B. TECH (R18) COMPUTER SCIENCE & ENGINEERING COURSE OUTCOMES

3.1.1 Course Outcomes (COs) R18 Regulations

- Defined the course outcome of all the courses
- All CO's are verified by the PAC and refinement carried out as suggested by the PAC.

Course Outcomes (COs)

The course outcomes are statements that describe the expected depth of understanding of the disciplinary subject and the essential abilities related to it upon completion of the course. The course outcomes for each course are outlined in the program syllabi. Course outcomes are formulated to meet the following guidelines:

- They follow Bloom's taxonomy.
- They reflect the entire syllabus prescribed by the Institute for each course.
- A key topic from each unit is designated as one course outcome.
- The number of course outcomes for each course should not exceed five.

I YEAR / I-SEMESTER

C101	MA101BS	Mathematics-I	3-1-0 (L-T-P)	4 Credits

Course outcomes: At the end of the course, the student will be able to:

C101.1	Write the matrix representation of a set of linear equations and to analyse the solution of the system of equations
C101.2	Find the Eigen values and Eigen vectors and reduce the quadratic form to canonical form by orthogonal transformations.
C101.3	Analyze the nature of sequence and series.
C101.4	Solve the applications on the mean value theorems and evaluate the improper integrals using Beta and Gamma functions
C101.5	Find the extreme values of functions of two variables with/ without constraints.

C102	CH102BS	ENGINEERING CHEMISTRY	3-1-0 (L-T-P)	4 Credits

Course outcomes: At the end of the course, the student will be able to:

C102.1	The concept of molecular and atomic orbital's and band theory related to conductivity
C102.2	Application of different methods to convert hard water into soft water
C102.3	Apply the electrochemistry concept to control corrosion process
C102.4	Analysis of reaction mechanism of organic molecules and synthesis drug molecules

C102.5	Application of basic techniques of spectroscopy in medical and other field

C103	EE103ES	Basic Electrical Engineering	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C103.1	Apply the concepts of KVL/KCL and network theorems in solving DC circuits.
C103.2	Understand and Analyze the AC fundamentals, AC circuits, phase relation and quality factor
C103.3	Identify the application areas of a single phase two winding transformer as well as an auto transformer and calculate their efficiency. Also identify the connections of a three phase transformer.
C103.4	Illustrate the working principles of induction motor, synchronous machine as well as DC machine and employ them in different area of applications.
C103.5	Describe the components of low voltage electrical installations and perform elementary calculations for energy consumption.

C104	ME105ES	Engineering Workshop	1-0-3 (L-T-P)	2.5 Credits

Course outcomes: At the end of the course, the student will be able to:

C104.1	Apply suitable tools for preparing different components of engineering processes, including material removal, measuring, chiselling fitting, and carpentry experiments.
C104.2	Students are able to build tin metal parts in real-world applications.
C104.3	Practice on tools in foundry, able to understand the properties of mould making
C104.4	Apply basic electrical engineering knowledge to house wiring practice
C104.5	Practice in fabrication of components using methods like welding and black smithy.

C105	EN105HS	English	2-0-0 (L-T-P)	2 Credits

Course outcomes: At the end of the course, the student will be able to:

C105.1	Better understanding of nuances of English language through audio – visual experience &group activities
C105.2	Classify the given texts and respond appropriately
C105.3	Illustrate confidently in various contexts and different cultures
C105.4	Acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills
C105.5	Analyse the language emphasis on vocabulary and grammar

C106	CH106BS	Engineering Chemistry Lab	0-0-3 (L-T-P)	1.5 Credits

Course outcomes: At the end of the course, the student will be able to:

C106.1	Determination of parameters like hardness and chloride content in water
C106.2	Estimation of rate constant of reaction from concentration –time relationship
C106.3	Determination of physical properties like adsorption and viscosity
C106.4	Calculation of R_f values of some organic molecules by TLC technique
C106.5	Able to perform methods such as conductometry and potentiometry in order to find out concentration of acids and bases

C107	EN107HS	English Language and Communication Skills Lab	0-0-2 (L-T-P)	1 Credits

Course outcomes: At the end of the course, the student will be able to:

C107.1	Better understanding of nuances of English language through audio – visual experience &group activities
C107.2	Neutralization of accent for intelligibility
C107.3	Speaking skills with clarity & confidence which in turn enhances their employability skills
C107.4	Personality traits like decision making, problem solving & leadership qualities
C107.5	Development of conversation skills

C108	EE108ES	Basic Electrical Engineering Lab	0-0-2 (L-T-P)	1 Credits

Course outcomes:

C108.1	Illustrate the application of KVL/KCL and network theorems to DC electrical circuits.
C108.2	Analyze the power factor and measure power of single phase and three phase AC electrical circuits.
C108.3	Demonstrate the behaviour of a single-phase AC series resonant circuit.
C108.4	Calculate efficiency of a single-phase transformer and DC machine.
C108.5	Demonstrate speed measurement and speed reversal of three phase induction motor and identify the type of DC and AC machines based on their construction.

I YEAR/II-SEMESTER

C109	MA201BS	Mathematics – II	3-1-0 (L-T-P)	4 Credits

Course outcomes: At the end of the course, the student will be able to:

C109.1	Identify whether the given differential equation of first order is exact or not.
C109.2	Apply the concept of higher differential equation to real World problems.
C109.3	Evaluate the multiple integrals and apply the concept to find areas volumes.
C109.4	Understand the importance of vector operators and their physical significance
C109.5	Evaluate the line, surface and volume integrals and converting them from one to another.

C110	AP202BS	Applied Physics	3-1-0 (L-T-P)	4 Credits

Course outcomes: At the end of the course, the student will be able to:

C110.1	Understand the fundamental concepts on Quantum behaviour of matter in its micro state.
C110.2	Apply fundamentals of Semiconductor physics, Optoelectronics, Lasers and fibre optics concepts to various systems like communications, solar cell, photo cells.
C110.3	Design, characterization and study of properties of materials.
C110.4	Understand the phenomena of electromagnetism, magnetic materials and dielectric materials.
C110.5	Understand various aspects of Nano materials.

C111	CS203ES	Programming for Problem Solving	3-1-0 (L-T-P)	4 Credits

Course outcomes: The student will learn

C111.1	Understand the basic s of computers, algorithms and flowcharts for computer problems
C111.2	Apply different types of control structures in computer programming
C111.3	Develop programs that make use of concepts such as arrays, pointers, strings, structures and files
C111.4	Develop programs using modular approach
C111.5	Solve searching and sorting problems

C112	ME204ES	Engineering Graphics	1-0-4 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C112.1	Understand basic engineering drawing standards and curves.
C112.2	Understand the system of projection with respect to the reference planes of various objects.
C112.3	Construct the internal details of cut section models.
C112.4	Build the development of solid surfaces.

C112.5	Design the 3D isometric view from the 2D orthographic views and vice versa.

C113	AP205BS	Applied Physics Lab	0-0-3 (L-T-P)	1.5 Credits

Course outcomes: At the end of the course, the student will be able to:

C113.1	Learn the fundamental concepts on electronic devices like L.C.R, R.C, L.E.D etc.
C113.2	Fundamentals of electric nature enable the students to applying varies areas like Hall effect, photo electric effect.
C113.3	Exposed to the phenomenon of electromagnetism, photo voltaic effect in daily life.
C113.4	Identify the type of semiconductor by finding energy gap value.
C113.5	Gain the knowledge about the bending losses of optical fiber.

C114	CS206ES	Programming for Problem Solving Lab	0-0-3 (L-T-P)	1.5 Credits

Course outcomes: The candidate is expected to be able to:

C114.1	Write the algorithms and draw flowcharts for solving Mathematical and Engineering problems.
C114.2	Apply data types and operators in data processing applications.
C114.3	Design and develop Computer programs using decision making statements, iteration, function and recursion.
C114.4	Demonstrate an understanding of computer programming language concepts using array and structures.
C114.5	Implement Computer programs, analyzes, and interprets the concept of pointers and file handling and their usage.

C115	*MC209ES	Environmental Science	3-0-0 (L-T-P)	0 Credits

Course outcomes: At the end of the course, the student will be able to:

C115.1	Gain knowledge about environment and ecosystem.
C115.2	Students will learn about natural resource, its importance and environmental impacts of Human activities on natural resource.
C115.3	Gain knowledge about the conservation of biodiversity and its importance.
C115.4	Aware students about problems of environmental pollution, its impact on human and Ecosystem and control measures.

C115.5	Students will learn about increase in population growth and importance of the acts.

II YEAR/I-SEMESTER

C201	CS301ES	Analog and Digital Electronics	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C201.1	Understand the utilization of components
C201.2	Design and analyze small signal amplifier circuits
C201.3	Learn Postulates of Boolean algebra and to minimize combinational functions
C201.4	Design and analyze combinational and sequential circuits
C201.5	Know about the logic families and realization of logic gates.

C202	CS302PC	Data Structures	3-1-0 (L-T-P)	4 Credits

Course outcomes: At the end of the course, the student will be able to:

C202.1	Understand the basic concepts of linear and non-linear data structures
C202.2	Describe the dictionaries, hash table representations and collision resolution methods
C202.3	Design programs using a variety of data structures including binary and general tree structures, search trees
C202.4	Apply algorithms for solving problems of graphs and sorting techniques
C202.5	Implement the algorithms of pattern matching and tries

C203	MA303BS	Computer Oriented Statistical Methods	3-1-0 (L-T-P)	4 Credits

Course outcomes: At the end of the course, the student will be able to:

C203.1	Apply the concept of Probability and distribution to some case studies
C203.2	Analyze and interpret Statistical data using appropriate probability distributions.
C203.3	Understand different type of sampling distribution and apply in various fields in real world problems
C203.4	Apply test of hypothesis to accept or reject a given hypothesis.
C203.5	Apply stochastic process and Markov process to solve various problems.

C204	CS304PC	Computer Organization and Architecture	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C204.1	Understand the basics of instructions sets and their impact on processor design.
C204.2	Demonstrate an understanding of the design of the functional units of a digital computer system.
C204.3	Evaluate cost performance and design trade-offs in designing and constructing a computer processor including memory.
C204.4	Design a pipeline for consistent execution of instructions with minimum hazards.
C204.5	Recognize and manipulate representations of numbers stored in digital computers

C205	CS305PC	Object Oriented Programming using C++	2-0-0 (L-T-P)	2 Credits

Course outcomes: At the end of the course, the student will be able to:

C205.1	Understand the basic of Object Oriented Programming Concepts.
C205.2	Develop programs using classes and Data abstraction.
C205.3	Develop C++ programs with reusability concept.
C205.4	Develop programs for File Handling.
C205.5	Handle Exceptions in C++ Programming.

C206	CS306ES	Analog and Digital Electronics Lab	0-0-2 (L-T-P)	1 Credits

Course outcomes: At the end of the course, the student will be able to:

C206.1	Understand the utilization of components
C206.2	Design and analyze small signal amplifier circuits
C206.3	Learn Postulates of Boolean algebra and to minimize combinational functions
C206.4	Design and analyze combinational and sequential circuits
C206.5	Know about the logic families and realization of logic gates.

C207	CS307PC	Data Structures Lab	0-0-3 (L-T-P)	1.5 Credits

Course outcomes: At the end of the course, the student will be able to:

C207.1	Implement various types of linked lists and their applications
C207.2	Implement the stack, Queue and their applications
C207.3	Implement searching and sorting algorithms
C207.4	Implement tree traversal operations
C207.5	Implement Graph traversal techniques

C208	CS308PC	IT Workshop Lab	0-0-3 (L-T-P)	1.5 Credits

Course outcomes: At the end of the course, the student will be able to:

C208.1	Understand basic peripherals of a personal computer.
C208.2	Assemble and disassemble a personal computer and install system software's such as windows and Linux.
C208.3	Understand & Demonstrate the procedure to access websites and emails.
C208.4	Create word documents; excel spread sheets, power point presentations using Latex Tools.
C208.5	Develop Excel/Spread sheets to calculate GPA and performance analysis

C209	CS309PC	C++ Programming Lab	0-0-2 (L-T-P)	1 Credits

Course outcomes: At the end of the course, the student will be able to:

C209.1	Understand the basics of object-oriented programming using C++ .
C209.2	Apply the concept of classes, abstraction and develop Simple C++ Programs.
C209.3	Design Simple C++ Programs using inheritance and polymorphism concepts.
C209.4	Implement file & Exception handling concepts using c++.
C209.5	Develop applications for a range of problems using object-oriented programming techniques

C210	MC309	Gender Sensitization Lab	0-0-2 (L-T-P)	0 Credits

Course outcomes: At the end of the course, the student will be able to:

C210.1	Developed a better understanding of important issues related to gender in contemporary India.
C210.2	Basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
C210.3	How gender discrimination works in our society and how to counter it.
C210.4	Acquire insight into the gendered division of labour and its relation to politics and economics.
C210.5	Develop a sense of appreciation of women in all walks of life.

II YEAR/II-SEMESTER

C211	CS401PC	Discrete Mathematics	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C211.1	Apply mathematical logic in discrete problems.
C211.2	Understand sets, relations, functions, and discrete structures.
C211.3	Analyze the efficiency of a developed algorithm of a computational problem.
C211.4	Understand discrete probability and counting techniques
C211.5	Apply graph theory in computing problem

C212	SM402MS	Business Economics & Financial Analysis	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C212.1	Understand the various forms of business and the impact of economic variables on the Business.
C212.2	Apply the concepts of Demand and Supply under given market conditions.
C212.3	Apply the concepts of production function, Cost, Market Structure, Pricing and BEP analysis for managerial decision making.
C212.4	Ascertain financial performance and financial position of an organization.
C212.5	Analyze and interpret the financial statement through Ratio analysis and Funds flow statement & Cash flow statement.

C213	CS403PC	Operating Systems	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C213.1	Analyze the OS structure and basic architectural components involved in its design
C213.2	Analyze and design the applications for CPU scheduling and process management.
C213.3	Understand the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system
C213.4	Analyze the memory management and virtual memory management techniques.
C213.5	Interpret the mechanisms adopted for file sharing in distributed Applications

C214	CS404PC	Database Management Systems	3-1-0 (L-T-P)	4 Credits

Course outcomes: At the end of the course, the student will be able to:

C214.1	Understand the basic concepts of Database.

C214.2	Analyze real world problems in the context of DBMS and demonstrate them using ER diagrams.
C214.3	Construct sql queries and apply normalization techniques in developing database application.
C214.4	Understand the basics of transaction processing and concurrency control.
C214.5	Compare database storage structures and access techniques.

C215	CS405PC	Java Programming	3-1-0 (L-T-P)	4 Credits

Course outcomes: At the end of the course, the student will be able to:

C215.1	Understand real world problems using OOP techniques.
C215.2	Implementation of Packages and Interface in java.
C215.3	Develop multithreaded applications with synchronization and exception handling
C215.4	Solve problems using Collection Framework and IO classes.
C215.5	Develop GUI application using applet classes, swing components and event handling programs.

C216	CS406PC	Operating Systems Lab	0-0-3(L-T-P)	1.5 Credits

Course outcomes: At the end of the course, the student will be able to:

C216.1	Simulate CPU Scheduling algorithms
C216.2	Implement deadlock detection and avoidance algorithms
C216.3	Understand and execute memory management concepts such as paging , segmentation and page replacement algorithms
C216.4	Implement file management concepts
C216.5	Implement C programs using Unix system calls.

C217	CS407PC	Database Management Systems Lab	0-0-3 (L-T-P)	1.5 Credits

Course outcomes: At the end of the course, the student will be able to:

C217.1	Analyze real world problems in the context of DBMS and demonstrate them using ER diagrams.
C217.2	Design database schema for a given applications.
C217.3	Apply normalization techniques in developing database application.
C217.4	Construct SQL commands.
C217.5	Develop solutions for database applications using procedures, cursors and triggers.

C218	CS408PC	Java Programming Lab	0-0-2 (L-T-P)	1 Credits

Course outcomes: At the end of the course, the student will be able to:

C218.1	develop programs for solving real world problems using collection framework
C218.2	Develop programs using abstract classes
C218.3	Implement exception handling and multithreaded applications using java.
C218.4	Analyze and Design GUI based applications using swings and applets
C218.5	Develop applets for web applications.

C219	MC409	Constitution of India	3-0-0 (L-T-P)	0 Credits

Course outcomes:

C219.1	Understand features and perspectives of the Indian constitution
C219.2	Demonstrate fundamental rights, duties and directive principles
C219.3	Describe federal structure, parliament system, powers of president and amendment of constitutional procedures
C219.4	Interpret emergency provisions and local self-government
C219.5	Apply right to equality, right to life and personal liberty

III YEAR/I-SEMESTER

C301	CS501PC	Formal Languages & Automata Theory	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C301.1	Understand the concept of abstract machines and their power to recognize the languages.
C301.2	Conversion of regular expression to finite automata and finite automata to regular expression
C301.3	Design push down automata and context free grammars for context free languages.
C301.4	Utilize tm to model computations and demonstrate the understanding of their variants.
C301.5	Evaluate decidable to un-decidability problems

C302	CS502PC	Software Engineering	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C302.1	Understand the SDLC models and apply them into real world applications.
C302.2	Apply the principles of requirements engineering and utilize various system modeling techniques.

C302.3	Apply software design principles and methodologies to create high quality software architectures.
C302.4	Implement various software testing strategies to ensure software quality.
C302.5	Apply software measurement techniques to evaluate software quality and implement risk management strategies.

