stages, using appropriate connectors; expressing causes and consequences, using appropriate logical connectors and presenting a biography
13.	NPT 550	**Industrial Practical Training - I (Evaluation)**	After successful completion of the course, the students will be able to • 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

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SIXTH SEMESTER

S. No.	Course Code	Course Title	Outcome
1.	CSE 601	Data Communication and Computer Networks	• Show clear understanding of the basic concepts of data communications including the key aspects of networking and their interrelationship, packet switching, circuit switching and cell switching as internal and external operations, physical structures, types, models, and internetworking. • Demonstrate the ability to unambiguously explain networking as it relates to the connection of computers, media, and devices (routing). • Able to intelligently compare and contrast local area networks and wide area networks in terms of characteristics and functionalities. Able to identify limitations of typical communication systems. • Able to differentiate among and discuss the four levels of addresses (physical, logical, port, and specific used by the Internet TCP/IP protocols. • Understand the concept of reliable and unreliable transfer protocol of data and how TCP and UDP implement these concepts • Developing the understanding of various advanced techniques like ISDN, ATM and wifi.
2.	CSE 602	Quantitative Aptitude	• 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.
3.	CSE 603	Internet of Things (IoT)	• Ability to develop IOT application.
4.	CSE 604	Problem Solving Techniques	• 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.

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5.	CSE 623	Internet of Things (IoT) Lab	• Ability to develop IOT application
6.	CSE 624	Problem Solving Techniques Lab	Able to write the program using different data structures. • Able to implement linked list data structure to solve various problems. • Able to 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.
7.	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.
8.	CSE 606	Object Oriented Analysis and Design	• At the end of the course, the student should be able to: • Design and implement projects using OO concepts. • Use the UML analysis and design diagrams. • Apply appropriate design patterns. • Create code from design.
9.	CSE 607	Soft Computing	• Fuzzy logic and its applications. • Artificial neural networks and its applications. • Solving single-objective optimization problems using GAs. • Solving multi-objective optimization problems using Evolutionary algorithms (MOEAs). • Applications of soft computing to solve problems in varieties of application domains.
10.	CSE 625	Software Engineering Lab	• Ability to design the proper documentation of software product. • Ability to implement the cost estimation modelling approaches. • Ability to use the unified modelling language as a tool.
11.	CSE 626	Object Oriented Analysis and Design Lab	• Lab Experiments are based on the course Object Oriented Analysis and Design.
12.	CSE 627	Soft Computing Lab	• Lab Experiments are based on the course Soft Computing.
13.	BCU 641	Communication Skills – VI	• 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.
14.	BSU 643	Behavioural Science – VI	• Student will able demonstrate thorough understanding of stress and its effects • Student will able to learn various coping strategies to deal

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			stress effectively so to overcome the consequences and impact of stress on their health and wellbeing, ultimately it will enhance their performance.
15.	FLU 644	French– VI	• To provide the students with the linguistic tools to enhance social communication skills and be able • To approve or disapprove a behavior • To congratulate somebody • To express possession
16.	NMP 660	**Minor Project**	At the end of the course, students will demonstrate the ability to: • 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.

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SEVENTH SEMESTER

S. No.	Course Code	Course Title	Outcome
1.	CSE 701	Cloud Computing	• Articulate the main concepts, key technologies, strengths, and limitations of cloud computing and the possible applications for state-of-the-art cloud computing • Identify the architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, etc. • Explain the core issues of cloud computing such as security, privacy, and interoperability. • Provide the appropriate cloud computing solutions and recommendations according to the applications used. • Collaboratively research and write a research paper, and present the research online.
2.	CSE 702	Artificial Intelligence	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.
3.	CSE 703	Advanced Problem Solving Techniques	• Able to analyze algorithms and determine their complexity. • Ability to apply the algorithms and design techniques to solve problems. • Ability to understand various views and management policies adopted by O.S. as pertaining with processes , Deadlock , memory , File and I/O operations. • Ability to understand the concepts of relational data model, entity-relationship model, relational database design, relational algebra and SQL. • Ability to improve the database design by normalization.
4.	CSE 721	Cloud Computing Lab	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
5.	CSE 722	Artificial Intelligence Lab	Learner will be able to... • program in lisp • create different AI solutions in LISP

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6.	CSE 723	Advanced Problem Solving Techniques Lab	• Able to write programs and determine their complexity. • Ability to apply the algorithms and design techniques to solve problems. • Ability to understand various views and management policies adopted by OS. • Ability to Create, Update and query on the database. • Ability to improve the database design by normalization.
	ELECTIVES (Any one from each category)		
	A (With Practical)		
7.	CSE 704	Data Analytics	**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.
8.	CSE 705	Distributed Operating System	After learning the course the students should be able to: • List the principles of distributed systems and describe the problems and challenges associated with these principles. • Understand Distributed Computing techniques, Synchronous and Processes. • Apply Shared Data access and Files concepts. • Design a distributed system that fulfills requirements with regards to key distributed systems properties. • Understand Distributed File Systems and Distributed Shared Memory. • Apply Distributed web-based system. • Understand the importance of security in distributed systems
9.	CSE 706	Simulation and Modeling	• Ability to choose appropriate simulation techniques in real world problems. • Ability to analyse the different algorithms used for simulation. • Able to analyze and implement various kinds of simulation and modeling techniques.
10.	CSE 724	Data Analytics Lab	• Implement statistical analysis techniques for solving practical problems. • Perform statistical analysis on variety of data. • Perform appropriate statistical tests using R and visualize the outcome.
11.	CSE 725	Distributed Operating System	• Ability to identify the appropriate distributed operating system for given problem.

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		Lab	• Apply Distributed web-based system. • Understand the importance of security in distributed systems
12.	CSE 726	Simulation and Modeling Lab	• To give exposure to software tools needed to analyse engineering problems. • To expose the students to different applications of simulation and analysis tools.
	ELECTIVES (Any one from each category)		
	B (Without Practical)		
13.	CSE 707	Mobile Computing	After learning this course • Students will able to describe the basic concepts and principles in mobile computing • Students will able to understand the concept of Wireless LANs, PAN, Mobile Networks, and Sensor Networks • Students will able to explain the structure and components for Mobile IP and Mobility Management • Students will able to describe the important issues and concerns on security and privacy
14.	CSE 708	Compiler Construction	After learning the course, the students should be able to: • Understand the basic concepts and application of Compiler Design • Apply their basic knowledge Data Structure to design Symbol Table, Lexical Analyzer Intermediate Code Generation, Parser (Top Down and Bottom Up Design) and will able to understand strength of Grammar and Programming Language. • Understand various Code optimization Techniques and Error Recovery mechanisms. • Understand and Implement a Parser.
15.	CSE 709	Grid Computing	Grid computing (or the use of a computational grid) is applying the resources of many computers in a network to a single problem at the same time - usually to a scientific or technical problem that requires a great number of computer processing cycles or access to large amounts of data. The major objective of this course is to provide a sound foundation to the students on the concepts, percepts and practices in a field that is of immense concern to the industry and business.

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16.	BCU 741	Communication Skills – VII	• Conduct all business activities related to the workplace with technical efficiency. • Contribute positively to the overall growth of the organization.
17.	BSU 743	Behavioural Science – VII	• Students develop the ability to identify suitable career options and to create a suitable career plan based on the utilization of the counseling process, assessment tools, and other resources. • Students will know how to assess their skills, interests and values. • Students will know how to make informed career choices based on their self- assessment. • Students will know how to explore relevant career options and build skills pertinent to those of greatest interest.
18.	FLU 744	French– VII	• To describe an object, compare objects and evaluate • To ask for information, precision • To make claims
19.	NPT 750	**Industrial Practical Training – II (Evaluation)**	After successful completion of the course, the students will be able to • 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.
20.	NMP 760	**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.

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EIGHTH SEMESTER

S. No.	Course Code	Course Title	Outcome
1.	CSE 801	Digital Image Processing	• Ability to examine various types of images, intensity transformations and spatial filtering. • Ability to evaluate the methodologies for image segmentation, restoration etc. • Ability to apply image processing algorithms in practical applications. • Ability to develop Fourier transform for image processing in frequency domain.
2.	CSE 802	Software Testing & Quality Assurance	After the completion of the course the students will be able to: • Design and develop bug free software systems using concepts of software testing. • Identify, formulate, review and analyze complex engineering problems of testing using principles of mathematics. • Create, select and apply appropriate techniques and modern engineering and IT tools for software testing. • Analyze verification, validation activities, static, dynamic testing, debugging tools and techniques and importance of working in teams.
3.	CSE 803	Cryptography & Network Security	At the end of the course students should be able to: • Analyze the vulnerabilities in any computing system and hence be able to design a security solution. • Identify the security issues in the network and resolve it. • Evaluate security mechanisms using rigorous approaches, including theoretical • Compare and Contrast different IEEE standards and electronic mail security
4.	CSE 821	Digital Image Processing Lab	• Ability to implement the image processing techniques using colour models. • Ability to implement the image compression algorithm. • Ability to implement the various image enhancement techniques.
5.	CSE 822	Software Testing & Quality Assurance Lab	• Apply modern software testing processes in relation to software development and project management. • Create test strategies and plans, design test cases, prioritize and execute them. • Manage incidents and risks within a project. • Contribute to efficient delivery of software solutions and

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			implement improvements in thesoftware development processes. • To gain expertise in designing, implementation and development of computer based systems and IT processes.
	ELECTIVES (Any one from following with Practical)		
6.	CSE 804	ASP.NET	After completion of the course the student will be able to use the features of Dot Net Framework along with the features of ASP. NET & Web Services.
7.	CSE 805	Big Data and Business Analytics	• After learning the course the students should be able to • Design and implement OLTP, OLAP and Warehouse concepts • Design and develop Data Warehouse using Various Schemas & Dimensional modelling • Use the ETL concepts, tools and techniques to perform Extraction, Transformation, and Loading of data • Report the usable data by using various reporting concepts, techniques/tools, and use charts, tables for reporting in BI • Use Analytics concepts like data mining, Exploratory and statistical techniques for predictive analysis in Business Intelligence • Demonstrate application of concepts in BI
8.	CSE 806	Data Mining and Data Warehousing	• Students should be able to understand why the data warehouse in addition to database systems. • After completing this course, the student will be able to: x Apply data mining techniques and methods to large data sets. x Use data mining tools x Compare and contrast the various classifiers. • Ability to identify the association rules, classification and clusters in large data sets. • Ability to solve real world problems in business and scientific information using data mining.
9.	CSE 824	ASP.NET Lab	• Develop dynamic web applications, create and consume web services. • Use appropriate data sources and data bindings in ASP.NET web applications.
10.	CSE 825	Big Data and Business Analytics Lab	• 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.

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			• Understand the fundamentals of various big data analytics techniques. • Build a complete business data analytics solution
11.	CSE 826	Data Mining and Data Warehousing Lab	• Students will be able to understand the various kinds of tools. • Students will be able to Analyze the mining techniques for realistic data, and also to conceptualize Data Mining and the need for pre-processing. • To develop the algorithms used for various types of Data Mining Problem. • Students will be able to construct algorithms to solve data mining problems using weka tool. • Students will be able to demonstrate the classification and clusters Techniques in large datasets. • Students will be able to build an ability to add mining algorithms as a component to the existing tools.
12.	BCU 841	Communication Skills – VIII	• Students will be able to navigate cross cultural encounters in a global economy. • Facilitate students to develop learning to construct and deliver messages that incorporate the appropriate use of organizing content, language, vocabulary, kinesics, eye contact, appearance, visual aids, and time constraints.
13.	BSU 843	Behavioural Science – VIII	• Students develop the ability to identify and regulate positive emotions for personal and professional excellence. • Students will know how to develop resilience. • Students will know how to role of happiness to attain wellbeing. • Students will know how to nurture personality by positivity.
14.	FLU 844	French– VIII	• To express an intention, announce a news, enquire about an event • To speak about the future • To discuss the media
15.	NMP 860	**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.

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			• 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.

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AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY

B. Tech. Information Technology (Eight Semesters)

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.