C303	CS503PC	Computer Networks	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C303.1	Understand concept of networking and architecture including OSI and TCP/IP models
C303.2	Analyze and apply different protocols for score detection data link control and medium access control
C303.3	Evaluate and design routing algorithms network layer protocols IP addressing
C303.4	Understand the transport layer protocols and their flow and error control mechanisms
C303.5	Analyze application layer protocols like HTTP,FTP,DNS and email and their functioning

C304	CS504PC	Web Technologies	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C304.1	Develop dynamic web applications using php
C304.2	Develop web pages using css and html and manage structured data with xml
C304.3	Implement servlet API to create dynamic web content
C304.4	Design dynamic web pages using java serve pages
C304.5	Develop interactive and dynamic web applications using java script.

C305	CS513PE	Data Analytics (PE-I)	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C305.1	Apply the principle of data architecture to design efficient data systems to integrate data sources
C305.2	Apply data analytic tools and modelling techniques in business applications
C305.3	Build estimation model using regression concepts and techniques
C305.4	Analysis supervised and unsupervised model to estimate accuracy of the algorithms
C305.5	Apply data visualizations techniques to visualize and interpret complex data

C306	CS522PE	Advanced Operating Systems (PE-II)	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C306.1	Understand the design approaches of advanced operating systems
C306.2	Analyze the design issues of distributed operating systems.
C306.3	Evaluate the design considerations of multi-processor operating systems.
C306.4	Identify the requirements for Distributed File System and Distributed Shared Memory.
C306.5	Develop the solutions for scheduling the real time applications.

C307	CS505PC	Software Engineering Lab	0-0-3 (L-T-P)	1.5 Credits

Course outcomes: At the end of the course, the student will be able to:

C307.1	Develop a clear and comprehensive problem statement for a software project, defining the scope, objectives, and constraints.
C307.2	Prepare detailed Software Requirement Specification (SRS) documents, design documents, and testing phase-related documents to support the software development lifecycle.
C307.3	Create Software Configuration Management (SCM) and Risk Management documents to ensure effective project management and mitigation of potential risks.
C307.4	Utilize a Design phase CASE (Computer-Aided Software Engineering) tool to assist in the design phase of software development.
C307.5	Design and implement software solutions using Design phase CASE tools, and develop test cases for unit testing, integration testing, and various white box and black box testing techniques.

C308	CS506PC	Computer Networks & Web Technologies Lab	0-0-3 (L-T-P)	1.5 Credits

Course outcomes: At the end of the course, the student will be able to:

C308.1	Implement and test data link layer techniques, including framing methods, CRC code computation, flow control, and loss recovery mechanisms.
C308.2	Develop and analyze network algorithms and tools, such as shortest path algorithms, routing algorithms, data encryption/decryption, and network simulation using tools like Wireshark, Nmap, and NS2 Simulator.
C308.3	Create PHP scripts for basic programming tasks, including printing prime numbers, string manipulation, array merging, and file operations.

C308.4	Design and develop static web pages for an online bookstore, and validate forms using JavaScript.
C308.5	Implement dynamic web pages using Java Servlets and JSP, with database integration and MVC architecture.

C309	EN508HS	Advanced Communication Skills Lab	0-0-2 (L-T-P)	1 Credits

Course outcomes: At the end of the course, the student will be able to:

C309.1	Improve the student's fluency in English, with a focus on vocabulary
C309.2	Enable them to listen to English spoken at normal conversational speed by educated English speakers
C309.3	Respond appropriately in different socio-cultural and professional contexts
C309.4	Communicate their ideas relevantly and coherently in writing
C309.5	Preparing the students for placements

C310	*MC510	Intellectual Property Rights	3-0-0 (L-T-P)	0 Credits

Course outcomes: At the end of the course, the student will be able to:

C310.1	The students are able to understand Fundamentals of Intellectual property areas and its latest developments at National and International level
C310.2	The students are able to understand Trademarks acquisition and its remedies for violation
C310.3	The students are able to determine the Fundamentals of Copyrights Law, Copyrights ownership and remedies available for its violation.
C310.4	The students are able to apply their knowledge for Patent concept ,its filing and Registration
C310.5	The students are able to explain Trade secrets Law and its protection

III YEAR/II-SEMESTER

C311	CS601PC	Machine Learning	3-1-0 (L-T-P)	4 Credits

Course outcomes: At the end of the course, the student will be able to:

C311.1	Apply concept learning and decision tree learning techniques to design and evaluate machine learning models
C311.2	Implement and assess artificial neural networks, including basic algorithms and advanced topics, and evaluate learning hypotheses
C311.3	Utilize Bayesian learning methods and instance-based learning techniques to develop and analyze machine learning models
C311.4	Apply genetic algorithms, rule-based learning, and reinforcement learning techniques to solve complex learning tasks
C311.5	Integrate inductive and analytical learning methods, including the use of prior knowledge for improving learning algorithms and search objectives.

C312	CS602PC	Compiler Design	3-1-0 (L-T-P)	4 Credits

Course outcomes: At the end of the course, the student will be able to:

C312.1	Create and use lexical analyzers to process and recognize tokens in programming languages.
C312.2	Implement syntax analysis methods to parse and analyze code structures using different parsing techniques.
C312.3	Generate and use intermediate code from syntax trees to support further stages of compilation.
C312.4	Manage run-time environments and generate efficient code with optimization techniques.
C312.5	Apply optimization techniques to improve the performance of compiled code through various data-flow analyses

C313	CS603PC	Design and Analysis of Algorithms	3-1-0 (L-T-P)	4 Credits

Course outcomes: Upon completing this course, the student will be able to

C313.1	Use and analyze divide and conquer methods, and understand performance measurement techniques.
C313.2	Apply disjoint set operations and backtracking techniques to solve constraint satisfaction problems.
C313.3	Solve complex optimization problems using dynamic programming techniques.
C313.4	Solve optimization problems using the greedy method
C313.5	Implement branch and bound techniques and understand NP-Hard and NP-Complete problems.

C314	CS615PE	Software Testing Methodologies (PE-III)	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C314.1	Learn the basics of software testing and apply path testing techniques using flow graphs.
C314.2	Use transaction flow, dataflow, and domain testing techniques to assess software quality.
C314.3	Apply path products, path expressions, and regular expressions for testing and detecting issues.
C314.4	Create and use state graphs for testing software behaviour and state transitions.
C314.5	Apply graph matrix techniques and testing tools like JMeter or WinRunner for software testing.

C315	EC600OE	Internet of Things (OE-I)	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C315.1	Understand fundamentals of the Internet of Things
C315.2	Develop applications by using IOT techniques.
C315.3	Developing python applications to support IOT devices
C315.4	Analyze the data using Arduino & Raspberry Pi.
C315.5	Analyse the revolution of Internet in Mobile Devices, Cloud & Sensor Networks

C316	CS604PC	Machine Learning Lab	0-0-3 (L-T-P)	1.5 Credits

Course outcomes: At the end of the course, the student will be able to:

C316.1	Understand fundamentals of the Machine learning
C316.2	Understand complexity of Machine Learning algorithms and their limitations
C316.3	Examine the real-world dataset & connect database to Python
C316.4	Implement Machine Learning classification Techniques
C316.5	Develop prediction model for given data using machine learning technique

C317	CS605PC	Compiler Design Lab	0-0-3 (L-T-P)	1.5 Credits

Course outcomes: At the end of the course, the student will be able to:

C317.1	Design lexical analyzer to scan reserve words and identifiers
C317.2	Implement predictive parsing algorithm for syntax analysis
C317.3	Develop an application to produce three address code for a given c program
C317.4	Design and implement SLR parsing algorithm

C317.5	Design and implement LALR bottom-up parser for the given language

C318	**CS625PE**	**Software Testing Methodologies Lab (PE-III Lab)**	**0-0-2 (L-T-P)**	**1 Credits**

Course outcomes: At the end of the course, the student will be able to:

C318.1	Apply automation techniques using context sensitive and analog modes
C318.2	Perform GUI bit map check points to ensure visual and functional accuracy
C318.3	Implement database checkpoints to validate data integrity
C318.4	Execute data driven test with dynamic inputs and various data sources
C318.5	Perform and stream line batch testing including silent mode execution

C319	***MC609**	**Environmental Science**	**3-0-0 (L-T-P)**	**0 Credits**

, **Course outcomes**: At the end of the course, the student will be able to:

C319.1	Gain knowledge about environment and ecosystem.
C319.2	Students will learn about natural resource, its importance and environmental impacts of Human activities on natural resource.
C319.3	Gain knowledge about the conservation of biodiversity and its importance.
C319.4	Aware students about problems of environmental pollution, its impact on human and Ecosystem and control measures.
C319.5	Students will learn about increase in population growth and importance of the acts.

IV YEAR/I-SEMESTER

C401	CS701PC	Cryptography & Network Security	3-0-0 (L-T-P)	3 Credits

Course outcomes: Upon completing this course, the student will be able to

C401.1	Understand the basic security concepts, including the types of attacks, cryptography techniques, and models for network security.
C401.2	Explore symmetric and asymmetric key ciphers, including widely used algorithms like DES, AES, and RSA.
C401.3	Learn about cryptographic hash functions, message authentication codes, digital signatures, and key management techniques.
C401.4	Implement security at the transport level, including web security, SSL/TLS, and wireless network security.
C401.5	Analyze case studies on cryptography and security applications

C402	CS702PC	Data Mining	2-0-0 (L-T-P)	2 Credits

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

C402.1	Understand the types of the data to be mined and present a general classification of tasks and primitives to integrate a data mining system
C402.2	Apply association rule mining techniques to discover frequent patterns and correlations in data.
C402.3	Develop classification models using decision tree induction, Bayesian classification, rule-based classification, and lazy learners.
C402.4	Perform cluster analysis and understand the different clustering methods and their applications.
C402.5	Explore advanced methods to mine complex data types like time-series, spatial, multimedia, and web data.

C403	CS714PE	Cloud Computing (PE-IV)	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C403.1	Explore various computing paradigms like cloud, parallel, distributed, and quantum computing.
C403.2	Understand the basics of cloud computing, including its definition, characteristics, and deployment models.
C403.3	Learn about cloud architecture, management, and migration strategies.
C403.4	Compare different cloud service models (IaaS, PaaS, SaaS) and understand their characteristics, benefits, and providers.
C403.5	Analyse major cloud providers like Google, Amazon, Microsoft, and IBM, and their services.

C404	CS725PE	Software Process & Project Management (PE-V)	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C404.1	Learn about different levels of software process maturity and models like Capability Maturity Model (CMM), CMMI, PCMM, PSP, and TSP.
C404.2	Study the Evolution of Software Management to understand the different phases of the software life cycle and Learn about the different types of artifacts involved in these phases.
C404.3	Understand workflows in software processes, including milestones, status assessments, and planning techniques like work breakdown structures and cost estimation.
C404.4	Learn about different project organizations, project control techniques, core metrics, and automation in project management.
C404.5	Study modern software project profiles, next-generation software economics, and future trends in process transitions.

C405	CE700OE	Remote Sensing & GIS (OE-II)	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C405.1	Understand different concepts and terms used in Remote Sensing and its data
C405.2	Understand data conversion and Process in different coordinate systems of GIS
C405.3	Understand the system of database management and data structures
C405.4	Evaluating the process of accuracy data, errors and interpolation techniques
C405.5	Understand the applicability of RS&GIS and implementation for various applications.

C406	CS703PC	Cryptography & Network Security Lab	0-0-2 (L-T-P)	1 Credits

Course outcomes: At the end of the course, the student will be able to:

C406.1	Apply fundamental bitwise operations to manipulate strings and understand the complexity they introduce in encryption.
C406.2	Implement and analyze classical and modern encryption algorithms to secure data.
C406.3	Utilize cryptography for real-world encryption tasks, emphasizing the practical application of cryptographic principles.
C406.4	Implement public-key cryptography algorithms and key exchange mechanisms.
C406.5	Calculate and analyse message digests using cryptographic hash functions to check data integrity and authentication.

C407	CS704PC	Industrial Oriented Mini Project	0-0-0 (L-T-P)	2* Credits

Course outcomes: At the end of the course, the student will be able to:

C407.1	Identify and define a real-world industrial problem, creating a project plan with clear objectives and timelines.
C407.2	Apply course knowledge and technical skills to design and implement a solution.
C407.3	Use relevant tools and technologies to develop a working prototype or proof-of-concept.
C407.4	Collaborate within a team to manage tasks and deliver the project on time.
C407.5	Present the project results with clear documentation and demonstrations, showcasing its industry relevance.

C408	CS705PC	Seminar	0-0-2 (L-T-P)	1 Credits

Course outcomes: At the end of the course, the student will be able to:

C408.1	Conduct research and understand current technical topics in the computer field.
C408.2	Create and organize seminar content in a PPT.
C408.3	Present technical content effectively and confidently to an audience.
C408.4	Integrate information from various sources to support the seminar topic.
C408.5	Collaborate with peers to give and receive feedback on presentations.

C409	CS706PC	Project Stage - I	0-0-6 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C409.1	Identify and formulate research problem from acquired knowledge
C409.2	Analyze and categorise problem modules with potential risk
C409.3	Design and develop solution to the contemporary problem
C409.4	Choose the effective Plan and Methodology for setting the project
C409.5	Utilization of efficient Development tools to implement and execute the project

IV YEAR/II-SEMESTER

C410	SM801MS	Organizational Behaviour	3-0-0 (L-T-P)	3 Credits

Course outcomes: After completion of this course, the student will be able to:

C410.1	Recall the fundamentals of Organizational Behavior and the need of impression management.
C410.2	Differentiate the individual differences like personality, motivation, emotional intelligence and self-efficacy.
C410.3	Develop the communication, decision making skills to overcome institutional and individual obstacles.
C410.4	Categorize the group dynamics, power factors affecting group and team performance.
C410.5	Implement Behavioral modification, Leadership and the importance of learning and work life balance.

C411	CS815PE	Cyber Forensics (PE-VI)	3-0-0 (L-T-P)	3 Credits

Course outcomes: After completion of this course, the student able to

C411.1	Understand the basics of digital forensics and incidence response
C411.2	Perform forensics duplication and collect data from windows and unix system
C411.3	Conduct forensic analysis, validate data & address data hiding fetching us.
C411.4	Use forensics tools to investigate emails , computers &mobile devices
C411.5	Analysis file system disc structures & start up tasks in windows & DOS systems

C412	CE800OE	Environmental Impact Assessment (OE-III)	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C412.1	Formulate Need, Objectives and Stages of the EIA studies
C412.2	Identify the Environmental Attributes and choose the right Methodology among available Attributes
C412.3	Prepare EIA Reports and Environmental Management Plans
C412.4	Understand Environmental Legislation and Life Cycle Assessment Analysis
C412.5	Evaluate and Describe Environmental Audits and Case Studies

C413	CS802PC	Project Stage - II	0-0-14 (L-T-P)	7 Credits

Course outcomes: At the end of the course, the student will be able to:

C413.1	Understand the methodologies for setting project objectives.
C413.2	Apply phases of the project

C413.3	Understand team members' task performance
C413.4	Apply the proposed methodologies for given project
C413.5	Evaluate Project timeline efficiency

Mandatory (Non-Credit) Course

B.Tech. III Year I/II Semester	**CYBER SECURITY**	**3-0-0-0 (L-T-P-C)**	**0 Credits**

Course outcomes: At the end of the course, the student will be able to:

C1	Understand the basic concepts and terminologies of cyber security, including vulnerabilities, threats, and attacks.
C2	Understand the process and techniques involved in cyber forensics and digital evidence management.
C3	Evaluate security measures and policies for mobile devices and identify potential vulnerabilities.
C4	Understand the impact of cybercrimes on organizations and the associated financial, legal, and privacy implications.
C5	Understand fundamental data privacy concepts and identify different types of data privacy attacks.

B.Tech. III Year I/II Semester	FUNDAMENTALS OF AI	3-0-0-0 (L-T-P-C)	0 Credits

Course outcomes: At the end of the course, the student will be able to:

C1	Understand basic AI concepts, agents, and environments, and apply different search strategies (uninformed, heuristic) to solve AI problems.
C2	Implement advanced search algorithms like A*, Minimax, and Alpha-Beta pruning, and apply logic-based reasoning techniques (propositional and first-order logic).
C3	Apply probabilistic reasoning and knowledge representation techniques to manage uncertainty in AI systems.
C4	Understand different types of learning and apply machine learning techniques, such as decision trees, to solve AI problems.
C5	Design expert systems using domain-specific knowledge and reasoning techniques to solve complex problems.

All PAC members have verified.

Name with Signature

1.V.MALSORU	Associate Professor & Head
2.V.NEELIMA	Associate Professor
3.D.SRINIVAS	Assistant Professor
4.B.UMARANI	Assistant Professor
5.P.PRANITHA	Associate Professor
6.N.VENKATESWARAN	Associate Professor

B. TECH (R18) ELECTRONICS & COMMUNICATION ENGINEERING COURSE OUTCOMES

JYOTHISHMATHI INSTITUTE OF TECHNOLOGY & SCIENCE

Approved by AICTE,New Delhi and Affiliated to JNTU, Hyderabad
Accredited with NAAC "A" Grade
(An ISO 9001:2015 Certified Institution)

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Department Vision

To become a center for academic excellence in imparting quality technical education, research with Comprehensive knowledge and holistic behavior for globally acclaimed services with cutting-edge technologies in the field of Electronics and Communication Engineering.

Department Mission

- To provide the learner's state of the art infrastructural facilities, core values of instruction having excellent teaching and learning methodologies with qualified and experienced teaching faculty.
- To have Industry Institution Interaction, collaborative research, professional practice, skills and knowledge hubs/center.
- Motivating the learners becoming intellectually adept, professionally deft and to instill high standards of discipline with holistic attitude.
- To furtherance the learners by focusing on the cutting-edge technologies, consultative services, entrepreneurial skills and practice of the profession in the real world usage.

Program outcomes

PO1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate

consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

B.TECH (ELECTRONICS & COMMUNICATION ENGINEERING) (R18)

COURSE OUTCOMES

I YEAR/I-SEMESTER

C101	MA101BS	Mathematics-I	3-1-0 (L-T-P)	4 Credits

Course outcomes: At the end of the course, the student will be able to:

C101.1	Write the matrix representation of a set of linear equations and to analyze the solution of the system of equations
C101.2	Find the Eigen values and Eigen vectors and reduce the quadratic form to canonical form by orthogonal transformations.
C101.3	Analyze the nature of sequence and series.
C101.4	Solve the applications on the mean value theorems and evaluate the improper integrals using Beta and Gamma functions
C101.5	Find the extreme values of functions of two variables with/ without constraints.

C102	AP202BS	Applied Physics	3-1-0 (L-T-P)	4 Credits

Course outcomes: At the end of the course, the student will be able to:

C102.1	Understand the fundamental concepts on Quantum behavior of matter in its micro state.
C102.2	Apply fundamentals of Semiconductor physics, Optoelectronics, Lasers and fibre optics concepts to various systems like communications, solar cell, photo cells.
C102.3	Design, characterization and study of properties of materials.
C102.4	Understand the phenomena of electromagnetism, magnetic materials and dielectric materials.
C102.5	Understand various aspects of nano materials.

C103	CS103ES	Programming for Problem Solving	3-1-0 (L-T-P)	4 Credits

Course outcomes: At the end of the course, the student will be able to:

C103.1	Understand the basic s of computers, algorithms and flowcharts for computer problems
C103.2	Apply different types of control structures in computer programming
C103.3	Develop programs that make use of concepts such as arrays, pointers, strings, structures and files
C103.4	Develop programs using modular approach
C103.5	Solve searching and sorting problems

C104	ME104ES	Engineering Graphics	1-0-4 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C104.1	Understand basic engineering drawing standards and curves.
C104.2	Understand the system of projection with respect to the reference planes of various objects.
C104.3	Construct the internal details of cut section models.
C104.4	Build the development of solid surfaces.
C104.5	Design the 3D isometric view from the 2D orthographic views and vice versa.

C105	AP105BS	Applied Physics Lab	0-0-3 (L-T-P)	1.5 Credits

Course outcomes: At the end of the course, the student will be able to:

C105.1	Learn the fundamental concepts on electronic devices like L.C.R, R.C, L.E.D etc
C105.2	Fundamentals of electric nature enable the students to applying varies areas like Hall effect, photo electric effect.
C105.3	Exposed to the phenomenon of electromagnetism, photo voltaic effect in daily life.
C105.4	Identify the type of semiconductor by finding energy gap value.
C105.5	Gain the knowledge about the bending losses of optical fiber.

C106	CS106ES	Programming for Problem Solving Lab	0-0-3 (L-T-P)	1.5 Credits

Course outcomes: At the end of the course, the student will be able to:

C106.1	Write the algorithms and draw flowcharts for solving Mathematical and Engineering problems.
C106.2	Apply data types and operators in data processing applications.
C106.3	Design and develop Computer programs using decision making statements, iteration, function and recursion.
C106.4	Demonstrate an understanding of computer programming language concepts using array and structures.
C106.5	Implement Computer programs, analyzes, and interprets the concept of pointers and file handling and their usage.

C107	*MC209ES	Environmental Science	3-0-0 (L-T-P)	0 Credits

Course outcomes: At the end of the course, the student will be able to:

C107.1	Gain knowledge about environment and ecosystem.
C107.2	Students will learn about natural resource, its importance and environmental impacts of Human activities on natural resource.
C107.3	Gain knowledge about the conservation of biodiversity and its importance.
C107.4	Aware students about problems of environmental pollution, its impact on human and Ecosystem and control measures.
C107.5	Students will learn about increase in population growth and importance of the acts.

I YEAR/II-SEMESTER

C108	MA201BS	Mathematics – II	3-1-0 (L-T-P)	4 Credits

Course outcomes:

C108.1	Identify whether the given differential equation of first order is exact or not.
C108.2	Apply the concept of higher differential equation to real World problems.
C108.3	Evaluate the multiple integrals and apply the concept to find areas volumes.
C108.4	Understand the importance of vector operators and their physical significance
C108.5	Evaluate the line, surface and volume integrals and converting them from one to another.

C109	CH202BS	Chemistry	3-1-0 (L-T-P)	4 Credits

Course outcomes:

C109.1	The concept of molecular and atomic orbital's and band theory related to conductivity
C109.2	Application of different methods to convert hard water into soft water
C109.3	Apply the electrochemistry concept to control corrosion process
C109.4	Analysis of reaction mechanism of organic molecules and synthesis drug molecules
C109.5	Application of basic techniques of spectroscopy in medical and other field

C110	EE203ES	Basic Electrical Engineering	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C110.1	Apply the concepts of KVL/KCL and network theorems in solving DC circuits.
C110.2	Understand and Analyze the AC fundamentals, AC circuits, phase relation and quality factor
C110.3	Identify the application areas of a single phase two winding transformer as well as an auto transformer and calculate their efficiency. Also identify the connections of a three phase transformer.
C110.4	Illustrate the working principles of induction motor, synchronous machine as well as DC machine and employ them in different area of applications.
C110.5	Describe the components of low voltage electrical installations and perform elementary calculations for energy consumption.

C111	ME205ES	Engineering Workshop	1-0-3 (L-T-P)	2.5 Credits

Course outcomes: At the end of the course, the student will be able to:

C111.1	Apply suitable tools for preparing different components of engineering processes, including material removal, measuring, chiseling fitting, and carpentry experiments.
C111.2	Students are able to build tin metal parts in real-world applications.
C111.3	Practice on tools in foundry, able to understand the properties of mould making
C111.4	Apply basic electrical engineering knowledge to house wiring practice
C111.5	Practice in fabrication of components using methods like welding and black smithy.

C112	EN205HS	English	2-0-0 (L-T-P)	2 Credits

Course outcomes: At the end of the course, the student will be able to:

C112.1	Better understanding of nuances of English language through audio –visual experience &group activities
C112.2	Classify the given texts and respond appropriately
C112.3	Illustrate confidently in various contexts and different cultures
C112.4	Acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills
C112.5	Analyse the language emphasis on vocabulary and grammar

C113	CH206BS	Engineering Chemistry Lab	0-0-3 (L-T-P)	2 Credits

Course outcomes: At the end of the course, the student will be able to:

C113.1	Determination of parameters like hardness and chloride content in water
C113.2	Estimation of rate constant of reaction from concentration –time relationship
C113.3	Determination of physical properties like adsorption and viscosity
C113.4	Calculation of R_f values of some organic molecules by TLC technique
C113.5	Able to perform methods such as conductometry and potentiometry in order to find out concentration of acids and bases

C114	EN207HS	English Language and Communication Skills Lab	0-0-2 (L-T-P)	1 Credits

Course outcomes:

C114.1	Better understanding of nuances of English language through audio –visual experience &group activities
C114.2	Neutralization of accent for intelligibility
C114.3	Speaking skills with clarity & confidence which in turn enhances their employability skills
C114.4	Personality traits like decision making, problem solving & leadership qualities
C114.5	Development of conversation skills

C115	EE208ES	Basic Electrical Engineering Lab	0-0-2 (L-T-P)	1 Credits

Course outcomes: The candidate is expected to be able to:

C115.1	Illustrate the application of KVL/KCL and network theorems to DC electrical circuits.
C115.2	Analyze the power factor and measure power of single phase and three phase AC electrical circuits.
C115.3	Demonstrate the behavior of a single-phase AC series resonant circuit.
C115.4	Calculate efficiency of a single-phase transformer and DC machine.
C115.5	Demonstrate speed measurement and speed reversal of three phase induction motor and identify the type of DC and AC machines based on their construction.

II YEAR/I-SEMESTER

C201	EC301PC	Electronic Devices and Circuits	3-1-0 (L-T-P)	4 Credits

Course outcomes: At the end of the course, the student will be able to:

C201.1	Understand the Operation of PN Junction diode and Design rectifiers, clippers, clampers using diodes.
C201.2	Analyze transistor parameters for configuration including CE, CB, and CC.
C201.3	Analyze the operation of FET & special purpose devices - Zener diode, SCR, Tunnel diode, UJT, Varactor diode.
C201.4	Design of small signal low frequency BJT amplifiers.
C201.5	Analyze the JFET Amplifier and MOSFET Amplifiers.

C202	EC302PC	Network Analysis and Transmission Lines	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C202.1	Gain the knowledge on basic Network topology and Magnetic coupled circuits
C202.2	Analyze the Steady state and transient analysis of RC, RL and RLC Circuits.
C202.3	Know the characteristics of two port network parameters and their applications to Electronic circuit simplification.
C202.4	Analyze the transmission line parameters and configurations to find the conditions for distortion less transmission of electric signals.
C202.5	Determine the transmission line Impedance and Reflection coefficient and design the single stub matching using Smith chart procedure

C203	EC303PC	Digital System Design	3-1-0 (L-T-P)	4 Credits

Course outcomes: At the end of the course, the student will be able to:

C203.1	Understand the numerical information in different forms and Boolean Algebra theorems, operation of Logic gates.
C203.2	Apply the Karnaugh map to minimize combinational logic functions and to Design various combinational logic circuits like Adders, Subtractors, Multiplexers, Encoders, and Decoders etc.
C203.3	Design sequential circuits like flip flops, registers and counters.
C203.4	Design and analyze the circuits using Finite state machines and minimization of state machines.
C203.5	Understand the logic families and realization of logic gates using discrete components.

C204	EC304PC	Signals and Systems	3-1-0 (L-T-P)	4 Credits

Course outcomes: At the end of the course, the student will be able to:

C204.1	Represent any arbitrary signals in terms of complete sets of orthogonal functions and understands the principles of impulse functions, step function and signum function.
C204.2	Express periodic signals and non-periodic signals in terms of Fourier transform and representation of the spectrum and to design a system for sampling a signal.
C204.3	Understand the principle of linear system, filter characteristics of a system and its band width
C204.4	Find Laplace transform and Z-transform of various signals and response of the system using Laplace transform and Z-transform.
C204.5	Understand the concepts of sampling theorem, auto correlation, cross correlation and power Density Spectrum.

C205	EC305PC	Probability Theory and Stochastic Processes	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C205.1	Ability to apply knowledge of mathematics, probability and engineering in communication based system design
C205.2	Designs and conduct experiments related to communication system design and to analyze their outcomes.
C205.3	Simulates & debug and test a Digital and analog communication system.
C205.4	Ability to identify, formulate, and solves engineering problems in communication based system design.
C205.5	Ability to use design tools for communication system design, test and evaluation.

C206	EC306PC	Electronic Devices and Circuits Lab	0-0-2 (L-T-P)	1 Credits

Course outcomes: At the end of the course, the student will be able to:

C206.1	Analyze the diode and transistor characteristics.
C206.2	Understand the principles of rectifier circuits using diodes and implement them using hardware.
C206.3	Understand the concepts of unipolar junction transistor and observe its characteristics.
C206.4	Design various amplifiers like CE, CC and common source FET amplifiers and implement them using hardware and also observe their frequency responses
C206.5	Design various types of Clippers and Clampers at different reference voltages

C207	EC307PC	Digital System Design Lab	0-0-2 (L-T-P)	1 Credits

Course outcomes: At the end of the course, the student will be able to:

C207.1	Understand the numerical information in different forms and Boolean Algebra theorems, operation of Logic gates
C207.2	Apply the Karnaugh map to minimize combinational logic functions and to Design various combinational logic circuits like Adders, Subtractors, Multiplexers, Encoders, Decoders etc.
C207.3	Design sequential circuits like flip flops and registers
C207.4	Design Synchronous and Asynchronous counter using flip-flops
C207.5	Understand the logic families and realization of logic gates using discrete components.

C208	EC308PC	Basic Simulation Lab	0-0-2 (L-T-P)	1 Credits

Course outcomes: At the end of the course, the student will be able to:

C208.1	Ability to Understand Basic Operations on Matrices
C208.2	Ability to Understand the Generation of Various Signals and Sequences (Periodic and Aperiodic).
C208.3	Ability to Understand Auto Correlation and Cross Correlation between Signals and Sequences and Verification of Linearity and Time Invariance Properties of a given Continuous/Discrete System.
C208.4	Understand the Waveform Synthesis and plotting the Pole-Zero maps in S-plane and Z-Plane for the given transfer function
C208.5	Ability to Know the Fourier Transform of a given signal and plotting its magnitude and phase spectrum.

II YEAR/II-SEMESTER

C209	MA401BS	Laplace Transforms, Numerical Methods & Complex Variables	3-1-0 (L-T-P)	4 Credits

Course outcomes: At the end of the course, the student will be able to:

C209.1	Application of ODE's by Laplace transformation techniques.
C209.2	Understanding the real root of the equation.
C209.3	Investigate the value for the given data by interpolation.
C209.4	Analyze the complex function with reference to their analyticity, integration using Residues.
C209.5	Develop the Taylor's and Laurent's expansions of complex Function.

C210	EC402PC	Electromagnetic Fields and Waves	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C210.1	Apply knowledge of Basic Laws, Concepts and proofs related to Electrostatic Fields and Magneto static Fields.
C210.2	To solve the energy problems on static and time varying electro static fields by using Maxwell equations and boundary condition.
C210.3	Analyze the Wave Equations for good conductors and good dielectrics, and evaluate the UPW Characteristics for several practical media of interest
C210.4	Establish the proof and estimate the polarization features, reflection and transmission coefficients for UPW propagation, distinguish between Brewster and Critical Angles, and acquire knowledge of their applications
C210.5	To analyses completely the rectangular wave guides, their mode characteristics and design wave guides for solving practical problems

C211	EC403PC	Analog and Digital Communications	3-1-0 (L-T-P)	4 Credits

Course outcomes: At the end of the course, the student will be able to:

C211.1	Analyze and design of various continuous wave and angle modulation and demodulation techniques.
C211.2	Apply the Karnaugh map to minimize combinational logic functions and to Design various combinational logic circuits like Adders, Subtractors, Multiplexers, Encoders, and Decoders etc.
C211.3	Attain the knowledge about AM,FM Transmitters and Receivers
C211.4	Analyze and design the various pulse modulation Techniques
C211.5	Understand the concept of Digital Modulation Techniques and Baseband Transmission.

C212	EC404PC	Linear IC Applications	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C212.1	Analyze important types of integrated circuits and characteristics of OP-Amps.
C212.2	Analyze linear and non-linear applications using op-amps
C212.3	Design different types of active filters, oscillators and waveform generators.
C212.4	Analyze the 555 timers, PLL and their applications in electrical and electronics Circuits.
C212.5	Analyze different types of D/A &A/D converters

C213	EC405PC	Electronic Circuit Analysis	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C213.1	Applies the knowledge of amplifiers in Electronic based systems.
C213.2	Designs, debug and test a Electronic system.
C213.3	Analyzes various signals using concepts of amplifiers.
C213.4	Designs and simulates a Various Amplifiers.
C213.5	Designs and simulate electronic system based on Amplifiers.

C214	EC406PC	Analog and Digital Communications Lab	0-0-3 (L-T-P)	1.5 Credits

Course outcomes: At the end of the course, the student will be able to:

C214.1	Analyze and design of various continuous wave and angle modulation and demodulation techniques.
C214.2	Attain the knowledge about AM, FM Transmitters and Receivers.
C214.3	Analyze and design the various pulse modulation Techniques.
C214.4	Understand the concept of Digital Modulation Techniques and Baseband Transmission.
C214.5	Understand the concept of Generation and Detection for various types Shift Keying

C215	EC407PC	IC Applications Lab	0-0-3 (L-T-P)	1.5 Credits

Course outcomes: At the end of the course, the student will be able to:

C215.1	To understand the various applications of operational amplifier (741).
C215.2	To design circuits using operational amplifiers for various applications.
C215.3	To design various combinational circuits using various Digital Integrated IC's.
C215.4	To differences between Linear and Digital Integrated IC's
C215.5	To design various types of Voltage Regulator.

C216	EC408PC	Electronic Circuit Analysis Lab	0-0-2 (L-T-P)	1 Credits

Course outcomes: At the end of the course, the student will be able to:

C216.1	Design the multistage amplifiers and understand the concepts of High Frequency Analysis of Transistors.
C216.2	Utilize the Concepts of negative feedback to improve the stability of amplifiers and positive feedback to generate sustained oscillations.
C216.3	Design and realize different classes of Power Amplifiers and tuned amplifiers useable for audio and Radio applications
C216.4	Design Multi-vibrators for various applications.
C216.5	Design sweep circuits for various applications.