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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. • Analyze the effects of system of forces on rigid bodies in static conditions.
			• The chemistry laboratory course will consist of

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6.	**CHE 121**	**Applied Chemistry Lab**	experiments illustrating the principles of chemistry relevant to the study of science and engineering. The students will learn to measure. • Molecular/system properties • Surface tension, • Viscosity • Conductance of solutions, • Redox potentials • Chloride content of water, etc.
7.	**CSE 124**	**Programming for Problem Solving 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
8.	**BME 121**	**Engineering Graphics & Design Lab**	• Introduction to engineering design and its place in society • Exposure to the visual aspects of engineering design • Exposure to engineering graphics standards • Exposure to solid modeling • Exposure to computer-aided geometric design • Exposure to creating working drawings • Exposure to engineering communication • Introduction to engineering design and its place in society
9.	**BCU 141**	**Communication Skills – I**	• 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. • Identify Common Errors and Rectify Them

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			• Develop and Expand Writing Skills Through Controlled and Guided Activities
10.	**EVS 142**	**Environmental Studies – I**	• 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.
11.	**BSU 143**	**Behavioral Science – I**	• Student will Develop accurate sense of self • Student will nurture a deep understanding of personal motivation • Student will develop thorough understanding of personal and professional responsibility • Student will able to analyze the emotions of others for better adjustment. • Student will Develop accurate sense of self
12.	**FLU 144**	**French – I**	• To greet someone in French • To present and describe oneself and people • To enter in contact, and begin a conversation • To talk about one's family, tastes and preferences

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SECOND SEMESTER

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. • 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.	PHY 101	Applied Physics - II – Modern Physics	• 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.	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++	• 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.	BME 102	Workshop/ Manufacturing	• After completion of course student will develop: Practical understanding and applications of fundamental concept

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		Practices	of classical and modern Physics.
6.	**PHY 121**	**Applied Physics Lab – I**	• After completion of course student will develop: Practical understanding and applications of fundamental concept of classical and modern Physics.
7.	**ECE 121**	**Basic Electrical Engineering Lab**	• Get an exposure to common electrical components and their ratings. • Make electrical connections by wires of appropriate ratings. • Understand the usage of common electrical measuring instruments. • Understand the basic characteristics of transformers and electrical machines. .
8.	**CSE 224**	**Object Oriented Programming Using C++ Lab**	• At the end of this course, students will demonstrate ability to: • knowledge of the structure and model of the C++ programming language, (knowledge) • evaluate user requirements for software functionality required to decide whether the C++ programming language can meet user requirements (analysis) • design the object-oriented programs for real world problems
9.	**BME 122**	**Workshop / Manufacturing Practices Lab**	• Upon completion of this laboratory course, students will be able to fabricate components with their own hands. • They will also get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes. • By assembling different components, they will be able to produce small devices of their interest
10.	**BCU 241**	**Communication Skills – II**	• The students should be able to: • Apply Verbal and Non-Verbal Communication Techniques in the Professional Environment
11.	**EVS 242**	**Environmental Studies – II**	• 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

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12.	**BSU 243**	**Behavioural Science – II**	• Student will be able to identify, understand, and apply contemporary theories of leadership to a wide range of situations and interactions • Student will be able to understand and respect individual difference, so to enhance the relationship • Learn social responsibility and develop a sense of citizenship • Student will be able to identify and understand the impact of culture on one's leadership style
13.	**FLU 244**	**French – II**	• to talk about daily activities and sports, to express necessities • to talk about activities in recent future, • to have conversations and perform day to day life tasks like enquiring about time, take an appointment • to enquire about products and place orders in a shop/ restaurant

THIRD SEMESTER

S.NO	Course Code	Course Title	Outcomes
1.	**MAT 301**	**Applied Mathematics – III (Probability, Statistics and Numerical Methods)**	• The objective of this course is to familiarize the students with statistical and numerical 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. • Numerical techniques to solve simultaneous linear equations, interpolation and extrapolation. • Numerical techniques of differential and integral. • Solution of ordinary differential equation by numerical techniques.

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2.	**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. • Ability to choose appropriate data structures to represent data items in real world problems.
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. • Ability to create client-server application for real world problems.
4.	**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.
5.	**ECE 306**	**Digital Electronics and Logic Design**	• At the end of this course, students will demonstrate the ability to • Understand working of logic families and logic gates. • Design and implement Combinational and Sequential logic circuits. • Understand the process of Analog to Digital conversion and Digital to Analog conversion. • Be able to use PLDs to implement the given logical problem

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6.	**CSE 222**	**Data Structures through C++ Lab**	• Ability to identify the appropriate data structure for given problem. • Graduate able to design and analyze the time and space complexity of algorithm or program. • Ability to effectively use compilers includes library functions, debuggers and trouble shooting. • Ability to identify the appropriate data structure for given problem.
7.	**CSE 322**	**Python Programming Lab**	• Ability to create client-server application for real world problems. • Ability to develop multithreaded application. • Ability to create web application for real world problem.
8.	**CSE 324**	**Database 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 updating operation on Databases
9.	**ECE 326**	**Digital Electronics and Logic Design Lab**	• To have thorough understanding of the fundamental concepts and techniques used in digital electronics. • To understand and examine the structure of various number systems and its application in digital design. • The ability to understand, analyze and design various combinational and sequential circuits. • Ability to identify basic requirements for a design application and propose a cost-effective solution. • To develop skill to build and troubleshoot digital circuits
10.	**BCU 341**	**Communication Skills – III**	• The students should be able to write correctly and properly with special reference to Letter writing.
11.	**BSU 343**	**Behavioral Science – III**	• Student will be able to understand and solve the problems effectively in their personal and professional life. • Students will outline multiple divergent solutions to a problem, • Student will able to create and explore risky or controversial ideas, and synthesize ideas/expertise to generate innovations.

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12.	**FLU 344**	**French – III**	• to talk about daily activities and sports, to express necessities • to talk about activities in recent future, • to have conversations and perform day to day life tasks like enquiring about time, take an appointment • to enquire about products and place orders in a shop/ restaurant
13.	**NTP 330**	**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

FOURTH SEMESTER

S.NO	Course Code	Course Title	Outcomes
1.	**CSE 401**	**Discrete Mathematics**	• For a given logic sentence express it in terms of predicates, quantifiers, and logical connectives • For a given a problem, derive the solution using deductive logic and prove the solution based on logical inference. • For a given a mathematical problem, classify its algebraic structure • Evaluate Boolean functions and simplify expressions using the properties of Boolean algebra.
2.	**CSE 402**	**Computer Organization and Architecture**	• 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.

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3.	**IT 401**	**Formal Languages and Automata Theory**	• Students will demonstrate knowledge of basic mathematical models of computation and describe how they relate to formal languages. • Students will understand that there are limitations on what computers can do, and learn examples of unsolvable problems.
			• Students will learn that certain problems do not admit efficient algorithms, and identify such problems. • Students will learn basic concepts of compiler.
4.	**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
5.	**CSE 404**	**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.
6.	**CSE 423**	**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)

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7.	**CSE 424**	**Operating Systems Lab**	• Identify the basic Unix general purpose commands. • Apply and change the ownership and file permissions using advance Unix commands. • Use the awk, grep, perl scripts. • Implement shell scripts and sed. • Apply basic of administrative task.
8.	**BCU 441**	**Communication Skills – IV**	• The students should be able to write correctly and properly with special reference to Letter writing.
9.	**BSU 443**	**Behavioral Science – IV**	• Able to answer the question: What do I stand for? • Ability to apply a coherent set of moral principles within professional and specialized contexts • Willing to make unpopular but right decision
10.	**FLU 444**	**French – IV**	• Talking about personal habits • Narrating events in the past, marking the stages, using appropriate connectors • Holding conversations on telephone • Asking for/giving advices

FIFTH SEMESTER

S.NO	Course Code	Course Title	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.	**IT 501**	**Introduction to Blockchain Technology**	• Students will demonstrate knowledge of blockchain technology • Students will understand the concepts of Cryptocurrency • Students will learn applications of blockchain

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3.	**CSE 503**	**Introduction to Android Application Development**	• At the end of the course the participant will. Create a Web Application with server controls
4.	**CSE 504**	**Advanced Java Programming**	• Can develop Java Applets, Beans programming. • Can Understand Advanced Java Networking concepts and develop server side application. • Can learn Server Side Programming Concepts and create Dynamic web Application. • Know about the JDBC Principles and can interact with back end database with java programming. • Understand the application server and also understand the enterprise level applications.
5.	**CSE 505**	**Introduction to 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.
6.	**CSE 323**	**DESIGN AND ANALYSIS OF ALGORITHMS LAB**	• To write programs to solve problems using divide and conquer strategy. • To write programs to solve problems using backtracking strategy. • To write programs to solve problems using greedy and dynamic programming techniques
7.	**CSE 523**	**Introduction to Android Application Development Lab**	• At the end of the course the participant will. Create a Web Application with server controls
8.	**CSE 524**	**Advanced Java Programming Lab**	• Ability to design and develop Java Applets, Beans programming. • Ability to design and structure the Server Side Programming Concepts. • Ability to Create and design Dynamic web Application. • Write the structured code for JDBC (back end database). • Ability to develop and design the enterprise level applications.

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9.	**CSE 525**	**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.
10.	**BCU 541**	**Communication Skills – V**	• 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
11.	**BSU 543**	**Behavioral Science – V**	• Students will Develop critical and reflective thinking abilities • Students will Demonstrate an understanding of group dynamics and effective teamwork • Student will develop a range of leadership skills and abilities such as effectively leading change, resolving conflict, and motivating others • Student will Gain knowledge and understanding of organization resources, policies, and involvement opportunities. • Student will Develop strategies to recruit, retain, and continually motivate contributing members to the organization
12.	**FLU 544**	**French – V**	• To strengthen the language of the students in both oral and written • To revise the grammar in application and the communication asks related to topics covered already • To get acquainted with the current social communication skills, oral (dialogue, telephone conversations, etc.) and written and perform simple communication tasks such as narrating events in the past, marking the stages, using appropriate connectors; expressing causes and consequences, using appropriate logical connectors and presenting a biography
			• Explore the preferred field of specialization and develop analytical / hardware / software / experimental /

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13.	**NPT 550**	**Industrial Practical Training - I (Evaluation)**	observation skills. • Manage the technical content and work. • Learn the various administrative process followed in industry. • Prepare and present technical report.

SIXTH SEMESTER

S.NO	Course Code	Course Title	Outcome
1.	**IT 601**	**Computer Networks**	• Show clear understanding of the basic concepts of data communications including the key aspects of networking and their interrelationship, packet switching, circuit switching and cell switching as internal and external operations, physical structures, types, models, and internetworking. • Able to intelligently compare and contrast local area networks and wide area networks in terms of characteristics and functionalities. Able to identify limitations of typical communication systems. • Able to differentiate among and discuss the four levels of addresses (physical, logical, port, and specific used by the Internet TCP/IP protocols. • Able to understand applications and security issues of computer networks
2.	**CSE 602**	**Quantitative Aptitude**	• 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.

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3.	**CSE 603**	**Internet of Things (IoT)**	• Ability to develop IOT application
4.	**CSE 604**	**Problem Solving Techniques**	• 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
5.	**CSE 623**	**Internet of Things (IoT) Lab**	• Ability to develop IOT application
6.	**CSE 624**	**Problem Solving Techniques Lab**	• Able to implement linked list data structure to solve various problems. • Able to 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.
7.	**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
8.	**CSE 606**	**Object Oriented Analysis and Design**	• At the end of the course, the student should be able to: • Design and implement projects using OO concepts. • Use the UML analysis and design diagrams. • Apply appropriate design patterns. • Create code from design.
9.	**CSE 607**	**Soft Computing**	• Fuzzy logic and its applications. • Artificial neural networks and its applications. • Solving single-objective optimization problems using GAs. • Solving multi-objective optimization problems using Evolutionary algorithms (MOEAs). • Applications of soft computing to solve problems in varieties of application domains.

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10.	**CSE 625**	**Software Engineering Lab**	• Ability to design the proper documentation of software product. • Ability to implement the cost estimation modelling approaches. • Ability to use the unified modelling language as a tool.
11.	**CSE 626**	**Object Oriented Analysis and Design Lab**	• Perform OO analysis and design for a given problem specification. • Identify and map basic software requirements in UML mapping. • Improve the software quality using design patterns and to explain the rationale behind applying specific design patterns • Test the compliance of the software with the SRS.
12.	**CSE 627**	**Soft Computing Lab**	• Fuzzy logic and its applications. • Artificial neural networks and its applications. • Solving single-objective optimization problems using GAs
13.	**BCU 641**	**Communication Skills - IV**	• To communicate contextually in specific personal and professional situations with courtesy. • To inject humor in their regular interactions. • To strengthen their creative learning process through individual expression and collaborative peer activities.
14.	**BSU 643**	**Behavioural Science – VI**	• Student will able demonstrate thorough understanding of stress and its effects • Student will able to learn various coping strategies to deal stress effectively so to overcome the consequences and impact of stress on their health and wellbeing, ultimately it will enhance their performance
15.	**FLU 644**	**French– VI**	• To provide the students with the linguistic tools to enhance social communication skills and be able • To approve or disapprove a behavior • To congratulate somebody • To express possession
16.	**NMP 660**	**Minor Project**	• Conceive a problem statement either from rigorous literature survey or from the requirements raised from need analysis.

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			• Design, implement and test the prototype/algorithm in order to solve the conceived problem. • Write comprehensive report on mini project work.

SEVENTH SEMESTER

S.NO	Course Code	Course Title	Outcome
1.	IT 701	Information Storage and Retrieval	• The dimensions of the information retrieval "problem". • The functions of an information retrieval system. • Analyze the components of an information retrieval system. • The factors which optimize the information retrieval process. • Examine current issues in information retrieval.
2.	IT 702	Cloud Computing and Virtualization	• Analyze the trade-offs between deploying applications in the cloud and over the local infrastructure. • Compare the advantages and disadvantages of various cloud computing platforms. • Deploy applications over commercial cloud computing infrastructures such as Amazon Web Services, Windows Azure, and Google AppEngine. • Analyze the performance, scalability, and availability of the underlying cloud technologies and software
3.	CSE 703	Advanced Problem-Solving Techniques	• Able to analyze algorithms and determine their complexity. • Ability to apply the algorithms and design techniques to solve problems. • Ability to understand various views and management policies adopted by O.S. as pertaining with processes, Deadlock, memory , File and I/O operations. • Ability to understand the concepts of relational data model, entity-relationship model, relational database design, relational algebra and SQL.

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			• Ability to improve the database design by normalization
5.	**IT 722**	**Cloud Computing and Virtualization Lab**	• Basics of Cloud Computing • Deployment on cloud • Different services on cloud
6.	**CSE 723**	**Advanced Problem Solving Techniques Lab**	• Able to write programs and determine their complexity. • Ability to apply the algorithms and design techniques to solve problems. • Ability to understand various views and management policies adopted by OS. • Ability to Create, Update and query on the database. • Ability to improve the database design by normalization
	ELECTIVES (Any one from each group)		
7.	**CSE 704**	**Data Analytics**	• 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.
8.	**CSE 706**	**Simulation and Modeling**	• Ability to choose appropriate simulation techniques in real world problems. • Ability to analyze the different algorithms used for simulation. • Able to analyze and implement various kinds of simulation and modeling techniques
9.	**IT 706**	**Parallel Computing**	• Be proficient at programming multiple parallel machines in more than one special programming language or programming system • Be able to descriptively compare the performance of different programs and methods on one machine • Demonstrate advanced knowledge of the elements of parallel programming, parallel communication and system implementation • Recall the history of parallel systems, principles of parallel algorithms and describe the developments in the field of parallel computing.

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10.	**CSE 724**	**Data Analytics Lab**	• Implement statistical analysis techniques for solving practical problems. • Perform statistical analysis on variety of data. • Perform appropriate statistical tests using R and visualize the outcome
11.	**CSE 726**	**Simulation and Modeling Lab**	• To give exposure to software tools needed to analyze engineering problems. • To expose the students to different applications of simulation and analysis tools
12.	**IT 726**	**Parallel Computing Lab**	• Memorize parallel processing approaches • Describe different parallel processing platforms involved in achieving High Performance Computing. • Discuss different design issues in parallel programming • Develop efficient and high-performance parallel programming • Learn parallel programming using message passing paradigm using open-source APIs. • Design algorithms suited for Multicore processor and GPU systems using
13.	**CSE 708**	**Compiler Construction**	• Understand the basic concepts and application of Compiler Design • Apply their basic knowledge Data Structure to design Symbol Table, Lexical Analyzer Intermediate Code Generation, Parser (Top Down and Bottom Up Design) and will able to understand strength of Grammar and Programming Language. • Understand various Code optimization Techniques and Error Recovery mechanisms. • Understand and Implement a Parser
14.	**CSE 702**	**Artificial Intelligence**	• 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
15.	**IT 707**	**Semantic Web and Knowledge Management**	• To learn Web Intelligence • To learn Knowledge Representation for the Semantic Web • To learn Ontology Engineering • To learn Semantic Web Applications, Services and Technology

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			• To learn Social Network Analysis and semantic web
17.	**BCU 741**	**Communication Skills – VII**	• Conduct all business activities related to the workplace with technical efficiency. • Contribute positively to the overall growth of the organization
18.	**BSU 743**	**Behavioral Science – VII**	• Students develop the ability to identify suitable career options and to create a suitable career plan based on the utilization of the counseling process, assessment tools, and other resources. • Students will know how to assess their skills, interests and values. • Students will know how to make informed career choices based on their self- assessment. • Students will know how to explore relevant career options and build skills pertinent to those of greatest interest.
19.	**FLU 744**	**French – VII**	• To describe an object, compare objects and evaluate • To ask for information, precision • To make claims
20.	**NPT 750**	**Industrial Practical Training – 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. • Prepare and present technical report.
21.	**NMP 760**	**Major Project – I**	• Demonstrate a sound technical knowledge of their selected project topic. • Undertake problem identification, formulation and solution. • Design engineering solutions to complex problems utilizing a systems approach. • Conduct an engineering project • Communicate with engineers and the community at large in written an oral form. • Demonstrate the knowledge, skills and attitudes of a professional engineer. • Write comprehensive report on project work.

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EIGHTH SEMESTER

S. No	Course Code	Course Title	Outcome
1.	IT 801	Machine Learning Techniques	• Develop an appreciation for what is involved in learning models from data. • Understand a wide variety of learning algorithms. • Understand how to evaluate models generated from data. • Apply the algorithms to a real-world problem, optimize the models learned and report on the expected accuracy that can be achieved by applying the models
2.	CSE 802	Software Testing & Quality Assurance	• Design and develop bug free software systems using concepts of software testing. • Identify, formulate, review and analyze complex engineering problems of testing using principles of mathematics. • Create, select and apply appropriate techniques and modern engineering and IT tools for software testing. • Analyze verification, validation activities, static, dynamic testing, debugging tools and techniques and importance of working in teams.
3.	IT 803	Cyber Security and Digital Forensics	• Understand the definition of Digital forensics fundamentals. • Describe the types of digital forensics technology. • Analyze various digital forensics systems. • Illustrate the methods for data recovery, evidence collection and data seizure. • Summarize duplication and preservation of digital evidence
4.	IT 821	Machine Learning Techniques Lab	• The students should be able to: • Understand the implementation procedures for the machine learning algorithms. • Design Java/Python programs for various Learning algorithms. • Apply appropriate data sets to the Machine Learning

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			algorithms. • Identify and apply Machine Learning algorithms to solve real world problems
5.	**CSE 822**	**Software Testing & Quality Assurance Lab**	• Apply modern software testing processes in relation to software development and project management. • Create test strategies and plans, design test cases, prioritize and execute them. • Manage incidents and risks within a project. • Contribute to efficient delivery of software solutions and implement improvements in thesoftware development processes. • To gain expertise in designing, implementation and development of computer based systems and IT processes.
	ELECTIVES (Any one from each group)		
6.	**IT 802**	**Neural Networks and Fuzzy Logic**	• Knowledge about different neural networks, their architecture and training algorithm • Concept of Fuzzy logic, Fuzzy Sets, fuzzy rules and fuzzy reasoning • Exposure to the applicability of neural networks and fuzzy logic
7.	**CSE 805**	**Big Data and Business Analytics**	• After learning the course the students should be able to • Design and implement OLTP, OLAP and Warehouse concepts • Design and develop Data Warehouse using Various Schemas & Dimensional modelling • Use the ETL concepts, tools and techniques to perform Extraction, Transformation, and Loading of data • Report the usable data by using various reporting concepts, techniques/tools, and use charts, tables for reporting in BI • Use Analytics concepts like data mining, Exploratory and statistical techniques for predictive analysis in Business Intelligence • Demonstrate application of concepts in BI
			• Students should be able to understand why the data warehouse in addition to database systems.

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8.	**CSE 806**	**Data Mining and Data Warehousing**	• After completing this course, the student will be able to: x Apply data mining techniques and methods to large data sets. x Use data mining tools x Compare and contrast the various classifiers. • Ability to identify the association rules, classification and clusters in large data sets. • Ability to solve real world problems in business and scientific information using data mining.
9.	**IT 822**	**Neural Networks and Fuzzy Logic Lab**	• Demonstrate basic concepts fuzzy logic and neural network through simulation. • Develop the logic given in problem statement using algorithms in NN and basics of toolbox studied. • Develop the logic given in problem statement using operations in fuzzy logic and basics of toolbox studied. • Develop real life applications using NN and Fuzzy Logic
10.	**CSE 825**	**Big Data and Business Analytics Lab**	• 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
11.	**CSE 826**	**Data Mining and Data Warehousing Lab**	• Students will be able to understand the various kinds of tools. • Students will be able to Analyze the mining techniques for realistic data, and also to conceptualize Data Mining and the need for pre-processing. • To develop the algorithms used for various types of Data Mining Problem. • Students will be able to construct algorithms to solve data mining problems using weka tool. • Students will be able to demonstrate the classification and clusters Techniques in large datasets. • Students will be able to build an ability to add mining algorithms as a component to the existing tools.

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12.	**BCU 841**	**Communication Skills – VIII**	• Students will be able to navigate cross cultural encounters in a global economy. • Facilitate students to develop learning to construct and deliver messages that incorporate the appropriate use of organizing content, language, vocabulary, kinesics, eye contact, appearance, visual aids, and time constraints.
13.	**BSU 843**	**Behavioral Science – VIII**	• Students develop the ability to identify and regulate positive emotions for personal and professional excellence. • Students will know how to develop resilience. • Students will know how to role of happiness to attain wellbeing. • Students will know how to nurture personality by positivity
14.	**FLU 844**	**French – VIII**	• To express an intention, announce a news, enquire about an event • To speak about the future • To discuss the media
15.	**NMP 860**	**Major Project – II**	• 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.

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AMITY SCHOOL OF ENGINEERING & TECHNOLOGY

BCA (Six Semesters)

COURSE OUTCOMES

FIRST SEMESTER

S. No.	Course Code	Course Title	Course OUTCOMES
1	**BCA101**	**Computer Fundamentals and Office Automation**	The objectives of this course is to • 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. • To develop expertise in word processing, spreadsheet and power point presentation.
2	**CSE 104**	**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

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			numerical method problems, namely rot finding of function, differentiation of function and simple integration
3	**MAT 102**	**Mathematics – I**	Students completing this course will be able to: • Compute the expression for the derivative of a function using the rules of differentiation including the power rule, product rule, and quotient rule and chain rule. • Evaluate integrals of rational functions using different methods. • Solve basic application problems by second order linear differential equations with constant coefficients. • Solve the system of simultaneous linear equations by using matrices.
4	**ECE 106**	**Digital Electronics**	At the end of this course, students will demonstrate the ability to • Design and implement Combinational and Sequential logic circuits. • Understand the process of Analog to Digital conversion and Digital to Analog conversion. • Be able to design digital circuits with minimum hardware.
5	**BCH 110**	**Principles of Management**	• At the end of this course, students will 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.
6	**BCA 121**	**Office Automation Lab**	At the end of this course, students are able to • Understanding about Computer System. • Identify all parts of the computer system and functioning of computer • Knowledge about software, its type and its uses. • Work efficiently in word processing, spreadsheet and presentation software.

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7	**CSE 124**	**Programming for Problem Solving 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.
8	**ECE 126**	**Digital Electronics Lab**	At the end of the course the students can able to • Ability to formulate and solve problems in Digital Systems design and implementation. • Consolidation of the design methodologies for combinational and sequential digital systems • Interpret the specifications of programmable reconfigurable device and select the appropriate for the application in hand
9	**BCU 141**	**Communication Skills – I**	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.
10	**EVS 142**	**Environmental Studies – I**	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.

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			• 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.
11	**BSU 143**	**Behavioural Science – I**	• Student will Develop accurate sense of self • Student will nurture a deep understanding of personal motivation • Student will develop thorough understanding of personal and professional responsibility • Student will able to analyse the emotions of others for better adjustment.
12	**FLU 144**	**French– I**	• To familiarize students with the French language, with its phonetic system and its accents. To enable students • To greet someone in French • To present and describe oneself and people • To enter in contact, and begin a conversation • To talk about one's family, tastes and preferences

SECOND SEMESTER

S. No.	Course Code	Course Title	Course OUTCOMES
1	**MAT 203**	**Mathematical Foundations for Computer Science**	• Understand about set theory and their applications. • Understand the computational and algorithmic aspects of Mathematical Logic. • For a given a problem, derive the solution using deductive logic and prove the solution based on

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			logical inference. • Evaluate Boolean functions and simplify expressions using the properties of Boolean algebra. • Develop the given problem as graph networks and solve with techniques of graph theory.
2	**CSE 204**	**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++.
3	**BCA 201**	**Computer 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
4	**BME 103**	**Production & Operations Management**	• Understand the basic principles of production and operation management for organization. • Understand the functioning of supply chain management and quality assurance.
5	**BCA 202**	**Web Design & Development**	The student will be able to • 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.