C217	MC409	Gender Sensitization Lab	0-0-2 (L-T-P)	0 Credits

Course outcomes: At the end of the course, the student will be able to:

C217.1	Developed a better understanding of important issues related to gender in contemporary India
C217.2	Sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film
C217.3	Acquire insight into the gendered division of labour and its relation to politics and economics.
C217.4	Develop a sense of appreciation of women in all walks of life
C217.5	Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence

III YEAR/I-SEMESTER

C301	EC501PC	Microprocessors & Microcontrollers	3-1-0 (L-T-P)	4 Credits

Course outcomes: At the end of the course, the student will be able to:

C301.1	To Understand the internal organization of popular 8086 microprocessor & compare with other architectures.
C301.2	To Understand the internal organization of popular 8051 Microcontrollers & differentiate with processors.
C301.3	To Develop assembly language programming to design Microprocessor based systems
C301.4	To Develop assembly language programming to design Microcontrollers based systems
C301.5	To Understand the internal architecture and organization of ARM processors, Advanced ARM processors.

C302	EC502PC	Data Communications and Networks	3-1-0 (L-T-P)	4 Credits

Course outcomes: At the end of the course, the student will be able to:

C302.1	Know the Categories and functions of various Data communication Networks
C302.2	Design and analyze various error detection techniques
C302.3	Demonstrate the mechanism of routing the data in network layer.
C302.4	Know the significance of various Flow control and Congestion control Mechanisms.
C302.5	Know the Functioning of various Application layer Protocols.

C303	EC503PC	Control Systems	3-1-0 (L-T-P)	4 Credits

Course outcomes: At the end of the course, the student will be able to:

C303.1	Describe feedback control systems in mathematical terms of different equations, transfer functions and state-space models.
C303.2	Analyze the system response and stability in both time-domain and frequency domain
C303.3	Design compensators and simple feedback controllers using time-domain and frequency domain specifications
C303.4	Analyze the system response and stability of systems represented in state space form
C303.5	Design compensators for systems modeled in state space form.

C304	SM504MS	Business Economics & Financial Analysis	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C304.1	Tol understand the various Forms of Business and the Impact of economic Variable on the Business.
C304.2	To understand The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt.
C304.3	To understand how production function is carried out to Achieve least cost Combination of input and cost analysis.
C304.4	To study the framework for manual accounting process.
C304.5	To analyze and interpret the financial statement through Ratio analysis, Funds flow statement and Cash flow statement.

C305	EC511PE	Computer Organization & Operating Systems	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C305.1	Recognize the architectures of processors used in computing systems.
C305.2	Realize Micro-programmed control units for a simple processor
C305.3	Understand memory hierarchy and virtual memory concept
C305.4	Demonstrate various I/O & Memory Transfer Techniques
C305.5	Distinguish functional architectures of operating systems and file systems

C306	EC505PC	Microprocessors & Microcontrollers Lab	0-0-3 (L-T-P)	1.5 Credits

Course outcomes: At the end of the course, the student will be able to:

C306.1	To Apply the fundamentals of assembly level programming of microprocessors.
C306.2	To Build a program on a microprocessor using instruction set of 8086.
C306.3	To Summarize the concepts of Assembly level language programming and its applications.
C306.4	To Build a program on a microcontroller using instruction set of 8051.
C306.5	To Analyze abstract problems and apply a combination of hardware and software to address the problem

C307	EC506PC	Data Communications and Networks Lab	0-0-3 (L-T-P)	1.5 Credits

Course outcomes: At the end of the course, the student will be able to:

C307.1	Understand and explore the basics of networks, creating two nodes, links between nodes and transmit data between nodes using TcL script.
C307.2	Evaluating various LAN Topologies used in the layers of OSI model
C307.3	Demonstrate about various routing protocols and transport layer protocols
C307.4	Analyze and simulate the transport layer and Application layer protocols using wireshark
C307.5	Evaluate the performance of AODV and DSR routing protocols.

C308	EN508HS	Advanced Communication Skills Lab	0-0-2 (L-T-P)	1 Credits

Course outcomes: At the end of the course, the student will be able to:

C308.1	Develops confidence to use relevant vocabulary, using apt kinesics or body language in communication
C308.2	Infer the meaning of the text easily through comprehension techniques like, skimming, scanning and effective reading through proper vocabulary
C308.3	Analyze the writing skills through letters, reports and resume writing from the text and use for all professional settings
C308.4	Gather ideas, information and organize them relevantly in making presentations
C308.5	Self assured to organize and deliver discussions, presentations and strategies to face the interviews effectively

C309	*MC510	Intellectual Property Rights	3-0-0 (L-T-P)	0 Credits

Course outcomes: At the end of the course, the student will be able to:

C309.1	The students are able to understand Fundamentals of Intellectual property areas and its latest developments at National and International level
C309.2	The students are able to understand Trademarks acquisition and its remedies for violation
C309.3	The students are able to determine the Fundamentals of Copyrights Law, Copyrights ownership and remedies available for its violation.
C309.4	The students are able to apply their knowledge for Patent concept, its filing and Registration
C309.5	The students are able to explain Trade secrets Law and its protection

B.Tech. III Year I/II Semester	CYBER SECURITY	3-0-0-0 (L-T-P-C)	0 Credits

Course outcomes: At the end of the course, the student will be able to:

C310.1	Understand the basic concepts and terminologies of cyber security, including vulnerabilities, threats, and attacks.
C310.2	Understand the process and techniques involved in cyber forensics and digital evidence management.
C310.3	Evaluate security measures and policies for mobile devices and identify potential vulnerabilities.
C310.4	Understand the impact of cybercrimes on organizations and the associated financial, legal, and privacy implications.
C310.5	Understand fundamental data privacy concepts and identify different types of data privacy attacks.

III YEAR/II-SEMESTER

C311	EC601PC	Antennas and Propagation	3-1-0 (L-T-P)	4 Credits

Course outcomes: At the end of the course, the student will be able to:

C311.1	To understand the radiation mechanism for different characteristic parameters with their mathematical relations for different practical cases.
C311.2	To Calculate the different parameters with current distribution patterns for various antennas.
C311.3	To Describe the behaviour of folded dipole, yagi-uda antenna, helical antennas, Horn antennas based on their geometry and frequency to measure the radiation patterns.
C311.4	To Design microstrip rectangular patch antenna and a parabolic reflector antenna with their requirements and feed structure for finding their patterns.
C311.5	To Develop the different wave propagation mechanisms with frequency ranges, characteristic features and parameters involved.

C312	EC602PC	Digital Signal Processing	3-1-0 (L-T-P)	4 Credits

Course outcomes: At the end of the course, the student will be able to:

C312.1	Understand the significance of various of signals and systems
C312.2	Understand the fast computation of DFT and appreciate the FFT processing.
C312.3	Design and realize IIR by Butter worth and Chebyshev methods
C312.4	Design and realize FIR by windowing methods
C312.5	Analyze and Implement a digital filter structures.

C313	EC603PC	VLSI Design	3-1-0 (L-T-P)	4 Credits

Course outcomes: Upon completing this course, the student will be able to

C313.1	To Analyze the behavior of MOS and BiCMOS with various loads
C313.2	To Analyze the VLSI Circuits through stick diagram, layout diagram 2Micro meter CMOS.
C313.3	To Analyze the transfer characteristics of CMOS logic gate.
C313.4	To Design building block of data path subsystem.
C313.5	To Design simple logic circuit using PLA, PAL, FPGA and CPLD.

C314	EC613PE	Embedded System Design	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C314.1	Understand Basic Concepts of Embedded Systems.
C314.2	Apply and Analyze the applications in various Processors and Domains of Embedded Systems.
C314.3	Analyze and develop embedded hardware and software development cycles and Tools.
C314.4	Analyze to understand different concepts of RTOS, Tasks, Process and Threads.
C314.5	Evaluate the Correlation between task synchronization and latency.

C315	ME800OE	NON-CONVENTIONAL SOURCES OF ENERGY	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C315.1	To recognize the awareness of energy conservation and Wind Power Plants
C315.2	To identify the principles of Photovoltaic Power Plants and Fuel Cells
C315.3	To identify the use of renewable energy sources for electrical power generation
C315.4	Understand the different energy storage methods
C315.5	Analyze the issues involved in the integration of renewable energy sources to the grid.

C316	EC604PC	Digital Signal Processing Lab	0-0-3 (L-T-P)	1.5 Credits

Course outcomes: At the end of the course, the student will be able to:

C316.1	To Understand the handling of discrete/digital signals using MATLAB
C316.2	To Understand the basic operations of Signal processing.
C316.3	To Analyse the spectral parameter of window functions
C316.4	To Design IIR, and FIR filters for band pass, band stop, low pass and high pass filters.
C316.5	To Analyse the Impulse Response of First order and Second Order Systems

C317	EC605PC	e – CAD Lab	0-0-3 (L-T-P)	1.5 Credits

Course outcomes: At the end of the course, the student will be able to:

C317.1	To Simulation of combinational circuit with test bench & implementation of the hardware using FPGA.
C317.2	To Simulation of sequential circuit with test bench & implementation of the hardware using FPGA.
C317.3	To Design a schematic and simple layout of CMOS Inverter & CMOS basic logic Gates.
C317.4	To Design a schematic and layout for complex CMOS of combinational circuit.
C317.5	To static timing analysis, IR drop analysis and crosstalk analysis of combinational circuit.

C318	EC606PC	Scripting Languages Lab	0-0-2 (L-T-P)	1 Credits

Course outcomes: At the end of the course, the student will be able to:

C318.1	Understanding the fundamentals of scripting programming language.
C318.2	Compare the scripting languages and programming languages.
C318.3	Applying scripting concepts like RUBY,PERL and TCL.
C318.4	Developing web based projects using scripting language.
C318.5	Analyze the real time applications by using scripting language.

C319	*MC609	Environmental Science	3-0-0 (L-T-P)	0 Credits

, **Course outcomes**: At the end of the course, the student will be able to:

C319.1	Gain knowledge about environment and ecosystem.
C319.2	Students will learn about natural resource, its importance and environmental impacts of Human activities on natural resource.
C319.3	Gain knowledge about the conservation of biodiversity and its importance.
C319.4	Aware students about problems of environmental pollution, its impact on human and Ecosystem and control measures.
C319.5	Students will learn about increase in population growth and importance of the acts.

B.Tech. III Year I/II Semester	FUNDAMENTALS OF AI	3-0-0-0 (L-T-P-C)	0 Credits

Course outcomes: At the end of the course, the student will be able to:

C320.1	Understand basic AI concepts, agents, and environments, and apply different search strategies (uninformed, heuristic) to solve AI problems.
C320.2	Implement advanced search algorithms like A*, Minimax, and Alpha-Beta pruning, and apply logic-based reasoning techniques (propositional and first-order logic).
C320.3	Apply probabilistic reasoning and knowledge representation techniques to manage uncertainty in AI systems.
C320.4	Understand different types of learning and apply machine learning techniques, such as decision trees, to solve AI problems.
C320.5	Design expert systems using domain-specific knowledge and reasoning techniques to solve complex problems.

IV YEAR/I-SEMESTER

C401	EC701PC	Microwave and Optical Communications	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C401.1	Derive the performance characteristics of known power generation at microwave frequencies
C401.2	Realize the need for solid state microwave sources and understand the principles of solid state devices.
C401.3	To Describe the behavior of folded dipole, yagi-uda antenna, helical antennas, Horn antennas based on their geometry and frequency to measure the radiation patterns.
C401.4	Understand the utility of S-parameters in microwave component design and learn the measurement procedure of various microwave parameters.
C401.5	Understand the mechanism of light propagation through Optical Fibers.

C402	EC713PE	Digital Image Processing	3-0-0 (L-T-P)	3 Credits

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

C402.1	Exploration of the limitations of the computational methods on digital images.
C402.2	Expected to implement the spatial and frequency domain image transforms on Enhancement and restoration of images.
C402.3	Elaborate understanding on image enhancement techniques.
C402.4	Expected to define the need for compression and evaluate the basic compression algorithms.
C402.5	Expected to define the need for compression and evaluate the basic compression algorithms.

C403	CS721PE	Database Management Systems	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C403.1	Demonstrate the basic elements of a relational database management system
C403.2	Ability to identify the data models for relevant problems.
C403.3	Ability to design entity relationship model and convert entity relationship diagrams into RDBMS and formulate SQL queries on the data
C403.4	Apply normalization for the development of application software.
C403.5	Demonstrate familiarity with database storage structures and access Techniques.

C404	CS701OE	Python Programming	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C404.1	Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.
C404.2	Demonstrate proficiency in handling Strings and File Systems.
C404.3	Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
C404.4	Interpret the concepts of Object-Oriented Programming as used in Python
C404.5	Implement exemplary applications related to Network Programming, Web Services and Databases in Python

C405	SM702MS	Professional Practice, Law & Ethics	1-0-4 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C405.1	Distinguish the personal ,professional and engineering ethics
C405.2	Interpret the contract laws
C405.3	Determine the arbitration and conciliation mechanism
C405.4	Examine the application of the labour laws
C405.5	Examine the Law relating to Intellectual property

C405	EC703PC	Microwave and Optical Communications Lab	0-0-2 (L-T-P)	1 Credits

Course outcomes: At the end of the course, the student will be able to:

C405.1	Verify characteristics of Reflex Klystron
C405.2	Analyze various parameters of Waveguide Components.
C405.3	Estimate the power measurements of RF Components such as directional Couplers.
C405.4	Demonstrate characteristics of various optical sources.
C405.5	Measure data Rate, Numerical Aperture and Losses in Optical Link.

C406	EC702PC	Industrial Oriented Mini Project/ Summer Internship	0-0-4 (L-T-P)	2 Credits

Course outcomes: At the end of the course, the student will be able to:

C406.1	To Demonstrate a sound technical knowledge of their selected project topic.
C406.2	To Undertake problem identification , formulation and solution.
C406.3	To Design engineering solutions to complex problems utilizing a systems approach.
C406.4	To demonstrate the knowledge ,skills and attitudes of a professional engineer
C406.5	Present the project results with clear demonstrations and showcasing its industry relevance.

C407	EC703PC	Seminar	0-0-2 (L-T-P)	1 Credits

Course outcomes: At the end of the course, the student will be able to:

C407.1	Spell for basic concepts of science and technology
C407.2	Contrast the understanding perceptive of techniques applicable to their domain
C407.3	Construct the solutions upon their own knowledge
C407.4	Improve their Presentation and Communication skills
C407.5	Make up them to pursue their placements and higher studies

C408	EC704PC	Project Stage – I	0-0-6 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C408.1	Analyze new problem, identify and define the appropriate requirement for its solutions
C408.2	Develop the solution for contemporary problems using modern tools for suitable development.
C408.3	Demonstrate ethical and professional sustainability while working in a team and communicate effectively for the benefit of the society.
C408.4	Understand the engineering, financial and management principle
C408.5	Recognize the need for long learning in the broadcast context of technological change.

IV YEAR/II-SEMESTER

C409	EC800OE	RADAR SYSTEM	3-0-0 (L-T-P)	3 Credits

Course outcomes: After Completion of the course the student is able to

C409.1	Illustrate the factors affecting the Radar performance using Radar Range Equation.
C409.2	Analyze the principle of FM-CW radar and apply it in FM- CW Altimeter.
C409.3	Differentiate between a MTI Radar and a Pulse Doppler Radar based on their working principle.
C409.4	Analyze the different Tracking Radar principles for tracking the targets.
C409.5	Demonstrate the basic principle of Receiver and also extraction of signal in Noise.

C410	EC811PE	Low Power VLSI Design	3-0-0 (L-T-P)	3 Credits

Course outcomes: After completion of this course, the student will be able to:

C410.1	Demonstrate in depth knowledge in the limitations of low power design and different sources of power dissipation.
C410.2	Acquire the knowledge in various low power design approaches and techniques.
C410.3	Analyze and design various types of low power adders
C410.4	Apply the different low power techniques for designing multipliers
C410.5	Apply the different low power techniques for designing Memory

C411	MT8020E	Total Quality management	3-0-0 (L-T-P)	3 Credits

Course outcomes: After completion of this course, the student able to

C411.1	To explain significance of quality control.
C411.2	To examine customer satisfaction.
C411.3	To illustrate various tools of total quality management.
C411.4	To evaluate accounting system and quality management.
C411.5	To develop the organization to meet ISO9000 standards.

C412	EC801PC	Project Stage – II	0-0-14 (L-T-P)	7 Credits

Course outcomes: At the end of the course, the student will be able to:

C412.1	To Demonstrate a sound technical knowledge of their selected project topic.
C412.2	To Undertake problem identification, formulation and solution.
C412.3	To Design engineering solutions to complex problems utilizing a systems approach.
C412.4	To demonstrate the knowledge, skills and attitudes of a professional engineer.
C412.5	Ability to function effectively as an individual as experienced during the project work.

B. TECH (R18) ELECTRICAL & ELECTRONICS ENGINEERING COURSE OUTCOMES

3.1.1 Course Outcomes (Cos)

(SAR should include course outcomes of one couse from each semester of study, however, should be prepared for all courses and made available as evidence)

I YEAR/I-SEMESTER

C101	MA101BS	Mathematics-I	3-1-0 (L-T-P)	4 Credits

Course outcomes: At the end of the course, the student will be able to:

C101.1	Write the matrix representation of a set of linear equations and to analyze the solution of the system of equations
C101.2	Find the Eigen values and Eigen vectors and reduce the quadratic form to canonical form by orthogonal transformations.
C101.3	Analyze the nature of sequence and series.
C101.4	Solve the applications on the mean value theorems and evaluate the improper integrals using Beta and Gamma functions
C101.5	Find the extreme values of functions of two variables with/ without constraints.