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			• Construct websites for user interactions using JavaScript and JQuery.
6	**CSE 224**	**Object Oriented Programming Using C++ Lab**	At the end of this course, students will demonstrate ability to: • knowledge of the structure and model of the C++ programming language, (knowledge) • evaluate user requirements for software functionality required to decide whether the C++ programming language can meet user requirements (analysis) • design the object-oriented programs for real world problems.
7	**BCA 222**	**Web Design & Development Lab**	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.
8	**BCU 241**	**Communication Skills – II**	The students should be able to : • Apply Verbal and Non-Verbal Communication Techniques in the Professional Environment
9	**EVS 242**	**Environmental Studies – II**	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.
10	**BSU 243**	**Behavioural Science – II**	• Student will be able to identify, understand, and apply contemporary theories of leadership to a wide range of situations and interactions • Student will be able to understand and respect individual difference, so to enhance the relationship • Learn social responsibility and develop a sense of citizenship

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			• Student will be able to identify and understand the impact of culture on one's leadership style.
11	**FLU 244**	**French– II**	To furnish the linguistic tools • To talk about daily activities and sports, to express necessities • To talk about activities in recent future, • To have conversations and perform day to day life tasks like enquiring about time, take an appointment • To enquire about products and place orders in a shop/ restaurant

THIRD SEMESTER

S. No.	Course Code	Course Title	Course OUTCOMES
1	**MAT 302**	**Mathematics-III (Computer Oriented Statistical & Optimization Methods)**	Students completing this course will be able to: • Learn the statistical and optimization methods, in particular, with reference to frequency distribution and measures of central tendency, measures of dispersion, correlation and regression· learn theory of probability, linear programming problems, transportation problems. • Learn important theorems, different formulae and practical applications of these statistical and optimization methods in the field of Computer Sciences and Applications.
2	**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.
3	**CSE 304**	**Database Management Systems**	The student will learn • Describe DBMS architecture, physical and logical database designs, database modeling, relational, hierarchical and network models. • Identify basic database storage structures and

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			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.
4	**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.
5	**BCA 301**	**Introduction to Operating Systems**	At the end of the course, the students should be able to: • Analyze various scheduling algorithms. • Understand deadlock, prevention and avoidance algorithms. • Compare and contrast various memory management schemes. • Understand the functionality of file systems.
6	**CSE 222**	**Data Structures through C++ Lab**	• Ability to identify the appropriate data structure for given problem. • Graduate able to design and analyze the time and space complexity of algorithm or program. • Ability to effectively use compilers includes library functions, debuggers and trouble shooting.
7	**CSE 324**	**Database 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.
8	**CSE 322**	**Python Programming Lab**	• Ability to create client-server application for real world problems. • Ability to develop multithreaded application. • Ability to create web application for real world

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			problem.
9	**BCU 341**	**Communication Skills – III**	• The students should be able to write correctly and properly with special reference to Letter writing.
10	**BSU 343**	**Behavioural Science – III**	• Student will be able to understand and solve the problems effectively in their personal and professional life. • Students will outline multiple divergent solutions to a problem, • Student will able to create and explore risky or controversial ideas, and synthesize ideas/expertise to generate innovations.
11	**FLU 344**	**French– III**	To enable the students • To talk about the qualities and defects of people. • To ask/give directions, to enquire about a lodging. • To ask and give information's about a certain place. • To describe events in past tense.
12	**NPT 360**	**Summer Project – I**	After successful completion of the course, the students will be able to • Explore the preferred field of specialization and develop analytical / hardware / software / experimental / observation skills. • Manage the technical content and work. • Learn the various administrative processes followed in industry. • Prepare and present technical report.

FORTH SEMESTER

S. No.	Course Code	Course Title	Course OUTCOMES
1	**MAT 401**	**Mathematics-IV (Computer Oriented Numerical Methods)**	• The objective of this course is to familiarize the students with numerical 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. • Numerical techniques to solve simultaneous linear equations, interpolation and extrapolation.

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			• Numerical techniques of differential and integral. Solution of ordinary differential equation by numerical techniques.
2	**BCA 401**	**Computer Networks**	• Show clear understanding of the basic concepts of data communications including the key aspects of networking and their interrelationship, packet switching, circuit switching and cell switching as internal and external operations, physical structures, types, models, and internetworking. • Demonstrate the ability to unambiguously explain networking as it relates to the connection of computers, media, and devices (routing). • Able to intelligently compare and contrast local area networks and wide area networks in terms of characteristics and functionalities. Able to identify limitations of typical communication systems. • Able to differentiate among and discuss the four levels of addresses (physical, logical, port, and specific used by the Internet TCP/IP protocols. • Understand the concept of reliable and unreliable transfer protocol of data and how TCP and UDP implement these concepts • Developing the understanding of various advanced techniques like ISDN, ATM and wifi.
3	**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

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			• 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
4	**BCA 402**	**Quantitative Techniques**	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.
5	**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.
6	**BCA 423**	**Programming Techniques for Problem Solving Lab**	Able to write the program using different data structures. • Able to implement linked list data structure to solve various problems. • Able to apply various data structure such as stacks, queues, trees and graphs to solve various computing problems using C/C++ -programming

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			language. • To apply concepts and techniques for implementation.
7	**CSE 423**	**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).
8	**BCU 441**	**Communication Skills – IV**	• Develop a resume for oneself • Ability to handle the interview process confidently • Learn the subtle nuances of an effective group discussion
9	**BSU 443**	**Behavioural Science – IV**	• Able to answer the question: What do I stand for? • Ability to apply a coherent set of moral principles within professional and specialized contexts • Willing to make unpopular but right decision • Committed to working for justice and peace locally and globally.

10	**FLU 444**	**French– IV**	• To strengthen the language of the students in both oral and written
			• To revise the grammar in application and the communication asks related to topics covered already
			• To get acquainted with the current social communication skills, oral(dialogue, telephone conversations, etc.) and written and perform simple communication tasks such as
			  • Talking about personal habits
			  • Narrating events in the past, marking the

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			stages, using appropriate connectors • Holding conversations on telephone • Asking for/giving advices

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	CSE 323	Design and Analysis of Algorithms Lab	• To write programs to solve problems using divide and conquer strategy. • To write programs to solve problems using backtracking strategy. • To write programs to solve problems using greedy and dynamic programming techniques
5	BCA 521	Internet of Things and Applications Lab	• Ability to develop IOT application
6	BCA 522	Android Application Development Lab	• At the end of the course the participant will. Create a Web Application with server controls.
7	BCU 541	Communication Skills – V	• 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.
8	BSU 543	Behavioural Science – V	• Students will Develop critical and reflective thinking abilities • Students will Demonstrate an understanding of

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			group dynamics and effective teamwork • Student will develop a range of leadership skills and abilities such as effectively leading change, resolving conflict, and motivating others • Student will Gain knowledge and understanding of organization resources, policies, and involvement opportunities. • Student will Develop strategies to recruit, retain, and continually motivate contributing members to the organization
9	**FLU 544**	**French– V**	• To strengthen the language of the students in both oral and written • To revise the grammar in application and the communication asks related to topics covered already • To get acquainted with the current social communication skills, oral (dialogue, telephone conversations, etc.) and written and perform simple communication tasks such as narrating events in the past, marking the stages, using appropriate connectors; expressing causes and consequences, using appropriate logical connectors and presenting a biography.
10	**NPT 560**	**Summer Project – II (Evaluation)**	After successful completion of the course, the students will be able to • 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.
11	**NMP 561**	**Minor Project**	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

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			• Design, implement and test the prototype/algorithm in order to solve the conceived problem. • 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 minor 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	**BCA 603**	**Data Warehousing and Mining**	• Students should be able to understand why the data warehouse in addition to database systems. • After completing this course, the student will be able to apply data mining techniques and methods to large data sets. • Use data mining tools to compare and contrast the various classifiers. • Ability to identify the association rules, classification and clusters in large data sets. • Ability to solve real world problems in business and scientific information using data mining.
3	**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.
4	**BCA 622**	**Artificial Intelligence and its Applications Lab**	• Learner will be able to program in Python for AI and create different AI solutions
5	**BCA 623**	**Data Warehousing and Mining Lab**	• Students will be able to understand the various kinds of tools.

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			• Students will be able to Analyze the mining techniques for realistic data, and also to conceptualize Data Mining and the need for pre-processing. • To develop the algorithms used for various types of Data Mining Problem. • Students will be able to construct algorithms to solve data mining problems using weka tool. • Students will be able to demonstrate the classification and clusters Techniques in large datasets. • Students will be able to build an ability to add mining algorithms as a component to the existing tools.
6	**CSE 625**	**Software Engineering Lab**	• Ability to design the proper documentation of software product. • Ability to implement the cost estimation modelling approaches. • Ability to use the unified modelling language as a tool.
7	**BCU 641**	**Communication Skills – VI**	• 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.
8	**BSU 643**	**Behavioural Science – VI**	• Student will able demonstrate thorough understanding of stress and its effects • Student will able to learn various coping strategies to deal stress effectively so to overcome the consequences and impact of stress on their health and wellbeing, ultimately it will enhance their performance.
9	**FLU 644**	**French– VI**	• To provide the students with the linguistic tools to enhance social communication skills and be able • To approve or disapprove a behavior • To congratulate somebody • To express possession

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10	**NMP 661**	**Major Project**	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.

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AMITY SCHOOL OF ENGINEERING & TECHNOLOGY

B.Sc. (IT) (Six Semesters)

Course Outcomes

FIRST SEMESTER

S.No.	Course Code	Course Title	Course Outcomes
1	**BSC 101**	**Fundamentals of Information Technology**	• Learn more about information systems and their connection to business. • Understand the use of information technology in a number of different departments including human resources, finance, manufacturing, and security.
2	**BCA 101**	**Computer Fundamentals and Office Automation**	• Understanding about Computer System. • Identify all parts of the computer system and functioning of computer • Knowledge about software, its type and its uses. • Work efficiently in word processing, spreadsheet and presentation software.
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	**ECE 106**	**Digital Electronics**	• Design and implement Combinational and Sequential logic circuits.

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			• Understand the process of Analog to Digital conversion and Digital to Analog conversion. • Be able to design digital circuits with minimum hardware.
5	**BCA 121**	**Office Automation Lab**	• Understanding about Computer System. • Identify all parts of the computer system and functioning of computer • Knowledge about software, its type and its uses. • Work efficiently in word processing, spreadsheet and presentation software.
6	**CSE 124**	**Programming for Problem Solving 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.
7	**ECE 126**	**Digital Electronics Lab**	• Ability to formulate and solve problems in Digital Systems design and implementation. • Consolidation of the design methodologies for combinational and sequential digital systems • Interpret the specifications of programmable reconfigurable device and select the appropriate for the application in hand
8	**BCU 141**	**Communication Skills – I**	• 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.
9	**EVS 142**	**Environmental Studies – I**	• The multidisciplinary nature of environmental studies, including its definition, scope and need for public awareness.

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			• 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.
10	**BSU 143**	**Behavioural Science – I**	• Student will Develop accurate sense of self • Student will nurture a deep understanding of personal motivation • Student will develop thorough understanding of personal and professional responsibility • Student will able to analyse the emotions of others for better adjustment.
11	**FLU 144**	**French– I**	To enable students • to greet someone in French • to present and describe oneself and people • to enter in contact, and begin a conversation • to talk about one's family, tastes and preferences

SECOND SEMESTER

S.No.	Course Code	Course Title	Course Outcomes
1	**BSC 201**	**Networking and Internet Environment**	• Know regarding internet related technologies. • Familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation.
2	**MAT 203**	**Mathematical Foundations for Computer Science**	• Understand about set theory and their applications. • Understand the computational and algorithmic aspects of Mathematical Logic.

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			• For a given a problem, derive the solution using deductive logic and prove the solution based on logical inference. • Evaluate Boolean functions and simplify expressions using the properties of Boolean algebra. • Develop the given problem as graph networks and solve with techniques of graph theory.
3	**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++.
4	**BCA 201**	**Computer 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
5	**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.
6	**CSE 224**	**Object Oriented Programming Using C++ Lab**	• knowledge of the structure and model of the C++ programming language, (knowledge) • evaluate user requirements for software functionality required to decide whether the C++ programming language can meet user requirements (analysis)

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			• design the object-oriented programs for real world problems.
7	**BCA 222**	**Web Design & Development 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.
8	**BCU 241**	**Communication Skills – II**	• Apply Verbal and Non-Verbal Communication Techniques in the Professional Environment
9	**EVS 242**	**Environmental Studies – II**	• 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.
10	**BSU 243**	**Behavioural Science – II**	• Student will be able to identify, understand, and apply contemporary theories of leadership to a wide range of situations and interactions • Student will be able to understand and respect individual difference, so to enhance the relationship • Learn social responsibility and develop a sense of citizenship • Student will be able to identify and understand the impact of culture on one's leadership style
11	**FLU 244**	**French– II**	To furnish the linguistic tools • to talk about daily activities and sports, to express necessities • to talk about activities in recent future, • to have conversations and perform day to day life tasks like enquiring about time, take an appointment • to enquire about products and place orders in a shop/ restaurant

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THIRD SEMESTER

S.No.	Course Code	Course Title	Course Outcomes
1	**BSC 301**	**Open Source Technologies (PHP, Mysql)**	• Write PHP code to produce outcomes and solve problems. • Display and insert data using PHP and MySQL. • Test, debug, and deploy web pages containing PHP and MySQL.
2	**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.
3	**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.
4	**BCA 301**	**Introduction to 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.
5	**BSC 321**	**Open Source Technologies (PHP, Mysql) Lab**	• Write PHP code to produce outcomes and solve problems. • Display and insert data using PHP and MySQL. • Test, debug, and deploy web pages containing PHP and MySQL.

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6	**CSE 222**	**Data Structures through C++ Lab**	• Ability to identify the appropriate data structure for given problem. • Graduate able to design and analyze the time and space complexity of algorithm or program. • Ability to effectively use compilers includes library functions, debuggers and trouble shooting.
7	**CSE 324**	**Database 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.
8	**BCU 341**	**Communication Skills –III**	• The students should be able to write correctly and properly with special reference to Letter writing.
9	**BSU 343**	**Behavioural Science – III**	• Student will be able to understand and solve the problems effectively in their personal and professional life. • Students will outline multiple divergent solutions to a problem, • Student will able to create and explore risky or controversial ideas, and synthesize ideas/expertise to generate innovations.
10	**FLU 344**	**French– III**	• To enable the students • To talk about the qualities and defects of people. • To ask/give directions, to enquire about a lodging. • To ask and give information about a certain place. • To describe events in past tense.
11	**NPT 360**	**Summer Project – I (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.

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FOURTH SEMESTER

S.No.	Course Code	Course Title	Course Outcomes
1	**BSC 401**	**System Analysis and Design**	• Gather data to analyze and specify the requirements of a system. • Design system components and environments. • Build general and detailed models that assist programmers in implementing a system. • Design a database for storing data, a user interface for data input and output, and controls to protect the system and its data.
2	**MAT 401**	**Mathematics-IV (Computer Oriented Numerical Methods)**	• The objective of this course is to familiarize the students with numerical 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. • Numerical techniques to solve simultaneous linear equations, interpolation and extrapolation. • Numerical techniques of differential and integral. Solution of ordinary differential equation by numerical techniques.
3	**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 • 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
4	**BCA 403**	**Programming Techniques for Problem Solving**	• Able to understand the concepts of data structure, data type and array data structure.

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			• 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.
5	**BCA 423**	**Programming Techniques for Problem Solving Lab**	• Able to implement linked list data structure to solve various problems. • Able to 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	**CSE 423**	**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)
7	**BCU 441**	**Communication Skills – IV**	• Develop a resume for oneself • Ability to handle the interview process confidently • Learn the subtle nuances of an effective group discussion
8	**BSU 443**	**Behavioural Science – IV**	• Able to answer the question: What do I stand for? • Ability to apply a coherent set of moral principles within professional and specialized contexts • Willing to make unpopular but right decision • Committed to working for justice and peace locally and globally
9	**FLU 444**	**French– IV**	• To strengthen the language of the students in both oral and written • To revise the grammar in application and the communication asks related to topics covered already • To get acquainted with the current social communication skills, oral (dialogue, telephone

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			conversations etc.) and written and perform simple communication tasks such as • • Talking about personal habits • Narrating events in the past, marking the stages, using appropriate connectors • Holding conversations on telephone • Asking for/giving a device.

FIFTH SEMESTER

S.No.	Course Code	Course Title	Course Outcomes
1	**BSC 501**	**Networks Management & Information Security**	• Learn about the concepts of network management • Become aware of various standards in the Information Security System
2	**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.
3	**BCA 501**	**Internet of Things and Applications**	• Ability to develop IoT application.
4	**CSE 323**	**Design and Analysis of Algorithms Lab**	• To write programs to solve problems using divide and conquer strategy. • To write programs to solve problems using backtracking strategy. • To write programs to solve problems using greedy and dynamic programming techniques
5	**BCA 521**	**Internet of Things and Applications Lab**	• Ability to develop IOT application
6	**BCU 541**	**Communication Skills – V**	• 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.
7	**BSU 543**	**Behavioural Science – V**	• Students will Develop critical and reflective thinking abilities • Students will Demonstrate an understanding of group dynamics and effective teamwork • Student will develop a range of leadership skills and abilities such as effectively leading

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			change, resolving conflict, and motivating others • Student will Gain knowledge and understanding of organization resources, policies, and involvement opportunities. • Student will Develop strategies to recruit, retain, and continually motivate contributing members to the organization
8	**FLU 544**	**French– V**	• To strengthen the language of the students in both oral and written • To revise the grammar in application and the communication tasks related to topics covered already • To get acquainted with the current social communication skills, oral (dialogue, telephone conversations, etc.) and written and perform simple communication tasks such as • • Narrating events in the past, marking the stages, using appropriate connectors • Expressing causes and consequences, using appropriate logical connectors • Presenting a biography
9	**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. • Prepare and present technical report.
10	**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 • Design, implement and test the prototype/algorithm in order to solve the conceived problem. • 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 minor project work.

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SIXTH SEMESTER

S.No.	Course Code	Course Title	Course Outcomes
1	**BSC 601**	**Application Development using Python Programming**	• Ability to apply selection and loop statement in Programming in real world problems. • Ability to create client-server application for real world problems. • Ability to apply Regular Expression, CGI and Database.
2	**BSC 602**	**Information Technology and E-Commerce**	• The concept of Internet Service Provider, web publishing concept. • The concept of managing emails newsgroups and mailing list. • The concepts of search engine and its utility un searching content. • The concept of ecommerce and electronic payment system.
3	**BCA 602**	**Artificial Intelligence and its Applications**	• 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.
4	**BSC 621**	**Application Development using Python programming Lab**	• Ability to create client-server application for real world problems. • Ability to develop multithreaded application. • Ability to create web application for real world problem.
5	**BCA 622**	**Artificial Intelligence and its Applications Lab**	• Learner will be able to program in Python for AI and create different AI solutions •
6	**BCU 641**	**Communication Skills – VI**	• 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.
7	**BSU 643**	**Behavioural Science – VI**	• Student will able demonstrate thorough understanding of stress and its effects • Student will able to learn various coping strategies to deal stress effectively so to overcome the consequences and impact of stress on their health and wellbeing, ultimately it will enhance their performance.
8	**FLU 644**	**French– VI**	• To provide the students with the linguistic tools to enhance social communications kills and be able

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			• To approve or disapprove a behavior • To congratulate somebody • To express possession
9	**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.

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AMITY SCHOOL OF ENGINEERING & TECHNOLOGY

M.TECH. (Electronics & Communication Engineering) (Four Semesters)

COURSE OUTCOMES:

FIRST SEMESTER:

S. No.	Course Code	Course Title	Course Outcomes
1	ECM 101	**Advanced Digital Communication**	At the end of this course students will demonstrate the ability to • Understand and analyze the signal flow in a digital communication system. • Analyze error performance of a digital communication system in presence of noise and other interferences. • Analyze the performance of a baseband and pass band digital communication system in terms of error rate and spectral efficiency. • Perform the time and frequency domain analysis of the signals in a digital communication system. • Analyze Performance of spread spectrum communication system.
2	ECM 102	**Audio Signal Processing**	At the end of this course students will demonstrate the ability to • Understand and analyze the concepts of Audio Signal Processing. • Analyze Linear Prediction in Narrowband and Wideband Coding. • Analyze the performance of a Psychoacoustic Principles. • Understand the concept of Analysis-Synthesis Framework for M-band Filter Banks. • Understand the concept of Lossless Audio Coding

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3	**ECM 103**	**Stochastic Methods**	At the end of this course students will demonstrate the ability to • Illustrate and formulate fundamental probability distribution and density functions, as well as functions of random variables. • Explain the concepts of expectation and conditional expectation and describe their properties. • Analyze continuous and discrete-time random processes. • Explain the concepts of stationary and wide-sense stationarity and appreciate their significance. • Apply the theory of stochastic processes to analyze linear systems. • Apply the above knowledge to solve basic problems in queuing networks.
4	**ECM 121**	**Advanced Digital Communication Lab**	Upon completion of this laboratory course students will demonstrate the ability to • Analyze and compare different digital modulation schemes for their efficiency and bandwidth. • Analyze the performance of a baseband and pass band digital communication system in terms of error rate and spectral efficiency. • Understand the basic concept of Compander and Expander. • Analyze different digital modulation schemes and can compute the bit error performance.
5	**ECM 122**	**Audio Signal Processing Lab**	Upon completion of this laboratory course students will demonstrate the ability to • Analyze and compare different audio signal processing techniques. • Handling audio files in MATLAB software. • Analyze the audio signals using Short-term Fourier Transform (STFT) in the

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			time-frequency domain. • Understand the basic concept of Up-sampling and down-sampling of audio file. • Analyze the power spectral density of different types of audio signals.
6	**ECM 124**	**Lab Using Labview Software /MATLAB**	Upon completion of this laboratory course students will demonstrate the ability to • Express programming & simulation for engineering problems. • Find importance of this software for Lab Experimentation. • Articulate importance of software's in research by simulation work. • In-depth knowledge of providing virtual instruments on LabVIEW Environment. • Observe the characteristics of different DC motors using Lab View software.
7	**ECM 105**	**Low Power VLSI Design**	At the end of this course students will demonstrate the ability to • Analyze the need for low power VLSI circuits. • Understand dynamic and static power dissipation and factors affecting them. • Recognize Role of simulation possible at various levels of design. • Define Relationship of probability while calculating power dissipation of circuits. • Apply Power reduction techniques possible at circuit, logic level. • Analyze Clock as a major source of power dissipation and distinguish various methods to reduce it.
8	**ECM 106**	**Advanced Instrumentation & System Design**	At the end of this course students will demonstrate the ability to • Understand the static and dynamic characteristics of transducer system. • Find importance of Transducers for

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			Biomedical Application. • Articulate importance of data acquisition on PC and sampling fundamentals. • In-depth knowledge of Development of Virtual Instrument using GUI, Real-time systems • Role of transducers in Instrumentation • In-depth knowledge of providing virtual instruments on LabVIEW Environment.
9	**ECM 107**	**Wireless Communication**	At the end of this course students will demonstrate the ability to • Discuss the cellular system design and technical challenges. • Analyze the Mobile radio propagation, fading, diversity concepts and the channel modeling. • Analyze the design parameters, link design, smart antenna, beam forming and MIMO systems. • Analyze Multiuser Systems, CDMA, WCDMA network planning and OFDM Concepts. • Summarize the principles and applications of wireless systems and standards.

SECOND SEMESTER:

S. No.	Course Code	Course Title	Course Outcomes
1	**ECM 201**	**Computer Communication & Networks**	At the end of this course students will demonstrate the ability to • Have a good understanding of the OSI Reference Model and in particular have a good knowledge of Layers 1-3. • Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies. • Have a basic knowledge of the use of cryptography and network security. • Specify and identify deficiencies in existing

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			protocols, and then go onto formulate new and better protocols. • Understand the issues surrounding Mobile and Wireless Networks. • Have a working knowledge of datagram and internet socket programming.
2	**ECM 202**	**Advanced Microwave Engineering**	At the end of this course students will demonstrate the ability to • Identify and describe principle and operation of advanced microwave devices and circuits. • Students are able to analyze where and how advanced microwave components are used. • Design microwave circuits using basic microwave components and devices. • Construct application-based circuits using microwave diodes/transistors etc.
3	**ECM 203**	**Advanced Information Theory & Coding**	At the end of this course students will demonstrate the ability to • Calculate the information content of a random variable from its probability distribution. • Relate the joint, conditional, and marginal entropies of variables in terms of their coupled probabilities. • Define channel capacities and properties using Shannon's Theorems. • construct efficient codes for data on imperfect communication channels. • Generalize the discrete concepts to continuous signals on continuous channels. • To obtain an understanding of the theoretical principles of source coding. • Describe the information resolution, compression, and efficient coding properties.
4	**ECM 221**	**Computer Communication & Networks Lab**	Upon completion of this laboratory course students will demonstrate the ability to • Understand fundamental underlying principles of computer networking

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			• Understand details and functionality of layered network architecture. • Apply mathematical foundations to solve computational problems in computer networking. • Analyze performance of various communication protocols. • Compare routing algorithms. • Practice packet /file transmission between nodes.
5	**ECM 222**	**Advanced Microwave Engineering Lab**	At the end of this laboratory course students will demonstrate the ability to • Identify and describe principle and operation of advanced microwave devices and circuits. • Students can analyze where and how advanced microwave components are used. • Design microwave circuits using basic microwave components and devices. • Construct application-based circuits using microwave diodes/transistors etc.
6	**ECM 224**	**CDMA Lab using Qualnet**	Upon completion of this laboratory course students will demonstrate the ability to • Express programming & simulation for engineering problems. • Find importance of this software for Lab Experimentation. • Articulate importance of software's in research by simulation work. • In-depth knowledge of different Antenna models for wireless networks on Qualnet software. • Develop a Wireless network scenario using Qualnet software.
7	**ECM 205**	**Advanced Optical Communication**	At the end of the course, students will demonstrate the ability to: • Understand the principles fiber-optic communication, the components and the

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			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. • Discuss the basic applications of optical amplifiers and widely used networks like SONET/SDH. • Understand principles and concepts of Wavelength Division Multiplexing. (WDM)
8	**ECM 206**	**Satellite Communication**	At the end of this course students will demonstrate the ability to • Visualize the Network architectures and access control protocols of VSAT System. • State various aspects related to satellite systems such as orbital equations, sub-systems in a satellite, link budget, modulation and multiple access schemes. • Understand the concept of Low Earth Orbit and Non – Geostationary Satellite System. • Solve numerical problems related to orbital motion and design of link budget for the given parameters and conditions.
9	**ECM 207**	**MEMS & IC Integration**	At the end of this course students will demonstrate the ability to • Acquire knowledge about MEMS & Micro Sensors, Pressure sensors with embedded electronics. • Understand various micro fabrication technologies. • Gather knowledge of characterization tools. • Acquire knowledge about Device Applications • Understand the concept of MEMS system-level design methodology.