C102	CH102BS	CHEMISTRY	3-1-0 (L-T-P)	4 Credits

Course outcomes: At the end of the course, the student will be able to:

C102.1	The concept of molecular and atomic orbital's and band theory related to conductivity
C102.2	Application of different methods to convert hard water into soft water
C102.3	Apply the electrochemistry concept to control corrosion process
C102.4	Analysis of reaction mechanism of organic molecules and synthesis drug moleculesa
C102.5	Application of basic techniques of spectroscopy in medical and other field

C103	EE103ES	Basic Electrical Engineering	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C103.1	Apply the concepts of KVL/KCL and network theorems in solving DC circuits.
C103.2	Understand and Analyze the AC fundamentals, AC circuits, phase relation and quality factor
C103.3	Identify the application areas of a single phase two winding transformer as well as an auto transformer and calculate their efficiency. Also identify the connections of a three phase transformer.
C103.4	Illustrate the working principles of induction motor, synchronous machine as well as DC machine and employ them in different area of applications.
C103.5	Describe the components of low voltage electrical installations and perform elementary calculations for energy consumption.

C104	ME105ES	Engineering Workshop	1-0-3 (L-T-P)	2.5 Credits

Course outcomes: At the end of the course, the student will be able to:

C104.1	Apply suitable tools for preparing different components of engineering processes, including material removal, measuring, chiseling fitting, and carpentry experiments.
C104.2	Students are able to build tin metal parts in real-world applications.
C104.3	Practice on tools in foundry, able to understand the properties of mould making
C104.4	Apply basic electrical engineering knowledge to house wiring practice
C104.5	Practice in fabrication of components using methods like welding and blacksmithy.

C105	EN105HS	English	2-0-0 (L-T-P)	2 Credits

Course outcomes: At the end of the course, the student will be able to:

C105.1	Usage of English Language effectively in spoken and written forms
C105.2	classify the given texts and respond appropriately
C105.3	illustrate confidently in various contexts and different cultures
C105.4	acquire basic proficiency In english including reading and listening comprahension , writing and speaking skills
C105.5	analyse the language emphasis on vocabulary and grammar

C106	CH106BS	Engineering Chemistry Lab	0-0-3 (L-T-P)	1.5 Credits

Course outcomes: At the end of the course, the student will be able to:

C106.1	Determination of parameters like hardness and chloride content in water
C106.2	Estimation of rate constant of reaction from concentration –time relationship
C106.3	Determination of physical properties like adsorption and viscosity
C106.4	Calculation of Rf values of some organic molecules by TLC technique
C106.5	Able to perform methods such as conductometry and potentiometry in order to find out concentration of acids and bases

C107	EN107HS	English Language and Communication Skills Lab	0-0-2 (L-T-P)	1 Credits

Course outcomes: At the end of the course, the student will be able to:

C107.1	distinguish and understand the nuances aap English language through audio visual experience and group activities
C107.2	neutralization of accent for intelligibility
C107.3	interpretation of spoken skills with clarity and confidence which intern enhance their employability skill
C107.4	enhance the LSRW skills
C107.5	improve self confidence and equip interview skills

C108	EE108ES	Basic Electrical Engineering Lab	0-0-2 (L-T-P)	1 Credits

Course outcomes: At the end of the course, the student will be able to:

C108.1	Illustrate the application of KVL/KCL and network theorems to DC electrical circuits.
C108.2	Analyze the power factor and measure power of single phase and three phase AC electrical circuits.
C108.3	Demonstrate the behavior of a single-phase AC series resonant circuit.
C108.4	Calculate efficiency of a single-phase transformer and DC machine.
C108.5	Demonstrate speed measurement and speed reversal of three phase induction motor and identify the type of DC and AC machines based on their construction.

I YEAR/II-SEMESTER

C109	MA201BS	Mathematics – II	3-1-0 (L-T-P)	4 Credits

Course outcomes: At the end of the course, the student will be able to:

C109.1	Identify whether the given differential equation of first order is exact or not.
C109.2	Apply the concept of higher differential equation to real World problems.
C109.3	Evaluate the multiple integrals and apply the concept to find areas volumes.
C109.4	Understand the importance of vector operators and their physical significance
C109.5	Evaluate the line, surface and volume integrals and converting them from one to another.

C110	AP202BS	Applied Physics	3-1-0 (L-T-P)	4 Credits

Course outcomes: At the end of the course, the student will be able to:

C110.1	Understand the fundamental concepts on Quantum behavior of matter in its micro state.
C110.2	Apply fundamentals of Semiconductor physics, Optoelectronics, Lasers and fibre optics concepts to various systems like communications, solar cell, photo cells.
C110.3	Design, characterization and study of properties of materials.
C110.4	Understand the phenomena of electromagnetism, magnetic materials and dielectric materials.
C110.5	Understand various aspects of nano materials.

C111	CS203ES	Programming for Problem Solving	3-1-0 (L-T-P)	4 Credits

Course outcomes: At the end of the course, the student will be able to:

C111.1	Understand the basic s of computers, algorithms and flowcharts for computer problems
C111.2	Apply different types of control structures in computer programming
C111.3	Develop programs that make use of concepts such as arrays, pointers, strings, structures and files
C111.4	Develop programs using modular approach
C111.5	Solve searching and sorting problems

C112	ME204ES	Engineering Graphics	1-0-4 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C112.1	Understand basic engineering drawing standards and curves.
C112.2	Understand the system of projection with respect to the reference planes of various objects.
C112.3	Construct the internal details of cut section models.
C112.4	Build the development of solid surfaces.
C112.5	Design the 3D isometric view from the 2D orthographic views and vice versa.

C113	AP205BS	Applied Physics Lab	0-0-3 (L-T-P)	1.5 Credits

Course outcomes: At the end of the course, the student will be able to:

C113.1	Learn the fundamental concepts on electronic devices like L.C.R, R.C, L.E.D etc
C113.2	Fundamentals of electric nature enable the students to applying varies areas like Hall effect , photo electric effect.
C113.3	Exposed to the phenomenon of electromagnetism, photo voltaic effect in daily life.
C113.4	Identify the type of semiconductor by finding energy gap value.
C113.5	Gain the knowledge about the bending losses of optical fiber.

C114	CS206ES	Programming for Problem Solving Lab	0-0-3 (L-T-P)	1.5 Credits

Course outcomes: At the end of the course, the student will be able to:

C114.1	Write the algorithms and draw flowcharts for solving Mathematical and Engineering problems.
C114.2	Apply data types and operators in data processing applications.
C114.3	Design and develop Computer programs using decision making statements, iteration, function and recursion.
C114.4	Demonstrate an understanding of computer programming language concepts using array and structures.
C114.5	Implement Computer programs, analyzes, and interprets the concept of pointers and file handling and their usage.

C115	*MC209ES	Environmental Science	3-0-0 (L-T-P)	0 Credits

Course outcomes: At the end of the course, the student will be able to:

C115.1	gain knowledge about environment and ecosystem
C115.2	students will learn about natural resources its importance and environmental impacts of human activities on natural resources
C115.3	gain knowledge about the conservation of biodiversity and its importance
C115.4	aware students about problems of environment and pollution it impact on human ecosystem and control measures
C115.5	student will learn about increase in population growth and importance of the acts

II YEAR/I-SEMESTER

C201	EE301ES	Engineering Mechanics	3-1-0 (L-T-P)	4 Credits

Course outcomes: At the end of the course, the student will be able to:

C201.1	Understand the concepts of moment, friction and its applications
C201.2	Analyze the given physical problem for finding the unknown reaction forces by using equilibrium equations & graphical method
C201.3	Determine the centroid and centre of gravity of the given plane area and solid body
C201.4	Estimate area and mass moment of inertia of a plane area and solid body
C201.5	Evaluate the displacement, velocity and acceleration of a particle subjected to rectilinear and curvilinear motion & methods of representing plane motion

C202	EE302PC	Electrical Circuit Analysis	3-1-0 (L-T-P)	4 Credits

Course outcomes: At the end of the course, the student will be able to:

C202.1	apply network theorems for the analysis of electrical circuits
C202.2	obtain the transient and study state response of electrical circuits
C202.3	analyse circuits in the sinusoidal study state(single phase and three phase)
C202.4	analyse electrical circuits by applying Laplace transforms
C202.5	analyse two port circuit behaviour

C203	EE303PC	Analog Electronics	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C203.1	Know the characteristics, utilization of various components.
C203.2	Understand the biasing techniques
C203.3	Design and analyze various rectifiers, small signal amplifier circuits
C203.4	Analyze & Design various Feedback amplifiers & oscillators
C203.5	Thorough understanding, functioning of OP-AMP, designs OP-AMP based circuits with linear integrated circuits.

C204	EE304PC	Electrical Machines-I	3-1-0 (L-T-P)	4 Credits

Course outcomes: At the end of the course, the student will be able to:

C204.1	Identify different parts of a DC machine & understand its operation
C204.2	Carry out different testing methods to predetermine the efficiency of DC machines
C204.3	Understand different excitation and starting methods of DC machines
C204.4	Control the voltage and speed of a DC machines
C204.5	Analyze single phase and three phase transformers circuits

C205	EE305PC	Electromagnetic Fields	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C205.1	Understand the physical concepts of electro static fields
C205.2	Analyze the behavior of electric field in conductor, dielectric and interfaces
C205.3	Solve magneto static field problems using Bio- Savart's law and Ampere's law.
C205.4	Analyze the effect of magnetic forces, materials and calculate its inductance.
C205.5	Solve electromagnetic problems using maxwell's equations in for time varying fields

C206	EE306PC	Electrical Machines Lab - I	0-0-2 (L-T-P)	1 Credits

Course outcomes: At the end of the course, the student will be able to:

C206.1	Verify the characteristics of different machines and predict specific applications of those machines accordingly.
C206.2	Perform the speed control of DC shunt motor.
C206.3	Determine the parameters of equivalent circuit of different machines.
C206.4	Identify polarity of windings to make parallel operation possible and to make proper connections of three phase transformers in the desired group.
C206.5	Students will be able to classify various losses in a three phase induction motor.

C207	EE307PC	Analog Electronics Lab	0-0-2 (L-T-P)	1 Credits

Course outcomes: At the end of the course, the student will be able to:

C207.1	Know the characteristics, utilization of various components.
C207.2	Understand the I/O Characteristics of BJT & FET
C207.3	Design and analyze various rectifiers, small signal amplifier circuits
C207.4	Analyze & Design various Feedback amplifiers & oscillators
C207.5	Thorough understanding, functioning of OP-AMP, Applications of an OP-AMP.

C208	EE308PC	Electrical Circuits Lab	0-0-2 (L-T-P)	1 Credits

Course outcomes: At the end of the course, the student will be able to:

C208.1	Analyse and conduct the experiments on basic theorems
C208.2	Understand the concept of locus diagram and resonance concept practically
C208.3	Analyze and draw the characteristics of RL,RC and RLC series circuits.
C208.4	Understand and conduct the experiment on two port network
C208.5	understand the applications of self and mutual inductance

C209	MC400HS	Gender Sensitization Lab	0-0-2 (L-T-P)	0 Credits

Course outcomes: At the end of the course, the student will be able to:

C209.1	Developed a better understanding of important issues related to gender in contemporary India.
C209.2	Basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
C209.3	How gender discrimination works in our society and how to counter it.
C209.4	Acquire insight into the gendered division of labour and its relation to politics and economics.
C209.5	Develop a sense of appreciation of women in all walks of life.

II YEAR/II-SEMESTER

C210	MA401BS	Laplace Transforms, Numerical Methods & Complex variables	3-1-0 (L-T-P)	4 Credits

Course outcomes: At the end of the course, the student will be able to:

C210.1	Apply Laplace transformation techniques to solve ODE's.
C210.2	Estimate the real root of the algebraic and transcendental equation and examine the value using interpolation for the provided data.
C210.3	Solve ODE and evaluating integrals using numerical methods.
C210.4	Analyze the complex function with reference to their analyticity, contour integration using ,Residues.
C210.5	Develop the Taylor's and Laurent's expansions of complex valued function

C211	EE402PC	Electrical Machines – II	3-1-0 (L-T-P)	4 Credits

Course outcomes: At the end of the course, the student will be able to:

C211.1	Understand the concepts of rotating magnetic fields and constructional features and characteristics of Poly-Phase Induction Machines
C211.2	Understand the characteristics and speed control of Poly-Phase Induction Machines with different methods.
C211.3	Explain constructional features and characteristics of synchronous machines and the regulation of alternator with different methods
C211.4	Illustrate concepts of parallel operation and short circuit analysis of alternator.
C211.5	Analyze the single phase and special machines.

C212	EE403PC	Digital Electronics	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C212.1	Understand working of logic families and logic gates
C212.2	Design and implement Combinational logic circuits.
C212.3	Design and implement Sequential logic circuits.
C212.4	Understand the process of Analog to Digital conversion and Digital to Analog conversion.
C212.5	Use PLDs to implement the given logical problem.

C213	EE404PC	Control Systems	3-1-0 (L-T-P)	4 Credits

Course outcomes: At the end of the course, the student will be able to:

C213.1	Understand the common control schemes and Obtain models of dynamic systems in transfer function
C213.2	Analyze the system response and stability in both time-domain and frequency domain
C213.3	Learn the features of different types of compensators and to design compensators using time-domain and frequency domain specification
C213.4	Designing the different controllers to improve the stability.
C213.5	Analyze the system response and stability of systems represented in state space form and to design compensators for systems modeled in state space form

C214	EE405PC	Power Systems - I	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C214.1	Understand various aspects of electrical power generation.
C214.2	Evaluating the economic aspects of power generation and tariff methods
C214.3	Understand and compare overhead line insulators and Insulated cables.
C214.4	Evaluate the electrical circuit parameters of transmission lines
C214.5	Analyze A.C. and D.C. distribution systems

C215	EE406PC	Digital Electronics Lab	0-0-2 (L-T-P)	1 Credits

Course outcomes: At the end of the course, the student will be able to:

C215.1	Understand working of logic families and logic gates
C215.2	Design and implement Combinational logic circuits.
C215.3	Design and implement Sequential logic circuits.
C215.4	Understand the process of Analog to Digital conversion and Digital to Analog conversion.
C215.5	Use PLDs to implement the given logical problem.

C216	EE407PC	Electrical Machines Lab - II	0-0-2 (L-T-P)	1 Credits

Course outcomes: At the end of the course, the student will be able to:

C216.1	Estimate Efficiency, Regulation of Single Phase Transformer
C216.2	Evaluate Core losses And Examine Three Phase to Two Phase Conversion of Transformer.
C216.3	Develop Equivalent Circuit, Characteristics And Circle Diagram Of 1 Phase & 3 Phase Induction Motor.
C216.4	Determine Efficiency And Regulation Of Alternator
C216.5	Relationships of V and Inverted V Curves of Synchronous Motor

C217	EE408PC	Control Systems Lab	0-0-2 (L-T-P)	1 Credits

Course outcomes: At the end of the course, the student will be able to:

C217.1	analyse and conduct experiment on lead, lag and lag - lead compensation for the given specifications
C217.2	to determine experimentally the time domain and frequency domain responses of a given second order system
C217.3	conduct experiment to draw the performance characteristics of DC AC servo motors and transmitter - receiver pair
C217.4	conduct experiment to study the effect of P, PI, PD and PID controller on the step response of a feedback control system and verify the same by simulation
C217.5	evaluation of time domain specifications of DC position and feedback a control system and simulate root locus

C218	*MC409	Constitution of India	3-0-0 (L-T-P)	0 Credits

Course outcomes: At the end of the course, the student will be able to:

C218.1	Understand features and perspectives of the Indian constitution
C218.2	Demonstrate fundamental rights, duties and directive principles
C218.3	Describe federal structure, parliament system, powers of president and amendment of constitutional procedures
C218.4	Interpret emergency provisions and local self government
C218.5	Apply right to equality, right to life and personal liberty

III YEAR/I-SEMESTER

C301	EE501PE	Power Electronics	3-1-0 (L-T-P)	4 Credits

Course outcomes: At the end of the course, the student will be able to:

C301.1	Demonstrate knowledge on •the characteristics of various power transistors. •operation, switching characteristics, ratings, protection and combinations of SCR. •various triggering methods and commutation techniques for SCR. •operation of line commutated converters and SCR based forced commutated converters.
C301.2	Analyze the performance of different power converters subjected to various loads.
C301.3	Design static and dynamic equalizing circuits, snubber circuits and commutating elements for protection and functionality of power electronic circuits.
C301.4	Investigate various configurations of power electronic circuits to provide feasible solutions.
C301.5	Select an appropriate power semiconductor device and/ or circuit for real time applications.