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THIRD SEMESTER:

S. No.	Course Code	Course Title	Course Outcomes
1	ECM 301	**Antenna Theory & Design**	At the end of this course students will demonstrate the ability to • Define overall needs and constraints of RF systems and antenna. • The ability to develop and assess alternative RF system designs based on technical criteria. • The technical ability to analyze a prescribed communication sub-system Analyze and attract the vital resources required to effectively use a RF system. • To identify and solve the technical requirements of the communication system and its impact on the global society. • Evaluate the opportunities involving technology, a product or a service required for developing a startup idea
2	ECM 302	**Image Processing & Pattern Recognition**	At the end of this course students will demonstrate the ability to • Identify and describe operation of different smoothing and sharpening filters. • Students are able to analyze the different segmentation techniques. • Students are able to apply different de-noising models to recover original image. • Identify different pattern recognition methods and apply them in problem areas.
3	ECM 303	**Research Methodology**	At the end of this course students will demonstrate the ability to • Develop understanding on various kinds of research, objectives of doing research, research process, research designs and sampling. • Have basic knowledge on qualitative research techniques. • Have adequate knowledge on measurement & scaling techniques as well

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			as the quantitative data analysis. • Have basic awareness of data analysis-and hypothesis testing procedures.
4	**ECM 321**	**Antenna Technology Lab**	At the end of this laboratory course students will demonstrate the ability to • Define overall needs and constraints of RF systems and antenna. • The ability to develop and assess alternative RF system designs based on technical criteria. • The technical ability to analyze a prescribed communication sub-system Analyze and attract the vital resources required to effectively use a RF system. • Understand the Design and implementation of different Microstrip patch antenna on HFSS.
5	**ECM 322**	**Advanced Image Processing Lab**	At the end of this course students will demonstrate the ability to • Identify To study about the basic image processing tools. • Simulate all programs using MATLAB. • Identify and describe operation of different smoothing and sharpening filters. • Students are able to analyze the different segmentation techniques. • Students are able to apply different de-noising models to recover original image. Identify different pattern recognition methods and apply them in problem areas.
6	**ECM 324**	**Semiconductor Device Physics & Modeling Lab (using SILVACO)**	At the end of this course students will demonstrate the ability to • Identify SILVACO software for semiconductor device physics & modeling lab • Simulate all programs using SILVACO software. • Identify and describe the I-V characteristics of HBT. • Students are able to analyze and design an

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			optically controlled MOSFET with Gaussian doping.
7	**MAM 309**	**Optimization Techniques**	At the end of this course students will demonstrate the ability to • Describe clearly a problem, identify its parts and analyze the individual functions. • Feasibility study for solving an optimization problem. • Becoming a mathematical translation of the verbal formulation of an optimization problem. • To design algorithms, the repetitive use of which will lead reliably to finding an approximate solution. • Evaluate and measure the performance of an algorithm. • Discovery, study and solve optimization problems. • Understand optimization techniques using algorithms. • Investigate, study, develop, organize and promote innovative solutions for various applications
8	**ECM 305**	**Project Management**	At the end of this course students will demonstrate the ability to • Manage the scope, cost, timing, and quality of the project, at all times focused on project success as defined by project stakeholders. • Align the project to the organization's strategic plans and business justification throughout its lifecycle. Identify project goals, constraints, deliverables, performance criteria, control needs, and resource requirements in consultation with stakeholders. • Implement project management knowledge, processes, lifecycle and the embodied concepts, tools and techniques in

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			order to achieve project success.
9	**ECM 306**	**Reliability Engineering**	At the end of this course students will demonstrate the ability to • Understand Network Modelling and Reliability Evaluation of Simple Systems. • Identify Probability Distributions in Reliability Evaluation. • Identify General Modelling Concept for Discrete Markov Chains
10	**CSM 311**	**Cluster & Grid Computing**	At the end of this course students will demonstrate the ability to • Understand the concept of Grid Computing, Web Services, and Service-oriented architecture, Architecture for grid computing, Cluster Computing, process scheduling and load balancing. • Understand the concept of Parallel Programming with MPI, Resource management and scheduling. • Understand the concept of deployment of Grid, software and tools, and application execution.

FOURTH SEMESTER:

S. No.	Course Code	Course Title	Course Outcomes
1	**MMP 460**	**DISSERTATION (20-22 WEEKS)**	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

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AMITY SCHOOL OF ENGINEERING & TECHNOLOGY

M.TECH. (Mechanical Engineering) (Four Semesters)

Course Outcomes:

FIRST SEMESTER:

S.No.	Course Code	Course Name	Course Outcome
1	MEM 101	Numerical Method & Programming	• Students will be able to define different mathematical problems of algebraic & transcendental equations, interpolation & approximation, linear equations, numerical equation & differentiation and differential equations. (Level 1 define and memorize) • Students will be able to compare different methods of solution of mathematical problems of algebraic & transcendental equations, interpolation & approximation, linear equations, numerical equation & differentiation and differential equations. (Level 2 compare and contrast) • Students will be able to apply acquired knowledge of various methods learnt in real life problems. (Level 3 apply) • Students will be able to analyze various mathematical and analytical methods of algebraic & transcendental equations, interpolation & approximation, linear equations, numerical equation & differentiation and differential equations. (Level 4 Analyze) • Students will be able to evaluate various methods in order to arrive upon the best technique to solve a given problem. (Level 5 Evaluate) • Students will be able to formulate newer laws and principles based upon the methods studied during this course and will be able to take individual case studies bases upon them.

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			(Level 6 Synthesis)
2	MEM 102	Advanced Manufacturing Processes	• Student will be able to define and state the various advanced manufacturing processes terminologies and their underlying principles • Students will be able to classify the types of advanced manufacturing and machining processes, their evolution and need. • Students will be able to apply the understanding and knowledge to select the latest and proper advanced manufacturing process for metal forming, casting, machining or additive manufacturing. • Students will be able to analyze the various process parameters of advanced manufacturing processes, rapid prototyping and types of generative manufacturing processes • Students will be able to analyze the processes and evaluate the role of each process parameter during various advanced manufacturing processes
3	MEM 103	Theory of Metal Forming	• Students will be able to learn the stress strain characteristics of materials, mechanics of different processes like rolling, forging, extrusion, drawing, bending and different high speed forming techniques. • Students will be able to differentiate between various forming process on the basis of their principles and stress-strain characteristics. • Students will be able apply the acquired knowledge in real life problem solution related to forming techniques. • Students will be able to analyze the different bulk metal forming process mechanics using different analysis approach and calculate the force, power requirements etc. • Students will be able to evaluate the effect of process parameters on the process mechanics during bulk metal forming. • Students will be able to Design a system taking into consideration the concepts of ease of forging, rolling, extrusion, drawing, etc.
4	MEM 104	Operation Management	• Students will be able to describe the concepts

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			of productivity, planning, scheduling and operations management, MRP & CRP concepts, inventory types and its objectives. • Students will be able to identify the elements of operations management and discuss their effects to enhance productivity and quality. • Students will be able to apply the decision models to various real time problems. • Students will be able to analyze problems using different forecasting techniques, compare various planning, controlling and scheduling techniques. • Students will be able to develop a balanced line of production & scheduling and sequencing techniques • Students will be able to develop aggregate capacity plans and Master Production Schedule in operation environments and formulate suitable quality control measures in quality circles to TQM.
5	MEM 122	Advanced Manufacturing Lab-I	• Student will be able to learn the preparation of various jobs using various manufacturing process • Student will be able to differentiate between various jigs and fixtures and their uses in industry • Student will be able to apply some of the manufactures process directly in the industry for preparation of complicated jobs. • Student will be able to identify and explain the various machining operations and their applications. • The student will be trained to implement similar features in preparation of jobs can be extended to implement in the preparation of complicated jobs.
6	MEM 123	Theory of Metal Forming Lab	• Students will be able to understand the stress strain concept for different types of materials. • Student will be able to explain the characteristics and forces developed in rolling, forging, drawing, bending, etc. • Student will be able to demonstrate the working of common machine such as universal

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			testing machine, bending machine, etc. • Student will be able to design and develop different components for the real life project.
7	MEM 124	Work Shop Practice Lab	• Students will be able to understand the working of machine tools such as lathe, shaper, planner, s milling and grinding. • Student will be able to explain the features and applications of lathe, milling, drilling and grinding machines. • Student will be able to demonstrate the working of common machine tools like lather, shaper, miller and grinding. • Student will be able to design and developed different machine tools for the real life project.

SECOND SEMESTER:

S.No.	Course Code	Course Name	Course Outcome
1	MEM 201	Optimization Techniques	Upon completion of the course, students will have: • Describe clearly a problem, identify its parts and analyze the individual functions. • Feasibility study for solving an optimization problem. • Becoming a mathematical translation of the verbal formulation of an optimization problem. • To design algorithms, the repetitive use of which will lead reliably to finding an approximate solution
2	MEM 202	Casting Technologies	• The students will able to understand and apply the principles of metal casting processes. • Student will be able to develop analytical relation between input and output process parameters. • They will also be able to analyze and apply the concept of cooling rate of materials in metal casting.
3	MEM 203	Materials Management	On completion of this course, the students will be able to meet:

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			• Identifying the scope for integrating materials management function over the logistics and supply chain operations. • Integrate the organization wide materials requirement to develop an overall plan (MRP). • Identify, study, compare, and evaluate alternatives, select and relate with a good supplier. • Apply various purchasing method and inventory controlling techniques into practice. • Analyzing the materials in storage, handling, packaging, shipping distributing and standardizing. CO6. Integrate important materials functions to both products and services & use MRP, ERP & PLM managing materials
4	MEM 204	Product Design & Development	A student passing this module should be able to: • Identify and analyse the product design and development processes in manufacturing industry. • Define the components and their functions of product design and development processes and their relationships from concept to customer over whole product lifecycle. • Analyse, evaluate and apply the methodologies for product design, development and management. • Undertake a methodical approach to the management of product development to satisfy customer needs. • Carry out cost and benefit analysis through various cost models. • Be familiar with the design protection and Intellectual Property.
5	MEM 225	Computer Aided Design Lab	• To develop different types of surfaces with the help of different curves • Suggest whether the given component is safe or not for the applied loading conditions • Select suitable manufacturing method for

			different mechanical components using CAM software.
6	MEM 226	Advanced Manufacturing Lab - II	• 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.

THIRD SEMESTER:

S.No.	Course Code	Course Name	Course Outcome
1	MEM 301	Research Methodology	• After the completion of course students would be able to do literature study & case study. • Student will be able to do structured surveys, interviews, focus groups, participatory approaches, narrative analysis. • Student will also be able to do cost-benefit analysis, scenario methodology and technology foresight.
2	MEM 302	Unconventional Machining	• After completion of course, the student shall understand the principle of working, mechanism of metal removal in the various unconventional machining process. • The student is able to identify the process parameters, their effect and applications of different processes.
3	MEM 303	Computer Integrated Manufacturing	• 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.
4	MEM 322	Unconventional Machining Lab	• Upon completion of this course, students will be able to conduct experiments on various unconventional machining.

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5	MEM 323	Computer Integrated Manufacturing Lab	On successful completion of the course, the student will be able to • Explain lifecycle of a product and the role of computer-aided Manufacturing (CAM) in product development. • Describe the concepts of geometric and solid modeling. • Visualize geometric models through animation and transform them into real world systems.
6	MEM 324	Simulation & Modeling Lab	• After the completion of course students will have a clear understanding of the need for the development process to initiate the real problem. • Students will have a clear understanding of principle and techniques of simulation methods. • Students would be able to model from different fields –and implementation of numerical algorithm to meet simple requirements.
7	MEM 304	Lean Manufacturing	• On completion of this course, the students will be able to understand issues & challenges in implementing lean manufacturing. • Student will be able to understand developing lean manufacturing techniques and its contribution for improving organizational performance.
8	MEM 305	Total Productive Maintenance	• Upon completion of this course, students will be able to understand the principles of various maintenance techniques.
9	MEM 306	Supply Chain Management & Logistics	• Upon completion of this course, students will have knowledge of scientific theories of supply chain. • Student will have knowledge of methods relevant to managing supply chains and operations within such chains.

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FOURTH SEMESTER:

S.No.	Course Code	Course Name	Course Outcome
1	MMP 460	DISSERTATION (20-22 WEEKS)	• Upon completion of this course, students will have knowledge of Research experience is as close to a professional problem-solving activity. • 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

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AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY

M.TECH. (CIVIL ENGINEERING) (Four Semesters)

Course Outcomes:

FIRST SEMESTER:

S.No.	Course Code	Course Name	Course Outcome
1.	CEM 101	Numerical Analysis and Computer Programming	• On completion of this course, the students will be able to learn about fundamentals of numerical methods such as interpolation, differentiation, integration and differential equations. They will also learn the basics of programming.
2.	CEM 102	Concrete Technology	• On completion of this course, the students will be able to learn the manufacture, properties, types and effect of different agencies on properties of concrete.
3.	CEM 103	Advanced Structural Analysis	• On completion of this course, the students will be able to learn the advanced concepts of structural analysis such as Force methods, Displacement methods, solution of symmetrical and anti-symmetrical problems, stiffness of plane and space frames solution of problems.
4.	CEM 120	Numerical Analysis Lab	• On completion of this course, the students will be able to learn about fundamentals of numerical methods such as interpolation, differentiation, integration and differential equations. They will also learn the basics of programming.
5.	CEM 121	Concrete Lab	• On completion of this course, the students will be able to learn the manufacture, properties, types and effect of different agencies on properties of concrete.
6.	CEM 122	Auto Cad Lab	• On completion of this course, the students will be able to learn the advanced concepts of structural analysis such as Force methods, Displacement methods, solution of symmetrical and anti-symmetrical problems, stiffness of plane and space frames solution of problems.
7.	CEM 104	Structural Dynamics and Earthquake Resistant Building	• On completion of this course, the students will be able to learn the concepts of engineering seismology, earthquake resistant design of buildings, seismic strengthening procedures etc.
8.	CEM 105	Bridge Engineering	• On completion of this course, the students will be able to learn the concepts of bridge engineering

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			piers, abutments, R.C. bridges, Prestressed bridges, their construction and design.
9.	**CEM 106**	**Advanced Elasticity and Plasticity**	• On completion of this course, the students will be able to learn the behavior of curved bars and thick walled cylinder on pure bending, general stress and strain equations, Saint Venant's theory, 2-D plastic flow etc.
10.	**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
11.	**BSP 143**	**Behavioural Science – I**	• The students will be able to use the LSRW Skills to communicate effectively in a professional environment
12.	**FLP 144**	**French – I**	• The student will be able to write impressive official correspondence in french
13.	**MTP 130**	**Term Paper (Review Paper)**	• After successful completion of this course, students will be able to • 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

SECOND SEMESTER:

S.No.	Course Code	Course Name	Course Outcome
1.	**CEM 201**	**Optimization Techniques**	• On completion of this course, the students will be able to learn about tension and compression steel members, plate girders, design of bridges, continuous beams and frames.
2.	**CEM 202**	**Advanced Foundation Engineering**	• On completion of this course, the students will be able to learn about advanced concepts of foundation engineering including pile and shallow foundation, cofferdams and machine foundation and soil exploration
3.	**CEM 203**	**Finite Element Method**	• On completion of this course, the students will be able to learn about fundamentals of finite element method, its procedures, static analysis and Gaussian elimination.
4.	**CEM 220**	**Structural Engineering Lab**	• On completion of this course, the students will be able to learn about advanced concepts of foundation engineering including pile and shallow

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			foundation, cofferdams and machine foundation and soil exploration
5.	**CEM 221**	**Foundation /Soil Testing Lab**	• On completion of this course, the students will be able to learn about fundamentals of finite element method, its procedures, static analysis and Gaussian elimination.
6.	**CEM 222**	**Finite Element Method Lab**	• On completion of this course, the students will be able to learn about tension and compression steel members, plate girders, design of bridges, continuous beams and frames.
7.	**CEM 204**	**Advanced Steel Structure**	• On completion of this course, the students will be able to learn about fundamentals of linear programing, sensitivity analysis, simulation and sequencing.
8.	**CEM 205**	**Design of Pre-Stressed Structures**	• On completion of this course, the students will be able to learn about different systems of pre-stressing, pre-tensioned and post tensioned concrete, losses in pre-stressed concrete.
9.	**CEM 206**	**Experimental Stress Analysis**	• On completion of this course, the students will be able to learn about different methods of measurement of strains, stresses and vibrations. They will also learn photoelasticity and different measurement devices.
10.	**BCP 241**	**Advanced Communication – II**	• The student will be able to write an impressive resume and face the interview confidently
11.	**BSP 243**	**Behavioural Science – II**	• The students will be able to use the LSRW Skills to communicate effectively in a professional environment.
12.	**FLP 244**	**French – II**	• The student will be able to write impressive official correspondence in French**.**
13.	**MMP 260**	**Minor Project I**	• At the end of the course, students will demonstrate the ability to: • 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.

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THIRD SEMESTER:

S.No.	Course Code	Course Name	Course Outcome
1.	CEM 301	Research Methodology	• On completion of this course, the students will be able to learn about different research methodologies, research modeling and design. They will learn how to use computer in their research.
2.	CEM 302	Advanced RCC Design	• On completion of this course, the students will be able to learn about construction of flat slab, yield line theory, virtual work method and deep beam construction.
3.	CEM 303	High Rise Buildings Analysis	• On completion of this course, the students will be able to learn about high rise building analysis, analysis of torsion in buildings, shear walls and beam-column joints for ductility
4.	CEM 320	Building Design Project Lab using Primavera	• On completion of this course, the students will be able to learn about construction of flat slab, yield line theory, virtual work method and deep beam construction.
5.	CEM 321	Advanced RCC Lab	• On completion of this course, the students will be able to learn about high rise building analysis, analysis of torsion in buildings, shear walls and beam-column joints for ductility.
6.	CEM 322	Structural Material Testing Lab – II	• On completion of this course, the students will be able to learn about various tests on mild steel rod, coil springs, concrete cube tests, RCC beams and different NDT tests.
7.	CEM 304	Analysis of Plate and Shells	• On completion of this course, the students will be able to learn about bending of plates, uniformly loaded circular plates, Navier solution for simply supported rectangular plates and design of spherical domes with/without lanterns at top.
8.	CEM 305	Reliability Based Civil Engineering Design	• On completion of this course, the students will be able to learn about probability theory for reliability based civil engineering design, resistance distribution, structural reliability.
9.	CEM 306	Evaluation and Retrofitting of Building	• On completion of this course, the students will be able to learn about deterioration of concrete buildings, structural health monitoring of buildings, surface repair and retrofitting techniques and seismic rehabilitation of existing buildings.
10.	BCP 341	Advanced Communication – III	• The student will be able to write an impressive resume and face the interview confidently
11.	BSP 343	Behavioural Science – III	• The students will be able to use the LSRW Skills to communicate effectively in a professional environment.

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12.	**FLP 344**	**French – III**	• The student will be able to write impressive official correspondence in French**.**
13.	**MSP 350**	**Summer Internship Programme (Evaluation)**	• After successful completion of the course, the students will be able to • 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. • Experience gained from the 'Industrial Internship' in classroom will be used in classroom discussions. • Create conditions condue to quest for knowledge and its applicability on the job. • Prepare and present technical report.
14.	**MMP 360**	**Minor Project II**	• 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

FOURTH SEMESTER:

S.No.	Course Code	Course Name	Course Outcome
1	**MMP 460**	**DISSERTATION (20-22 WEEKS)**	• 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

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AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY

M.TECH. (STRUCTURAL ENGINEERING) - (Four Semesters)

Course Outcomes:

FIRST SEMESTER:

S.No.	Course Code	Course Name	Course Outcome
1.	CEM 101	Numerical Analysis and Computer Programming	• Evaluate the numerical and statistical techniques in the analysis of structure and reliability of structure. • Remember the fundamental principles and basics of numerical methods will be covered.
2.	CEM 102	Concrete Technology	• Evaluate the chemical composition, hydration of ent, mechanical strength of ent gel. • Analyse the factors affecting the strength of concrete • Remember the statistical quality control concepts of concrete, and fibres reinforced concrete. • Understand the behaviour of common constructional metals in tension and compression.**5**Create knowledge base for temperature and creep properties
3.	CEM 103	Advanced Structural Analysis	• Evaluate the force methods of structural engineering. • Remember the applications to plane and space structures with pin joints and rigid joints • Analyse the displaent methods, basic concepts, evaluation of stiffness coefficients, • Apply the concepts of symmetrical & anti-symmetrical problems and stiffness of plane & space frames for solution of complex problems
4.	CEM 105	Bridge Engineering	• On completion of this course, the students will be able to learn the concepts of bridge engineering piers, abutments, R.Cbridges, Prestressed bridges, their construction and design.
5.	CEM 120	Numerical Analysis Lab	• Evaluate the numerical and statistical techniques in the analysis of structure and reliability of structure. • Remember the fundamental principles and basics of numerical methods will be covered.
6.	CEM 123	Advanced Concrete Lab	• Evaluate the various techniques of making concrete • Analyse the strength of these concrete.
7.	CEM 124	Computer Aided Design	• On completion of this course, the students will be

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		Lab	able to learn the advanced concepts of structural analysis such as Force methods, Displaent methods, solution of symmetrical and anti-symmetrical problems, stiffness of plane and space frames solution of problems. • Apply various techniques of making concrete and determining the strength of the concrete • Analyze the test results of evaluation.
8.	**CEM 106**	**Advanced Elasticity And Plasticity**	• Analyse the experimental • Solve the site construction requirements of different materials. • Evaluate and analyse the testing results from the experiments.
9.	**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
10.	**BSP 143**	**Behavioral Science – I**	• The students will be able to use the LSRW Skills to communicate effectively in a professional environment
11.	**FLP 144**	**French-I**	• The student will be able to write impressive official correspondence in french
12.	**MTP 130**	**Term Paper**	• After successful completion of this course, students will be able to • 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

SECOND SEMESTER:

S.No.	Course Code	Course Name	Course Outcome
1.	**CEM 104**	**Structural Dynamics And Earthquake Resistant Building**	• Evaluate cases histories learning from earthquakes, seismic strengthening procedures. • Apply concepts and knowledge to analyse lateral analysis of building systems • Create own knowledge system to evaluate seismic design of structures, multi-storied buildings. • Understand the seismic design of liquid storage tanks, submersible bridges, dams; Hydrodynamic effect due to reservoir, concrete gravity dams etc. • Remember the basic terms, seismic waves,

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			earthquake magnitude and intensity, ground motion, dynamic response of structures etc.
2.	**CEM 203**	**Finite Element Method**	• Evaluate the general application finite element method • Analyze the equilibrium problems • Apply knowledge in general procedure of finite element method • Understand Iso-parametric Formulation • Analyze Stress and Plane Strain Problems Plates and Shells
3.	**CEM 204**	**Advanced Steel Structures**	• Analyze the design for torsion and compression members and connections. • Evaluate the design of plate girders • Apply knowledge in the design of silos, bins and hoppers • Remember the design concepts of bridges, and trusses etc • Create design base for continuous beams, and frames
4.	**CEM 207**	**Experimental Stress Analysis**	• Evaluate the factors affecting health of structures, causes of distress, regular maintenance. • Analyse the concepts, various measures, structural safety in alteration. Structural audit: assessment of health of structure, collapse and investigation, investigation management, shm procedures. • Evaluate the types of static tests, simulation and loading methods, sensor systems and hardware requirements, static response measurement. • Remember the types of dynamic field test, stress history data, dynamic response methods, hardware for remote data acquisition systems, remote structural health monitoring. • Apply concepts in Case Studies (Site Visits), piezo–electric materials and other smart materials, electro–mechanical impedance (EMI) technique, adaptations of EMI technique.
5.	**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.
6.	**CEM 222**	**Finite Element Method Lab**	• On completion of this course, the students will be able to learn about advanced concepts of foundation engineering including pile and shallow foundation, cofferdams and machine foundation

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			and soil exploration
7.	**CEM 223**	**Non- Destructive Testing Lab**	• On completion of this course, the students will be able to • Learn about fundamentals of finite element method, its procedures, static analysis and Gaussian elimination. • Evaluate the various techniques of finite element method • Analyze the various experiments.
8.	**BCP 241**	**Advanced Communication – II**	• The student will be able to write an impressive resume and face the interview confidently
9.	**BSP 243**	**Behavioral Science – II**	• The students will be able to use the LSRW Skills to communicate effectively in a professional environment.
10.	**FLP 244**	**French-II**	• The student will be able to write impressive official correspondence in French**.**
11.	**MMP 260**	**Minor Project I**	• At the end of the course, students will demonstrate the ability to: • 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.

THIRD SEMESTER:

S.No.	Course Code	Course Name	Course Outcome
1.	**CEM 301**	**Research Methodology**	• Analyze research proposals and aspects. • Evaluate the concepts and type of research design • Create strategies to conduct hypothesis testing for experiments • Apply concepts to data storing and data analysis
2.	**CEM 302**	**Advanced RCC Design**	• Apply concepts on plastic section theory for reinforced Concrete structures • Evaluate flat slabs, equivalent frame method. • Understand yield line theory, yield line patterns, moment capacity along yield line • Apply design knowledge on pre-stressed concrete
3.	**CEM 303**	**High Rise Buildings Analysis**	• Evaluate the structural system of multi-storied buildings**.** • Apply **i**mportance of symmetry and regularity in plan, and regularity in elevation • Evaluate designs of buildings with shear walls and coupled shear walls

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			• Module IV Design and detailing of structures
4.	**CEM 306**	**Analysis of Plate and Shells**	• Understand the fundamental concepts of distresses in concrete • Evaluate the problems relating to non destructive techniques • Examine the structural health monitoring. • Understand the concept of repair and retrofitting • Analyse the strengthening techniques • Analyse the structural seismic retrofitting
5.	**CEM 322**	**Structural Material Testing Lab-II**	• Analyse the experiments for real value problems at site. • Solve the site construction requirements of different materials. • Evaluate the testing results from the experiments
6.	**CEM 323**	**Structural Dynamics Lab**	• Students can understand the various methods of dynamic analysis. • Students can use the various control schemes in the research work
7.	**CEM 324**	**Advanced Structural Detailing Lab**	• Prepare the drawings of beams, columns, slabs and beams. • Evaluate the different types of drawings of il structures. • Analyse the drawings for error if any.
8.	**MSP 350**	**Summer Internship Programme (SIP)**	• After successful completion of the course, the students will be able to • 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. • Experience gained from the 'Industrial Internship' in classroom will be used in classroom discussions. • Create conditions condue to quest for knowledge and its applicability on the job. • Prepare and present technical report.
9.	**MMP 360**	**Minor Project II**	• 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

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			• 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.