C302	EE502PE	Power Systems - II	3-1-0 (L-T-P)	4 Credits

Course outcomes: At the end of the course, the student will be able to:

C302.1	Analyze transmission line performance.
C302.2	Apply load compensation techniques to control reactive power
C302.3	Understand the application of per unit quantities.
C302.4	Design over voltage protection and insulation coordination
C302.5	Determine the fault currents for symmetrical and unbalanced faults

C303	EE503PE	Measurements and Instrumentation	3-1-0 (L-T-P)	4 Credits

Course outcomes: At the end of the course, the student will be able to:

C303.1	Acquire knowledge and understanding different types of measuring instruments, their construction, operation and characteristics
C303.2	analyse and identify the instruments suitable for typical measurements
C303.3	apply the knowledge about transducers and instrumental Transformers to use them effectively
C303.4	ability to balance bridges to measure the unknown values
C303.5	apply the knowledge of smart and digital metering for industrial applications

C304	EE512PE	High Voltage Engineering	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C304.1	Analysis of Breakdown Occurring in gaseous, liquids and solid dielectrics
C304.2	Remembering the Generation of High voltage and current
C304.3	Understanding the measurement of High voltage and current
C304.4	Understanding Lightning And Switching Over-Voltages
C304.5	Explain various High voltage testing methods

C305	SM504MS	Business Economics and Financial Analysis	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C305.1	Understand the various forms of business and the impact of economic variables on the Business.
C305.2	Apply the concepts of Demand and Supply under given market conditions.
C305.3	Apply the concepts of production function, Cost, Market Structure, Pricing and BEP analysis for managerial decision making.
C305.4	Ascertain financial performance and financial position of an organization.
C305.5	Analyze and interpret the financial statement through Ratio analysis and Funds flow statement & Cash flow statement.

C306	EE505PC	Power System Simulation Lab	0-0-2 (L-T-P)	1 Credits

Course outcomes: At the end of the course, the student will be able to:

C306.1	Analyze the various transients and resonance in the circuits
C306.2	Compare different types of transmission lines
C306.3	Understand different circuits time constants
C306.4	Perform various transmission line calculations
C306.5	Analyze the experimental data and draw the characteristics

C307	EE506PC	Power Electronics Lab	0-0-2 (L-T-P)	1 Credits

Course outcomes: At the end of the course, the student will be able to:

C307.1	Demonstrate knowledge on characteristics of power switching devices, their triggering and commutation circuits, various converters and drives.
C307.2	Analysis the physical observations and measurements of various parameters related to power switching devices, converter circuits and drives.
C307.3	Select an appropriate power switching device and/or circuit for real time applications.
C307.4	Commit to ethical principles and standards while exercising the practical investigations on power electronics and drives
C307.5	Communicate effectively in verbal and written form in relevance to power electronics and drives

C308	EE507PC	Measurements and Instrumentation Lab	0-0-2 (L-T-P)	1 Credits

Course outcomes: At the end of the course, the student will be able to:

C308.1	Analyze measuring of Resistance, Inductance and Capacitance of different ranges
C308.2	Perform experiments to measure three phase power.
C308.3	Design experiments able to calibrate and test single phase energy meter, calibrate PMMC voltmeter and calibrate LPF wattmeter
C308.4	Identify the industrial practices of test current transformers and dielectric strength of oil.
C308.5	How to calibrate LVDT and resistance strain gauge

C309	EN508HS	Advanced Communication Skills Lab	0-0-2 (L-T-P)	1 Credits

Course outcomes: At the end of the course, the student will be able to:

C309.1	Acquire vocabulary and use it contextually
C309.2	listen and speek effectively
C309.3	develop proficiency in academic reading and writing
C309.4	increase possibilities of job prospects
C309.5	communicate confidently formal and informal contexts

C310	*MC510	Intellectual Property Rights	3-0-0 (L-T-P)	0 Credits

Course outcomes: At the end of the course, the student will be able to:

C310.1	The students are able to understand Fundamentals of Intellectual property areas and its latest developments at National and International level
C310.2	The students are able to understand Trademarks acquisition and its remedies for violation
C310.3	The students are able to determine the Fundamentals of Copyrights Law, Copyrights ownership and remedies available for its violation.
C310.4	The students are able to apply their knowledge for Patent concept ,its filing and Registration
C310.5	The students are able to explain Trade secrets Law and its protection

III YEAR/II-SEMESTER

C311	MT601OE	Non-Conventional Energy Sources(OE-I)	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C311.1	Study the Solar energy concepts , components and Solar radiation
C311.2	Estimate the solar energy, Utilization of it, Principles involved in solar energy collection and conversion of it to electricity generation and have a working knowledge on types of fuel cells.
C311.3	Understand the applications of solar energy and Illustrate ocean energy & the operational methods of their utilization.
C311.4	Explore the concepts involved in wind energy conversion system by studying its components, types and performance
C311.5	Acquire the knowledge on Biomass and Geothermal energy

C312	EE612PE	Power Semiconductor Drives (PE-II)	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C312.1	Understand the operation of DC motor speed control using converters
C312.2	Analyze the operation of DC motor speed control using choppers
C312.3	Apply power converters knowledge to obtain variable voltage and frequency control of induction motor
C312.4	Understand the speed control of induction motor from rotor side
C312.5	Analyze the control of Synchronous Motor drive using VSI and CSI

C313	EE601PC	Signals and Systems	2-1-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C313.1	Differentiate various signal functions.
C313.2	Represent any arbitrary signal in time and frequency domain.
C313.3	Understand the characteristics of linear time invariant systems.
C313.4	Analyze the signals with different transform technique.
C313.5	Understand the process of sampling to convert an analog signal into discrete signal.

C314	EE602PC	Microprocessors & Microcontrollers	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C314.1	Understand theinternal architecture, register organization and assembly language programming of 8086processors.
C314.2	Understand the internal architecture, register organization and assembly language programming of 8051 controller.
C314.3	Understand the interfacing to 8051 and communication interfaces.
C314.4	Understand the internal architecture, register organization of ARM processors
C314.5	Understand the internal architecture, register organization of CORTEX,OMAP processors

C315	EE603PC	Power System Protection	3-1-0 (L-T-P)	4 Credits

Course outcomes: At the end of the course, the student will be able to:

C315.1	Understand the working of circuit breakers in power system.
C315.2	Explain the working of Relays in power system.
C315.3	Grasp the knowledge of different protection schemes of transformer, bus-bar, generator and Transmission lines.
C315.4	Understand the importance of Neutral Grounding.
C315.5	Explain the concept of over voltages and various means to protect the system.

C316	EE604PC	Power System Operation and Control	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C316.1	understand the importance of LFC in power systems
C316.2	to extend the knowledge on reactive power - voltage loop
C316.3	analyse the optimal scheduling of power plants
C316.4	analyse the operation of thermal and hydro power plant subjected to different constraints
C316.5	understand the importance of SCADA and EMS in power systems

C317	EE605PC	Power System Lab	0-0-3 (L-T-P)	2 Credits

Course outcomes: At the end of the course, the student will be able to:

C317.1	Analyze the characteristics of different relays
C317.2	Understand various protection methods
C317.3	Finding the sequence impedances of Electrical machines
C317.4	Perform transmission line calculations
C317.5	Analyze the different power flow methods

C318	EE606PC	Microprocessors & Microcontrollers Lab	0-0-2 (L-T-P)	1 Credits

Course outcomes: At the end of the course, the student will be able to:

C318.1	Understand the assembly language programs and implemention on 8086.
C318.2	Understand the assembly language programs and implemention on 8051
C318.3	Understand the Timer,serial communication,interrupts operations of 8051
C318.4	Understand the Interface the Input devices with 8051 micro controllers
C318.5	Understand the Interface the output devices with 8051 micro controllers

C319	EE607PC	Signals and Systems Lab	0-0-2 (L-T-P)	1 Credits

Course outcomes: At the end of the course, the student will be able to:

C319.1	understand the generation of continuous and descrete time signals.
C319.2	understand the frequency transformation techniques.
C319.3	Understand the concepts of continuous time and discrete time systems.
C319.4	Analyse systems in complex frequency domain.
C319.5	Understand sampling theorem and its implications.

C320	*MC609	Environmental Science	3-0-0 (L-T-P)	0 Credits

Course outcomes: At the end of the course, the student will be able to:

C320.1	gain knowledge about environment and ecosystem
C320.2	students will learn about natural resources its importance and environmental impacts of human activities on natural resources
C320.3	gain knowledge about the conservation of biodiversity and its importance
C320.4	aware students about problems of environment and pollution it impact on human ecosystem and control measures
C320.5	student will learn about increase in population growth and importance of the acts

IV YEAR/I-SEMESTER

C401	EC700OE	Electronic Sensors (OE-II)	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C401.1	learn about sensor principle, classification and characterization
C401.2	explore the working of electromechanical, thermal, magnetic, radiation sensors
C401.3	explore the working of electro analytic sensors
C401.4	understand the basic concepts of smart sensors
C401.5	design a system with sensors

C402	EE713PE	Electrical and Hybrid Vehicles(PE-III)	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C402.1	Understand the models to describe hybrid vehicles and their performance.
C402.2	Choose a suitable drive scheme for developing an electric hybrid vehicle depending on resources
C402.3	Analyze the power and energy need of the various hybrid electric vehicle.
C402.4	Measure and Estimate the energy consumption of the Hybrid Vehicles.
C402.5	Evaluate energy efficiency of the vehicle for its drive trains.

C403	EE721PE	HVDC Transmission (PE-IV)	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C403.1	Understand the knowledge on different types of HVDC transmission system, various converter configurations and analyze the Greatz circuit
C403.2	Analyze different control strategies in HVDC system
C403.3	Analyze the power flow in HVDC transmission system and solve problems in HVDC system to provide various solutions
C403.4	Demonstrate effect of faults and different protection schemes in HVDC system
C403.5	Understand effects of harmonics and designing of filter circuits for minimizing Harmonics

C404	SM701MS	Fundamentals of Management for Engineers	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C404.1	Demonstrate basic functional areas and approaches to Management.
C404.2	Understand and analyze the strategic planning, decision making and Problem solving skills
C404.3	Apply organizational principles, frame work and various functional areas of HRM
C404.4	Choose Leadership and motivational concepts.
C404.5	Institute the effective control system

C405	EE701PC	Electrical & Electronics Design Lab	1-0-4 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C405.1	get practical knowledge related to electrical related to various types of starters
C405.2	get practical knowledge on various types of circuit breakers
C405.3	get practical knowledge on wiring of various types of lamps
C405.4	design filter circuit
C405.5	assemble various types of contactors

C406	EE702PC	Industrial Oriented Mini Project/ Summer Internship	0-0-4 (L-T-P)	2 Credits

Course outcomes: At the end of the course, the student will be able to:

C406.1	Demonstrate a sound technical knowledge of their selected project topic.
C406.2	Undertake problem identification, formulation and solution.
C406.3	Design engineering solutions to complex problems utilizing a systems approach.
C406.4	Conduct engineering & societal projects.
C406.5	Communicate with engineers and the community at in written an oral forms

C407	EE703PC	Seminar	0-0-2 (L-T-P)	1 Credits

Course outcomes: At the end of the course, the student will be able to:

C407.1	**Spell** for basic concepts of science and technology
C407.2	**Contrast** the understanding perceptive of techniques applicable to their domain
C407.3	**Construct** the solutions upon their own knowledge
C407.4	**Improve** their Presentation and Communication skills
C407.5	**Make up** them to pursue their placements and higher studies

C408	EE704PC	Project Stage - I	0-0-6 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C408.1	Ability to investigate and solve complex engineering problems faced during the project work.
C408.2	Ability to apply tools and techniques to complex engineering activities with an understanding of limitations in the project work.
C408.3	Ability to provide solutions as per societal needs with consideration to health, safety, legal and cultural issues considered in the project work.
C408.4	Understanding of the impact of the professional engineering solutions in environmental context and need for sustainable development experienced during the project work.
C408.5	Ability to function effectively as an individual as experienced during the project work.

IV YEAR/II-SEMESTER

C409	EC800OE	MEASURING INSTRUMENTS (OE-III)	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C409.1	understand about the measurement, errors and various standards
C409.2	identify suitable sensors and transducers for real time applications
C409.3	understand the measurement of dimensions, velocity, acceleration.
C409.4	identify suitable methods for force and pressure measurement
C409.5	identify suitable methods for flow, density and viscosity measurement

C410	EE811PE	Power Quality & FACTS (PE-V)	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C410.1	Understand the concept of power quality problems in distribution system and improving the power quality
C410.2	Analyze the compensated & uncompensated AC transmission lines and compare series & shunt compensations
C410.3	Analyze the control circuits of Shunt Controllers TCR, TSC,SVC & STATCOM for various functions
C410.4	Analyze the Power and control circuits of Series Controllers GCSC, TSSC and TCSC for various functions
C410.5	Understand the control circuits of Combined Compensators and their functions

C411	EE822PE	Electrical Distribution Systems(PE-VI)	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C411.1	distinguish between transmission, and distribution line and design the feeders
C411.2	compute power loss and voltage drop of the feeders
C411.3	design protection of distribution systems
C411.4	understand the importance of voltage control and
C411.5	understand the importance of power factor improvement

C412	EE801PC	Project Stage - II	0-0-14 (L-T-P)	7 Credits

Course outcomes: At the end of the course, the student will be able to:

C412.1	Ability to investigate and solve complex engineering problems faced during the project work.
C412.2	Ability to apply tools and techniques to complex engineering activities with an understanding of limitations in the project work.
C412.3	Ability to provide solutions as per societal needs with consideration to health, safety, legal and cultural issues considered in the project work.
C412.4	Understanding of the impact of the professional engineering solutions in environmental context and need for sustainable development experienced during the project work.
C412.5	Ability to function effectively as an individual as experienced during the project work.

B. TECH (R18)
CIVIL ENGINEERING
COURSE OUTCOMES

CIVIL R18 REGULATION Course Outcomes (Cos)

I YEAR/I-SEMESTER

C101	MA101BS	Mathematics-I	3-1-0 (L-T-P)	4 Credits
Course outcomes: At the end of the course, the student will be able to:				
C101.1	Write the matrix representation of a set of linear equations and to analyze the solution of the system of equations			
C101.2	Find the Eigen values and Eigen vectors and reduce the quadratic form to canonical form by orthogonal transformations.			
C101.3	Analyze the nature of sequence and series.			
C101.4	Solve the applications on the mean value theorems and evaluate the improper integrals using Beta and Gamma functions			
C101.5	Find the extreme values of functions of two variables with/ without constraints.			

C102	PH102BS	ENGINEERING PHYSICS	3-1-0 (L-T-P)	4 Credits
Course outcomes: At the end of the course, the student will be able to:				
C102.1	Establish the knowledge of Physics relevant to engineering and converting ideas into technologies			
C102.2	An understanding of Physics also helps engineers understand the working and limitations of existing devices and techniques, which eventually leads to new innovations and improvements.			
C102.3	In the present course, the students can gain knowledge on the mechanism of physical bodies upon the action of forces on them, the generation, transmission and the like Interference, diffraction, the principles of lasers and Fibre Optics.detection of the			
C102.4	Various chapters establish a strong foundation on the different kinds of characters of several materials and pave a way for them to use in at various technical and engineering applications.			
C102.5	Learn the fundamentals of lasers and fiber optics, including laser operation, types, and fiber optics principles, applications, and associated losses.			

C103	CS103ES	Programming for Problem Solving	3-1-0 (L-T-P)	4 Credits
Course outcomes: At the end of the course, the student will be able to:				
C103.1	Understand the basic s of computers, algorithms and flowcharts for computer problems			
C103.2	Apply different types of control structures in computer programming			
C103.3	Develop programs that make use of concepts such as arrays, pointers, strings, structures and files			
C103.4	Develop programs using modular approach			
C103.5	Solve searching and sorting problems			

C104	ME104ES	Engineering Graphics	1-0-4 (L-T-P)	3 Credits
Course outcomes: At the end of the course, the student will be able to:				
C104.1	Understand basic engineering drawing standards and curves.			
C104.2	Understand the system of projection with respect to the reference planes of various objects.			
C104.3	Construct the internal details of cut section models.			
C104.4	Build the development of solid surfaces.			
C104.5	Design the 3D isometric view from the 2D orthographic views and vice versa.			

C105	PH105BS	Engineering Physics Lab	0-0-3 (L-T-P)	1.5 Credits
Course outcomes: At the end of the course, the student will be able to:				
C105.1	Apply experimental techniques to study wave and oscillatory phenomena, including Melde's experiment and coupled oscillators.			
C105.2	Determine material properties and constants such as rigidity modulus using a torsional pendulum and spring constants.			
C105.3	Analyze optical phenomena like Newton's rings, diffraction, and dispersive power to evaluate lens curvature, grating lines, and prism properties.			
C105.4	Understand the characteristics of LASER sources and measure parameters of optical fibers such as bending losses and numerical aperture.			
C105.5	Evaluate electrical circuit performance by determining the quality factor and resonance frequency of LCR circuits.			

C106	CS106ES	Programming for Problem Solving Lab	0-0-3 (L-T-P)	1.5 Credits
Course outcomes: At the end of the course, the student will be able to:				
C106.1	Write the algorithms and draw flowcharts for solving Mathematical and Engineering problems.			
C106.2	Apply data types and operators in data processing applications.			
C106.3	Design and develop Computer programs using decision making statements, iteration, function and recursion.			
C106.4	Demonstrate an understanding of computer programming language concepts using array and structures.			
C106.5	Implement Computer programs, analyzes, and interprets the concept of pointers and file handling and their usage.			

C107	MC109ES	Environmental Science	3-0-0 (L-T-P)	0 Credits
Course outcomes: At the end of the course, the student will be able to:				
C107.1	Gain knowledge about environment and ecosystem			
C107.2	Students will learn about natural resources its importance and environmental impacts of human activities on natural resources			
C107.3	Gain knowledge about the conservation of biodiversity and its importance			
C107.4	Aware students about problems of environment and pollution it impact on human ecosystem and control measures			
C107.5	Student will learn about increase in population growth and importance of the acts			

I YEAR/II-SEMESTER

C108	MA201BS	Mathematics – II	3-1-0 (L-T-P)	4 Credits
Course outcomes: At the end of the course, the student will be able to:				
C108.1	Identify whether the given differential equation of first order is exact or not.			
C108.2	Apply the concept of higher differential equation to real World problems.			
C108.3	Evaluate the multiple integrals and apply the concept to find areas volumes.			
C104.4	Understand the importance of vector operators and their physical significance			
C108.5	Evaluate the line, surface and volume integrals and converting them from one to another.			