FOURTH SEMESTER:

S.No.	Course Code	Course Name	Course Outcome
1.	**MMP 460**	**DISSERTATION (20-22 WEEKS)**	• 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

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AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY

M.Tech. (CSE) (Four Semesters)

Course Outcomes:

FIRST SEMESTER:

S.No.	Course Code	Course Name	Course Outcome
1	CSM 101	ADVANCED DATA STRUCTURES AND ALGORITHM DESIGN	• Analyse the asymptotic performance of algorithms. • Derive and solve recurrences describing the performance of divide-and-conquer algorithms. • Find optimal solution by applying various methods. • Apply pattern matching algorithms to find particular pattern. • Differentiate polynomial and non-polynomial problems. • Explain the major graph algorithms and their analyses. Employ graphs to model engineering problems, when appropriate. • Illustrate the methods for data recovery, evidence collection and data seizure. • Summarize duplication and preservation of digital evidence.
2	CSM 102	ADVANCED DATABASE MANAGEMENT SYSTEM	• Exposure for students to write complex queries including full outer joins, self-join, sub queries, and set theoretic queries. • Knowhow of the file organization, Query Optimization, Transaction management, and database administration techniques

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3	**CSM 103**	**ARTIFICIAL INTELLIGENCE & MACHINE LEARNING**	• Learn Artificial Intelligence and intelligent agents, history of Artificial Intelligence • Building intelligent agents (search, games, logic, constraint satisfaction problems) • Machine Learning and Applications of AI and ML
4	**CSM 104**	**DISCRETE MATHEMATICAL STRUCTURES**	• For a given logic sentence express it in terms of predicates, quantifiers, and logical connectives • For a given a problem, derive the solution using deductive logic and prove the solution based on logical inference. • For a given a mathematical problem, classify its algebraic structure • Evaluate Boolean functions and simplify expressions using the properties of Boolean algebra. • Develop the given problem as graph networks and solve with techniques of graph theory.
5	**CSM 121**	**ADVANCED DATA STRUCTURE AND ALGORITHM DESIGN LAB**	• Identify the problem given and design the algorithm using various algorithm design techniques. • Implement various algorithms in a high level language. • Analyze the performance of various algorithms. • Compare the performance of different algorithms for same problem.
6	**CSM 122**	**ADVANCED DATABASE MANAGEMENT SYSTEM LAB**	• Exposure for students to write complex queries including full outer joins, self-join, sub queries, and set theoretic queries. • Knowhow of the file organization, Query Optimization, Transaction management, and database administration techniques
7	**CSM 123**	**ARTIFICIAL INTELLIGENCE & MACHINE LEARNING LAB**	• Learn basics of R and will be able to understand programming for data visualisation using R Studio • Learn to analyse Data in terms of Graphical View

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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**	**BEHAVIOURAL SCIENCE - I**	• The students will be able to use the LSRW Skills to communicate effectively in a professional environment.
10	**FLP 144**	**FRENCH – I**	• The student will be able to write impressive official correspondence in French
11	**MTP 130**	**TERM PAPER**	After successful completion of this course, students will be able to • 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

SECOND SEMESTER:

S.No.	Course Code	Course Name	Course Outcome
1	**CSM 201**	**ADVANCED OPERATING SYSTEMS**	• Understanding of following concepts of Operating System: Process Management, Memory Management, File & I/O Management • Knowhow List the principles of distributed systems and describe the problems and challenges associated with these principles. • Understand Distributed Computing techniques, Synchronous and Processes. Apply Shared Data access and Files concepts. • Design a distributed and real time system that fulfil the requirements with regards to key distributed systems properties
2	**CSM 202**	**MOBILE AD HOC AND WIRELESS SENSOR NETWORKS**	• Students will be able to describe an adhoc network and analyze various technologies associated with it.

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			• Students will be able to analyze various transport layer and analyze various protocols associated with it. • Students will apply this knowledge to analyze adhoc & sensor based networks and compute various parameters associated with it. •
3	**CSM 203**	**DATA WAREHOUSING AND DATA MINING**	• Learn Data Warehousing basics and OLAP, OLTP. • Understand data mining techniques and algorithms • Understand the concepts of big data in data mining •
4	**CSM 204**	**IMAGE PROCESSING AND PATTERN RECOGNITION**	• Ability to examine various types of images, intensity transformations and spatial filtering. • Ability to evaluate the methodologies for image segmentation, restoration etc. • Ability to apply image processing algorithms in connection with pattern recognition methods. • Ability to develop Fourier transform for image processing in frequency domain
5	**CSM 223**	**DATA WAREHOUSING AND DATA MINING LAB**	• Learn Data Warehousing basics and OLAP, OLTP. • Understand data mining techniques and algorithms • Understand and analyse the structure and model of the R programming language • Evaluate user requirements for software functionality required to decide whether the R programming language can meet user requirements •
6	**CSM 224**	**IMAGE PROCESSING AND PATTERN RECOGNITION LAB**	• Ability to implement the image processing techniques using colour models. • Ability to implement the image compression algorithm. • Ability to implement the various image enhancement techniques with pattern recognition.
7	**BCP 241**	**ADVANCED COMMUNICATION-II**	• The student will be able to write an impressive resume and face the interview confidently

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8	**BSP 243**	**BEHAVIOURAL SCIENCE - II**	• The students will be able to use the LSRW Skills to communicate effectively in a professional environment.
9	**FLP 244**	**FRENCH – II**	• The student will be able to write impressive official correspondence in French.
10	**MMP 260**	**MINOR PROJECT-I**	At the end of the course, students will demonstrate the ability to: • 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.

THIRD SEMESTER:

S.No.	Course Code	Course Name	Course Outcome
1	**CSM 301**	**CYBER SECURITY AND DIGITAL FORENSICS**	• Able to know the brief fundamentals of hardware and software component. • Learn PC-based partition such as DOS partition, apple partition and its analysis. • Able to understand hard disk technology. • Well aware from the internal process of operating system. • Have an idea of memory management and disk management. •
2	**CSM 302**	**DATA ANALYTICS**	• Deploying the Data Analytics Lifecycle to address big data analytics project. • Reframing a business challenge as an analytics challenge. • Applying appropriate analytic techniques and tools to analyze big data, create statistical models, and identify insights that can lead to actionable results. • Selecting appropriate data visualizations to clearly communicate analytic insights to business sponsors and analytic audiences. • Using tools such as: R and R Studio, MapReduce/Hadoop, in-database analytics. • Explain how advanced analytics can be leveraged to create competitive advantage.

3	**CSM 303**	**IOT ARCHITECTURE AND PROTOCOLS**	• Understand key IoT concepts on sensor network. • Understand routing in wireless sensor network. • Learn how IOT work on data link and network layer.
4	**CSM 322**	**DATA ANALYTICS LAB**	• Ability to identify the characteristics of datasets and compare the trivial data and big data for various applications. • Ability to select and implement machine learning techniques and computing environment that are suitable for the applications under consideration. • Ability to solve problems associated with batch learning and online learning, and the big data characteristics such as high dimensionality, dynamically growing data and in particular scalability issues. • Ability to understand and apply scaling up machine learning techniques and associated computing techniques and technologies. • Ability to recognize and implement various ways of selecting suitable model parameters for different machine learning techniques
5	**CSM 323**	**IOT ARCHITECTURE AND PROTOCOLS LAB**	• Understand key IoT concepts on sensor network and implementation of IOT devices. • Understand routing in wireless sensor network. • Learn how IOT work on data link and network layer.
6	**CSM 304**	**CLOUD COMPUTING AND VIRTUALIZATION**	• Analyze the trade-offs between deploying applications in the cloud and over the local infrastructure. • Deploy applications over commercial cloud computing infrastructures such as Amazon Web Services,Windows Azure, and Google AppEngine. • Analyze the performance, scalability, and availability of the underlying cloud technologies and software. • Understanding virtualization and various ways of using virtualization, Implementation of private cloud platform using virtualization.

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			• Understanding Virtual machines and Implementation of virtual machines.
7	**CSM 305**	**NATURAL LANGUAGE PROCESSING**	• Automatic processing and information extraction of human language using computer. • Learn applications of Natural Language Processing such as Information extraction, semantic web search, machine translation, text summarization, spam detection.
8	**CSM 306**	**INFORMATION RETRIEVAL**	• Describe the objectives of information retrieval systems • Describe models like vector-space, probabilistic and language models to identify the similarity of query and document • Implement clustering algorithms like hierarchical agglomerative clustering and k-means algorithm. • Understand relevance feedback in the vector space model and the probabilistic model. • Illustrate how N-grams are used for the detection and correction of spelling errors. • Understand the method of Regression analysis to estimate the probability of relevance. • Understand the method to construct thesauri automatically and Manually. • Understand natural language systems to build semantic networks for text. • Illustrate algorithms used for natural language processing. • Understand the measures to evaluate the performance of cross-language information • Understand query, document, and phrase translation. • Design the method to build an inverted index.
9	**CSM 307**	**ADVANCED CRYPTOSYSTEMS AND BLOCKCHAIN CRYPTOCURRENCY**	• Able to know the advanced algorithm techniques for cryptography. • Learn technology of blockchain and its application in cryptocurrency. • Able to understand crypto token and use of block chain technology. • Well aware from the use of bit coins and cryptocurrency exchanges and wallet safety.

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			• Have an idea of business and standards of blockchain in cryptocurrency.
10	**CSM 308**	**HIGH PERFORMANCE COMPUTING**	• The basic knowledge of advanced computing technologies. • Student will be able to understand architecture of computing technologies. • Student will be able to know cloud computing service models. • Student will be able to know emerging trends in computing technology. • Student will be able to know big data and hadoop architecture.
11	**CSM 309**	**SOFT COMPUTING**	• Discuss the various aspects of uncertainty in real life and inability of conventional computing to handle them. • Relate real life problem contexts to soft computing paradigms tools • Design and use fuzzy sets and numbers in the context of various domains. • Design fuzzy rule-based system for a control application like washing machine. • Identify the problems suitable for solution using neural networks • Train a perceptron network over a given input/output pattern information. • Design a genetic model for a given problem with huge state space. • Apply GA tools and solution to a problem to find an amicable solution for the same. • Design soft computing models to solve real life problems
12	**BCP 341**	**ADVANCED COMMUNICATION – III**	• The student will be able to write impressive official correspondence and also learn to make and give effective presentations in a professional environment.
13	**BSP 343**	**BEHAVIOURAL SCIENCE – III**	• The student will be able to write impressive official correspondence and also learn to make and give effective presentations in a professional environment.
14	**FLP 344**	**French – III**	• The student will be able to write impressive official correspondence in French
15	**MSP 350**	**SUMMER INTERNSHIP PROGRAMME (SIP)**	• After successful completion of the course, the students will be able to

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			• 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.
16	**MMP 360**	**Minor Project-II**	At the end of the course, students will demonstrate the ability to: • 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.

FOURTH SEMESTER:

S.No.	Course Code	Course Name	Course Outcome
1	**MMP 460**	**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.

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AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY

M.C.A. (Four Semesters)

Course Outcomes:

FIRST SEMESTER:

S.No.	Course Code	Course Name	Course Outcome
1	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.
2	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
3	MCA 103	Operating Systems	• Analyze various scheduling algorithms.

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			• Understand deadlock, prevention and avoidance algorithms. • Compare and contrast various memory management schemes. • Understand the functionality of file systems**.**
4	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
5	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.

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			• Understand various transaction processing, concurrency control mechanisms and database protection mechanisms.
6	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.
7	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.
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	Behavioural Science – I	• The students will be able to use the LSRW Skills to communicate effectively in a professional environment.
10	FLP 144	French – I	• The student will be able to write impressive official correspondence in French
11	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

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			• Compare and evaluate the existing solutions for a specific cases study • Develop skills of presentation and report writing -

SECOND SEMESTER:

S.No.	Course Code	Course Name	Course Outcome
1	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.
2	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 of the direction- industrial job or further research in networking.
3	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.
4	MCA 204	Data Science with Python Programming	Understand python library, basic principles of Python programming language, Data Processing in Python, Data Representation, and Implement object oriented concepts, Implement database and GUI applications, Ability to create client-server application for real world problems.

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5	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.
6	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
7	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
8	MCA 224	Python Programming Lab	• Ability to create client-server application for real world problems. • Ability to develop multithreaded application. • Ability to create web application for real world problem.

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9	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.
	BCP 241	Advanced Communication – II	• The student will be able to write an impressive resume and face the interview confidently
	BSP 243	Behavioural Science – II	• The students will be able to use the LSRW Skills to communicate effectively in a professional environment.
	FLP 244	French-II	• The student will be able to write impressive official correspondence in French
10	MMP 260	**Minor Project- I**	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.

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THIRD SEMESTER:

S.No.	Course Code	Course Name	Course Outcome
1	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
2	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
3	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.

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			• Apply important algorithmic design paradigms and methods of analysis. • Synthesize efficient algorithms in common engineering design situation
4	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;
5	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.
6	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)

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7	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
8	MCA 324	Android Application Development Lab	• At the end of the course the participant will create a Web Application with server controls.
9	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.
	ELECTIVES (Any one from following)		
10	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
11	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.

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			• To develop wireless sensor systems for different applications using 802.15.4 • Optimize resources for different IoT applications • Understand Real world IoT Design constraints
12	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.
13	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++.
14	BCP 341	Advanced Communication – III	• The student will be able to write impressive official correspondence and also learn to make and give effective presentations in a professional environment.
15	BSP 343	Behavioural Science – III	• The student will be able to write impressive official correspondence and also learn to make and give effective presentations in a professional environment.
16	FLP 344	French-III	• The student will be able to write impressive official correspondence in French

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17	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.
18	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.

FOURTH SEMESTER:

S.No.	Course Code	Course Name	Course Outcome
1	MMP 460	**Dissertation**	• Identify the complex Programming problems for software project • Understanding the systematic process & sound technical knowledge about the project. • Demonstrate different methodologies for making projects and documentation/report writing. • Examine the key stages to finalize the project. • Select the suitable method which leads to appropriate results. • Design software solutions to various problems used for societal benefits.

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