C109	CH202BS	Chemistry	3-1-0 (L-T-P)	4 Credits
Course outcomes: At the end of the course, the student will be able to:				
C109.1	The concept of molecular and atomic orbital's and band theory related to conductivity			
C109.2	Application of different methods to convert hard water into soft water			
C109.3	Apply the electrochemistry concept to control corrosion process			
C109.4	Analysis of reaction mechanism of organic molecules and synthesis drug moleculesa			
C109.5	Application of basic techniques of spectroscopy in medical and other field			

C110	ME203ES	Engineering Mechanics	3-1-0 (L-T-P)	4 Credits
Course outcomes: At the end of the course, the student will be able to:				
C110.1	Determine resultant of forces acting on a body and analyse equilibrium of a body subjected to a system of forces.			
C110.2	Solve problem of bodies subjected to friction			
C110.3	Find the location of centroid and calculate moment of inertia of a given section			
C110.4	Understand the kinetics and kinematics of a body undergoing rectilinear, curvilinear, rotatory motion and rigid body motion			
C110.5	Solve problems using work energy equations for translation, fixed axis rotation and plane motion and solve problems of vibration			

C111	ME205ES	Engineering Workshop	1-0-3 (L-T-P)	2.5 Credits
Course outcomes: At the end of the course, the student will be able to:				
C111.1	Apply suitable tools for preparing different components of engineering processes, including material removal, measuring, chiseling fitting, and carpentry experiments.			
C111.2	Students are able to build tin metal parts in real-world applications.			
C111.3	Practice on tools in foundry, able to understand the properties of mould making			
C111.4	Apply basic electrical engineering knowledge to house wiring practice			
C111.5	Practice in fabrication of components using methods like welding and blacksmithy.			

C112	EN205HS	English	2-0-0 (L-T-P)	2 Credits
Course outcomes: At the end of the course, the student will be able to:				
C112.1	Usage of English Language effectively in spoken and written forms			
C112.2	classify the given texts and respond appropriately			
C112.3	illustrate confidently in various contexts and different cultures			
C112.4	acquire basic proficiency In english including reading and listening comprahension , writing and speaking skills			
C112.5	analyse the language emphasis on vocabulary and grammar			

C113	CH206BS	Engineering Chemistry Lab	0-0-3 (L-T-P)	1.5 Credits
Course outcomes: At the end of the course, the student will be able to:				
C113.1	Determination of parameters like hardness and chloride content in water			
C113.2	Estimation of rate constant of reaction from concentration –time relationship			
C113.3	Determination of physical properties like adsorption and viscosity			
C113.4	Calculation of Rf values of some organic molecules by TLC technique			
C113.5	Able to perform methods such as conductometry and potentiometry in order to find out concentration of acids and bases			

C114	EN207HS	English Language and Communication Skills Lab	0-0-2 (L-T-P)	1 Credits
Course outcomes: At the end of the course, the student will be able to:				
C114.1	distinguish and understand the nuances aap English language through audio visual experience and group activities			
C114.2	neutralization of accent for intelligibility			
C114.3	interpretation of spoken skills with clarity and confidence which intern enhance their employability skill			
C114.4	enhance the LSRW skills			
C114.5	improve self confidence and equip interview skills			

II YEAR/I-SEMESTER

C201	CE301PC	Surveying and Geomatics	3-0-0 (L-T-P)	3 Credits
Course outcomes: At the end of the course, the student will be able to:				
C201.1	Apply the knowledge to calculate angles, distances and levels			
C201.2	Identify data collection methods and prepare field notes			
C201.3	Understand the working principles of survey instruments, measurement errors and corrective measures			
C201.4	Interpret survey data and compute areas and volumes, levels by different type of equipment and relate the knowledge to the modern equipment and methodologies			
C201.5	Understand the diiferent aerial photograph,Collection of maps and mapping using different instruments			

C202	CE302PC	Engineering Geology	2-0-0 (L-T-P)	2 Credits
Course outcomes: At the end of the course, the student will be able to:				
C202.1	Site characterization and how to collect, analyze, and report geologic data using standards in engineering practice			
C202.2	The fundamentals of the engineering properties of Earth materials and fluids.			
C202.3	Rock mass characterization and the mechanics of planar rock slides and topples			
C202.4	Study earthquake causes, seismic waves, landslides, and geological considerations in the construction of dams, reservoirs, and tunnels, including site selection			
C202.5	Explore geological considerations in the construction of dams, reservoirs, and tunnels, including site selection, failure analysis, and ground stability.			

C203	CE303PC	Strength of Materials - I	3-1-0 (L-T-P)	4 Credits
Course outcomes: At the end of the course, the student will be able to:				
C203.1	Describe the concepts and principles, understand the theory of elasticity including strain/displacement and Hooke's law relationships			
C203.2	Recognize various types loads applied on structural components of simple framing geometries and understand the nature of internal stresses that will develop within the components.			
C203.3	To evaluate the strains and deformation that will result due to the elastic stresses developed within the materials for simple types of loading			
C203.4	Analyze various situations involving structural members subjected to plane stresses by application of Mohr's circle of stress;			
C203.5	Frame an idea to design a system, component, or process			

C204	MA304BS	Probability and Statistics	3-1-0 (L-T-P)	4 Credits
Course outcomes: At the end of the course, the student will be able to:				
C204.1	Formulate and solve problems involving random variables and apply statistical methods for analysing experimental data.			
C204.2	Learn about discrete probability distributions, specifically the binomial and Poisson distributions, and how to evaluate their statistical parameters,			
C204.3	Study continuous random variables, their properties, and distribution functions, focusing on the normal, exponential, and gamma distributions			
C204.4	Apply statistical methods like curve fitting using the least squares method, fitting various types of curves			
C204.5	Learn about hypothesis testing, including tests of significance for large and small samples, such as proportion tests, mean difference tests, and variance ratio tests.			

C205	CE305PC	Fluid Mechanics	3-1-0 (L-T-P)	4 Credits
Course outcomes: At the end of the course, the student will be able to:				
C205.1	Understand the concepts of fluid properties and the relationship between them and to obtain the principles of continuity, momentum and energy as applied to fluid motion			
C205.2	Interprect key concepts of fluid kinematics and dynamics to solve problems in a fluid flow			
C205.3	Formulate the eulers and bernoullis equation with practical applications, to determine the discharge over notches and weirs and to apply the momentum equation for a pipe bend			
C205.4	Evalute the head lossess in pipes flow between parallel plates and to sove the pipe network problems			
C205.5	Demonstrate boundary layer concepts and to explain the seperation of the boundary layer			

C206	CE306PC	Surveying Lab	0-0-3 (L-T-P)	1.5 Credits
Course outcomes: At the end of the course, the student will be able to:				
C206.1	Apply the principle of surveying for civil Engineering Applications			
C206.2	Calculation of areas, Drawing plans and contour maps using different measuring equipment at field level			
C206.3	Write a technical laboratory report			
C206.4	understand and apply tachometric surveying techniques to measure heights and distances.			
C206.5	Acquire the skill to set out curves using a total station for precise alignment in construction projects.			

C207	CE307PC	Strength of Materials Lab	0-0-3 (L-T-P)	1.5 Credits
Course outcomes: At the end of the course, the student will be able to:				
C207.1	Configure & Operate a data acquisition system using various testing machines of solid materials			
C207.2	Compute and Analyze engineering values (e.g. stress or strain) from laboratory measurements.			
C207.3	Study material behavior under compressive loads and predict failure modes.			
C207.4	Compare experimental results with theoretical predictions for beam deflection			
C207.5	Write a technical laboratory report			

C208	CE308PC	Engineering Geology Lab	0-0-2 (L-T-P)	1 Credits
Course outcomes: At the end of the course, the student will be able to:				
C208.1	Understands the method and ways of investigations required for Civil Engg projects			
C208.2	Identify the various rocks, minerals depending on geological classifications			
C208.3	Couple geologic expertise with the engineering properties of rock and unconsolidated materials in the characterization of geologic sites for civil work projects and the quantification of processes such as rock slides and settlement.			
C208.4	Apply structural geology principles to solve problems related to folds, faults, and unconformities.			
C208.5	Develop skills in the identification of crystals and crystal systems to connect their properties to geological processes.			

C209	*MC309	Constitution of India	3-0-0 (L-T-P)	0 Credits
Course outcomes: At the end of the course, the student will be able to:				
C209.1	Understand features and perspectives of the Indian constitution			
C209.2	Demonstrate fundamental rights, duties and directive principles			
C209.3	Describe federal structure, parliament system, powers of president and amendment of constitutional procedures			
C209.4	Interpret emergency provisions and local self government			
C209.5	Apply right to equality, right to life and personal liberty			

II YEAR/II-SEMESTER

C210	EE401ES	Basic Electrical and Electronics Engineering	3-0-0 (L-T-P)	3 Credits

Course outcomes: At the end of the course, the student will be able to:

C210.1	To analyze and solve electrical circuits using network laws and theorems.
C210.2	To understand and analyze basic Electric and Magnetic circuits
C210.3	To study the working principles of Electrical Machines
C210.4	To introduce components of Low Voltage Electrical Installations
C210.5	To identify and characterize diodes and various types of transistors.

C211	CE402ES	Basic Mechanical Engineering for Civil Engineers	3-0-0 (L-T-P)	3 Credits
Course outcomes: At the end of the course, the student will be able to:				
C211.1	To understand the mechanical equipment for the usage at civil engineering systems			
C211.2	To familiarize with the general principles and requirement for refrigeration, manufacturing Process			
C211.3	To realize the techniques employed to construct civil engineering systems.			
C211.4	Learn various manufacturing processes like sheet metal work, welding, gas cutting, brazing, soldering, and casting, including their equipment and techniques equipment and techniques.			
C211.5	Gain knowledge of machine tools such as lathe, drilling, milling, and grinding machines, along with their operations and industrial applications.			

C212	CE403PC	Building Materials, Construction and Planning	3-0-0 (L-T-P)	3 Credits
Course outcomes: At the end of the course, the student will be able to:				
C212.1	Define the Basic terminology that is used in the industry			
C212.2	Categorize different building materials, properties and their uses			
C212.3	Understand the Prevention of damage measures and good workmanship			
C212.4	Explain different building services			
C212.5	Gain knowledge of building by-laws and regulations for safe and compliant construction practices.			

C213	CE404PC	Strength of Materials - II	3-0-0 (L-T-P)	3 Credits
Course outcomes: At the end of the course, the student will be able to:				
C213.1	Describe the concepts and principles, understand the theory of elasticity, and perform calculations, relative to the strength of structures and mechanical components in particular to torsion and direct compression;			
C213.2	To evaluate the strains and deformation that will result due to the elastic stresses developed within the materials for simple types of loading			
C213.3	Analyze strength and stability of structural members subjected to Direct, and Direct and Bending stresses;			
C213.4	Understand and evaluate the shear center and unsymmetrical bending			
C213.5	Frame an idea to design a system, component, or process			

C214	CE405PC	Hydraulics and Hydraulic Machinery	3-0-0 (L-T-P)	3 Credits
Course outcomes: At the end of the course, the student will be able to:				
C214.1	Apply their knowledge of fluid mechanics in addressing problems in open channels and hydraulic machinery.			
C214.2	Understand and solve problems in uniform, gradually and rapidly varied flows in open channel in steady state conditions			
C214.3	Apply dimensional analysis and to differentiate the model, prototype and similitude conditions for practical problems.			
C214.4	Get the knowledge on different hydraulic machinery devices and its principles that will be utilized in hydropower development and for other practical usages			
C214.5	Learn about multistage pumps, parallel operation of pumps, and their performance under various conditions.			

C215	CE406PC	Structural Analysis - I	3-0-0 (L-T-P)	3 Credits
Course outcomes: At the end of the course, the student will be able to:				
C215.1	An ability to apply knowledge of mathematics, science, and engineering			

C215.2	Analyse the statically indeterminate bars and continuous beams
C215.3	Draw strength behaviour of members for static and dynamic loading
C215.4	Calculate the stiffness parameters in beams and pin jointed trusses.
C215.5	Understand the indeterminacy aspects to consider for a total structural system

C216	CE407PC	Computer aided Civil Engineering Drawing	0-0-3 (L-T-P)	1.5 Credits
Course outcomes: At the end of the course, the student will be able to:				
C216.1	The objective of this lab is to teach the student usage of Auto cad and basic drawing fundamentals in various civil engineering applications, specially in building drawing.			
C216.2	Develop proficiency in using CAD tools like draw, modify, layers, dimensions, and text for creating accurate designs.			
C216.3	Create 2D and 3D building plans and components such as walls, doors, windows, and lintels.			
C216.4	Generate detailed sections and elevations for single and multi-storied buildings using CAD software.			
C216.5	Apply CAD techniques in various engineering domains like surveying and mechanics for practical problem-solving.			

C217	CE409PC	Hydraulics and Hydraulic Machinery Lab	0-0-3 (L-T-P)	1.5 Credits
Course outcomes: At the end of the course, the student will be able to:				
C217.1	Describe the basic measurement techniques of fluid mechanics and its appropriate application			
C217.2	Interpret the results obtained in the laboratory for various experiments			
C217.3	Discover the practical working of Hydraulic machines- different types of Turbines, Pumps, and other miscellaneous hydraulics machines			
C217.4	Compare the results of analytical models introduced in lecture to the actual behavior of real fluid flows and draw correct and sustainable conclusions			
C217.5	Write a technical laboratory report			

C218	EE409ES	Basic Electrical and Electronics Engineering Lab	0-0-2 (L-T-P)	1 Credits
Course outcomes: At the end of the course, the student will be able to:				
C218.1	To analyze and solve electrical circuits using network laws and theorems.			
C218.2	To understand and analyze basic Electric and Magnetic circuits			
C218.3	To study the working principles of Electrical Machines			
C218.4	To introduce components of Low Voltage Electrical Installations			
C218.5	To identify and characterize diodes and various types of transistors			

C219	*MC409	Gender Sensitization Lab	0-0-2 (L-T-P)	0 Credits
Course outcomes: At the end of the course, the student will be able to:				
C219.1	Developed a better understanding of important issues related to gender in contemporary India.			
C219.2	Basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.			
C219.3	How gender discrimination works in our society and how to counter it.			

C219.4	Acquire insight into the gendered division of labour and its relation to politics and economics.
C219.5	Develop a sense of appreciation of women in all walks of life.

III YEAR/I-SEMESTER

C301	CE501PC	Structural Analysis-II	3-0-0 (L-T-P)	3 Credits
Course outcomes: At the end of the course, the student will be able to:				
C301.1	Analyze the two hinged arches			
C301.2	Solve statically indeterminate beams and portal frames using classical methods			
C301.3	Sketch the shear force and bending moment diagrams for indeterminate structures			
C301.4	Formulate the stiffness matrix and analyze the beams by matrix methods			
C301.5	Understand the concept and significance of influence line diagrams for shear force and bending moment in propped cantilever beams			

C302	CE502PC	Geotechnical Engineering	3-0-0 (L-T-P)	3 Credits
Course outcomes: At the end of the course, the student will be able to:				
C302.1	Characterize and classify the soils			
C302.2	Able to estimate seepage, stresses under various loading conditions and compaction characteristics			
C302.3	Able to analyse the compressibility of the soils			
C302.4	Able to understand the strength of soils under various drainage conditions			
C302.5	Understand the importance of soil shear strength, apply Mohr-Coulomb failure theories, analyze strength parameters			

C303	CE503PC	Structural Engineering –I (RCC)	3-1-0 (L-T-P)	4 Credits
Course outcomes: At the end of the course, the student will be able to:				
C303.1	Compare and Design the singly reinforced, doubly reinforced and flanged sections			
C303.2	Design the axially loaded, uniaxial and biaxial bending columns			
C303.3	Classify the footings and Design the isolated square, rectangular and circular footings			
C303.4	Distinguish and Design the one-way and two-way slabs			
C303.5	Plan and design various types of foundations, including isolated, combined, and wall footings, ensuring structural adequacy and stability			

C304	CE504PC	Transportation Engineering	3-0-0 (L-T-P)	3 Credits
Course outcomes: At the end of the course, the student will be able to:				
C304.1	apply the knowledge of mathematics, science and engineering in the areas of traffic engineering, highway development and maintenance			
C304.2	design, conduct experiments to assess the suitability of the highway materials like soil, bitumen, aggregates and a variety of bituminous			
C304.3	design flexible and rigid highway pavements for varying traffic compositions as well as soil subgrade and environmental conditions using the standards			
C304.4	An ability to evaluate the structural and functional conditions of in-service highway pavements and provide solution in the form of routine maintenance measures			

C304.5	assess the issues related to road traffic and provide engineering solutions supported with an understanding of road user psychological and behavioural patterns

C305	CE511PE	Professional Elective-I (Concrete Technology)	3-0-0 (L-T-P)	3 Credits
Course outcomes: At the end of the course, the student will be able to:				
C305.1	Determine the properties of concrete ingredients i.e. cement, sand, coarse aggregate by conducting different tests. Recognize the effects of the rheology			
C305.2	Apply the use of various chemical admixtures and mineral additives to design cement-based materials with tailor-made properties			
C305.3	Use advanced laboratory techniques to characterize cement-based materials			
C305.4	Perform mix design and engineering properties of special concretes such as high-performance concrete, self-compacting concrete, and fibre reinforced concrete			
C305.5	Develop and apply mix design principles for concrete, ensuring durability and quality control, and gain knowledge of special concretes and their applications			

C306	SM505MS	Engineering Economics and Accountancy	2-0-0 (L-T-P)	2 Credits
Course outcomes: At the end of the course, the student will be able to:				
C306.1	To perform and evaluate present and future worth of the alternate projects and to appraise projects by using traditional and DCF Methods.			
C306.2	Analyze macroeconomic concepts like national income, inflation, and the impact of economic policies on industries			
C306.3	Evaluate investment proposals using capital budgeting techniques and the concept of the time value of money			
C306.4	Differentiate between equity and debt financing and analyze leverage concepts through basic calculations			
C306.5	Apply accounting principles, prepare financial statements, and perform cost classification and breakeven analysis			

C307	CE506PC	Highway Engineering & Concrete Technology Lab	0-0-3 (L-T-P)	1.5 Credits
Course outcomes: At the end of the course, the student will be able to:				
C307.1	Categorize the test on materials used Civil Engineering Building & Pavement constructions			
C307.2	To perform the tests on concrete for it characterization			
C307.3	To Design Concrete Mix Proportioning by Using Indian Standard Method			
C307.4	Examine the tests performed for Bitumen mixes			
C307.5	To prepare a laboratory report			

C308	CE507PC	Geotechnical Engineering Lab	0-0-3 (L-T-P)	1.5 Credits
Course outcomes: At the end of the course, the student will be able to:				
C308.1	Classify and evaluate the behavior of the soils subjected to various loads			
C308.2	Measure field density of soil using core cutter and sand replacement methods for construction quality control			
C308.3	Evaluate soil permeability using constant and variable head test methods for groundwater and drainage studies			
C308.4	Conduct direct shear tests to evaluate the shear strength parameters under controlled drainage conditions			
C308.5	Assess the swelling potential of expansive soils using the Differential Free Swell Index (DFSI) test			

C309	EN508HS	Advanced Communication Skills Lab	0-0-2 (L-T-P)	1 Credits
Course outcomes: At the end of the course, the student will be able to:				
C309.1	Acquire vocabulary and use it contextually			
C309.2	listen and speek effectively			
C309.3	develop proficiency in academic reading and writing			
C309.4	increase possibilities of job prospects			
C309.5	communicate confidently formal and informal contexts			

C310	*MC509	Intellectual Property Rights	3-0-0 (L-T-P)	0 Credits
Course outcomes: At the end of the course, the student will be able to:				
C310.1	understand Fundamentals of Intellectual property areas and its latest developments at National and International level			
C310.2	understand Trademarks acquisition and its remedies for violation			
C310.3	determine the Fundamentals of Copyrights Law, Copyrights ownership and remedies available for its violation.			
C310.4	apply their knowledge for Patent concept ,its filing and Registration			
C310.5	explain Trade secrets Law and its protection			

III YEAR/II-SEMESTER

C311	CE601PC	Hydrology & Water Resources Engineering	3-1-0 (L-T-P)	4 Credits
Course outcomes: At the end of the course, the student will be able to:				
C311.1	Understand the different concepts like hydrological cycle and precipitation used in engineering hydrology			
C311.2	Applying the various formulae used in estimation of surface and Ground water hydrology components			
C311.3	Analyzing characteristics of various hydrographs			
C311.4	Understanding the concept connect hydrology to the field requirement			
C311.5	Applying various formulae used in design discharge calculations in canals			

C312	CE602PC	Environmental Engineering	3-0-0 (L-T-P)	3 Credits
Course outcomes: At the end of the course, the student will be able to:				
C312.1	Assess characteristics of water and wastewater and their impacts			
C312.2	Estimate quantities of water and waste water and plan conveyance component			
C312.3	Design components of water and waste water treatment plants			
C312.4	Be conversant with issues of air pollution and control			
C312.5	Explore techniques for controlling Air particulate and gaseous pollutants			

C313	CE603PC	Foundation Engineering	3-0-0 (L-T-P)	3 Credits
Course outcomes: At the end of the course, the student will be able to:				

C313.1	Understand the principles and methods of Geotechnical Exploration
C313.2	Decide the suitability of soils and check the stability of slopes
C313.3	Calculate lateral earth pressures and check the stability of retaining walls
C313.4	Analyze and design the shallow foundations
C313.5	Analyze and design the deep foundations

C314	CE604PC	Structural Engineering –II (Steel)	3-0-0 (L-T-P)	3 Credits
Course outcomes: At the end of the course, the student will be able to:				
C314.1	Analyze the tension members, compression members			
C314.2	Design the tension members, compression members and column bases and joints and connections			
C314.3	Analyze and Design the beams including built-up sections and beam and connections			
C314.4	Identify and Design the various components of welded plate girder including stiffeners			
C314.5	Analyze and design industrial structures, including roof trusses, purlins, and gantry girders, considering wind loads and other relevant factors.			

C315	CE611PE	Prestressed Concrete (Professional Elective –II)	3-0-0 (L-T-P)	3 Credits
Course outcomes: At the end of the course, the student will be able to:				
C315.1	Acquire the knowledge of evolution of process of prestressing			
C315.2	Acquire the knowledge of various prestressing techniques			
C315.3	Develop skills in analysis design of prestressed structural elements as per the IS codal provisions			
C315.4	Analyze and design composite beams, accounting for differential shrinkage and stress distribution in propped and unpropped conditions			
C315.5	Assess and control deflections in prestressed concrete beams, addressing both short-term and long-term factors as per IS code requirements			

C316	CS601OE	Fundamentals of Management for Engineers (Open Elective –I)	3-0-0 (L-T-P)	3 Credits
Course outcomes: At the end of the course, the student will be able to:				
C316.1	Understand the significance of management in particular profession			
C316.2	Understand the various management functions and concepts			
C316.3	Analyze the concepts of management			
C316.4	Applications of concepts in practical aspects			
C316.5	Development of managerial skills for engineers			

C317	CE605PC	Environmental Engineering Lab	0-0-2 (L-T-P)	1 Credits
Course outcomes: At the end of the course, the student will be able to:				
C317.1	Understand about the equipment used to conduct the test procedures			
C317.2	Perform the experiments in the lab			

C317.3	Examine and Estimate water, waste water, air and soil Quality
C317.4	Compare the water, air quality standards with prescribed standards set by the local governments
C317.5	Develop a report on the quality aspect of the environment

C318	CE606PC	Computer Aided Design Lab	0-0-2 (L-T-P)	1 Credits

Course outcomes: At the end of the course, the student will be able to:

C318.1	Model the geometry of real-world structure Represent the physical model of structural element/structure
C318.2	Perform analysis
C318.3	Interpret from the Post processing results
C318.4	Design the structural elements and a system as per IS Codes
C318.5	Analysis of RCC Slab

C319	*MC609	Environmental Science	3-0-0 (L-T-P)	0 Credits
Course outcomes: At the end of the course, the student will be able to:				
C319.1	Gain knowledge about environment and ecosystem			
C319.2	Students will learn about natural resources its importance and environmental impacts of human activities on natural resources			
C319.3	Gain knowledge about the conservation of biodiversity and its importance			
C319.4	Aware students about problems of environment and pollution it impact on human ecosystem and control measures			
C319.5	Student will learn about increase in population growth and importance of the acts			

IV YEAR/I-SEMESTER

C401	CE701PC	Estimation, Costing and Project Management	3-1-0 (L-T-P)	4 Credits
Course outcomes: At the end of the course, the student will be able to:				
C401.1	Understand the principles of working out quantities for estimate of buildings.			
C401.2	Evaluate the estimates for roads and canals.			
C401.3	Analyse the rates for various items of work			
C401.4	Understand the concepts of contracts and valuation			
C401.5	Understand the construction project planning			

C402	CE712PE	GROUND IMPROVEMENT TECHNIQUES	3-0-0 (L-T-P)	3 Credits
Course outcomes: At the end of the course, the student will be able to:				
C402.1	understand the need and objectives of ground modification techniques and their relevance in civil engineering projects			
C402.2	identify and characterize problematic soils through in situ and laboratory tests			
C402.3	explore mechanical modification methods such as shallow and deep compaction techniques and their applications			

C402.4	study hydraulic modification techniques, including traditional dewatering systems, electro-osmosis, and the use of geosynthetics for drainage and seepage control
C402.5	To gain knowledge of soil reinforcement methods using inclusions like strips, grids, anchors, and nails for ground improvement and stability

C403	CE721PE	Irrigation and Hydraulic Structures (Professional Elective –IV)	3-0-0 (L-T-P)	3 Credits
Course outcomes: At the end of the course, the student will be able to:				
C403.1	Identify various types of reservoir, dam and its key parameters			
C403.2	Analyze and design the Gravity dams and Earth dams with available foundation strata			
C403.3	Understand the details of Spillway, Energy dissipation works and their design aspects			
C403.4	Understand the concepts of diversion head works and evaluate the concept of creep theories			
C403.5	Design of a irrigation system components & its types			

C404	MN700OE	HEALTH & SAFETY IN MINES(Open Elective –II)	3-0-0 (L-T-P)	3 Credits
Course outcomes: At the end of the course, the student will be able to:				
C404.1	Understand and apply methods for measuring safety performance in industrial and mining contexts			
C404.2	Apply statistical tools to analyze accidents and promote data-driven safety strategies.			
C404.3	Implement a generic approach to loss control within mining operations.			
C404.4	Utilize advanced tools like Fault Tree Analysis (FTA), Hazard and Operability Study (HAZOP), and Event Tree Analysis (ETA) for effective risk analysis.			
C404.5	Understand and apply the human behavioral approach to enhancing workplace safety.			

C405	SM702MS	Professional Practice law & Ethics	2-0-0 (L-T-P)	2 Credits
Course outcomes: At the end of the course, the student will be able to:				
C405.1	Understand the principles of professional practice and ethics, including engineering ethics, professional responsibilities			
C405.2	Comprehend the fundamental elements of contract law, including formation, performance, breach, and remedies, along with specific laws			
C405.3	Analyze arbitration, conciliation, and alternative dispute resolution (ADR) systems, their scope, processes, and applications in both domestic and international contexts.			
C405.4	Recognize the role of labor in civil engineering, methods of engagement, and relevant construction and labor laws such as the Industrial Disputes Act and RERA Act.			
C405.5	Recognize the role of labor in civil engineering, methods of engagement, and relevant construction and labor laws such as the Industrial Disputes Act and RERA Act.			

C406	CE703PC	Industrial Oriented Mini Project/ Summer Internship	0-0-0 (L-T-P)	2* Credits
Course outcomes: At the end of the course, the student will be able to:				
C406.1	Apply theoretical knowledge to practical problems in civil engineering by designing and implementing solutions for real-world challenges			
C406.2	Demonstrate proficiency in the use of modern tools, software, and equipment for planning, analysis, and execution of civil engineering projects			
C406.3	Enhance teamwork, communication, and project management skills by collaborating effectively in a professional setting			
C406.4	Analyze and interpret data to assess the performance and sustainability of civil engineering designs and solutions			
C406.5	Develop innovative approaches to solve engineering problems while adhering to ethical, safety, and environmental standards			

C407	CE704PC	Seminar	0-0-2 (L-T-P)	1 Credits
Course outcomes: At the end of the course, the student will be able to:				
C407.1	Spell for basic concepts of science and technology			
C407.2	Contrast the understanding perceptive of techniques applicable to their domain			
C407.3	Construct the solutions upon their own knowledge			
C407.4	Improve their Presentation and Communication skills			
C407.5	Make up them to pursue their placements and higher studies			

C408	CE705PC	Project Stage - I	0-0-6 (L-T-P)	3 Credits
Course outcomes: At the end of the course, the student will be able to:				
C408.1	Ability to investigate and solve complex engineering problems faced during the project work.			
C408.2	Ability to apply tools and techniques to complex engineering activities with an understanding of limitations in the project work.			
C408.3	Ability to provide solutions as per societal needs with consideration to health, safety, legal and cultural issues considered in the project work.			
C408.4	Understanding of the impact of the professional engineering solutions in environmental context and need for sustainable development experienced during the project work.			
C408.5	Ability to function effectively as an individual as experienced during the project work.			

IV YEAR/II-SEMESTER

C409	CE812PE	Environmental Impact Assessment (Professional Elective -V)	3-0-0 (L-T-P)	3 Credits
Course outcomes: At the end of the course, the student will be able to:				
C409.1	Identify the environmental attributes to be considered for the EIA study			
C409.2	Formulate objectives of the EIA studies			
C409.3	Identify the methodology to prepare rapid EIA			
C409.4	Prepare EIA reports and environmental management plans			
C409.5	Preparation of EIA for developmental projects, making assessment decisions and Water Resources Project			

C410	CE821PE	Airports, Railways and Waterways (Professional Elective –VI)	3-0-0 (L-T-P)	3 Credits
Course outcomes: At the end of the course, the student will be able to:				
C410.1	An ability to design of runways and taxiways			
C410.2	Define the different components of railway and its permanent way			
C410.3	Analyze the geometric design of railway and its super elevation design			
C410.4	Explain the concept of signal and interlocking			
C410.5	Understand the concept of harbour and other coastal structure			

C411	MT802OE	TOTAL QUALITY MANAGEMENT (Open Elective –III)	3-0-0 (L-T-P)	3 Credits
Course outcomes: At the end of the course, the student will be able to:				
C411.1	Understand the fundamentals of Total Quality Management (TQM) and its impact on organizational performance.			
C411.2	Evaluate the role of marketing, sales, and supplier relationships in achieving customer satisfaction			
C411.3	Adopt a systems approach to transition from traditional management to a TQM-oriented organization			
C411.4	Define and classify the components of quality costs, including prevention, appraisal, and failure costs.			
C411.5	Understand the requirements for ISO 9000 documentation and the importance of third-party audits in certification.			

C412	CE801PC	Project Stage - II	0-0-14 (L-T-P)	7 Credits
Course outcomes: At the end of the course, the student will be able to:				
C412.1	Ability to investigate and solve complex engineering problems faced during the project work.			
C412.2	Ability to apply tools and techniques to complex engineering activities with an understanding of limitations in the project work.			
C412.3	Ability to provide solutions as per societal needs with consideration to health, safety, legal and cultural issues considered in the project work.			
C412.4	Understanding of the impact of the professional engineering solutions in environmental context and need for sustainable development experienced during the project work.			
C412.5	Ability to function effectively as an individual as experienced during the project work.			

B. TECH (R18) MECHANICAL ENGINEERING COURSE OUTCOMES

3.1.1 Course Outcomes (Cos)

(SAR should include course outcomes of one couse from each semester of study, however, should be prepar
all courses and made available as evidence)

I YEAR/I-SEMESTER

C101	MA101BS	Mathematics-I	3-1-0 (L-T-P)	4 Cre

Course outcomes: At the end of the course, the student will be able to:

C101.1	Write the matrix representation of a set of linear equations and to analyze the solution of the sy of equations
C101.2	Find the Eigen values and Eigen vectors and reduce the quadratic form to canonical form by orthogonal transformations.
C101.3	Analyze the nature of sequence and series.
C101.4	Solve the applications on the mean value theorems and evaluate the improper integrals using B and Gamma functions
C101.5	Find the extreme values of functions of two variables with/ without constraints.

C102	PH102BS	Engineering Physics	3-1-0 (L-T-P)	4 Cre

Course outcomes: At the end of the course, the student will be able to:

C102.1	compare simple and damped harmonic oscillations
C102.2	illustrate the interference and diffraction phenomena of light
C102.3	Examine the mechanism of various lasers and holography
C102.4	demonstrate the propagation of light in optical fiber
C102.5	Analyze the properties of nano materials

C103	CS103ES	Programming for Problem Solving	3-1-0 (L-T-P)	4 Cre

Course outcomes: At the end of the course, the student will be able to:

C103.1	Understand the basic s of computers, algorithms and flowcharts for computer problems
C103.2	Apply different types of control structures in computer programming
C103.3	Develop programs that make use of concepts such as arrays, pointers, strings, structures and file
C103.4	Develop programs using modular approach
C103.5	Solve searching and sorting problems

C104	ME104ES	Engineering Graphics	1-0-4 (L-T-P)	3 Cre

Course outcomes: At the end of the course, the student will be able to:

C104.1	Understand basic engineering drawing standards and curves.
C104.2	Understand the system of projection with respect to the reference planes of various objects.
C104.3	Construct the internal details of cut section models.
C104.4	Build the development of solid surfaces.
C104.5	Design the 3D isometric view from the 2D orthographic views and vice versa.

C105	PH105BS	Engineering Physics Lab	0-0-3 (L-T-P)	1.5 Cr

Course outcomes: At the end of the course, the student will be able to:

C105.1	Learn the usage of signal generator and spectrometer.
C105.2	Understand and determine the wave length of various light sources by using principles of interfe and diffraction.
C105.3	Practically observe resonance phenomenon and determine the selectivity parameters in LCR circ

C105.4	Study the numerical aperture and bending losses in optical enable them to apply in electronic engineering devices.
C105.5	Understand the concept of elastic behavior of matter by practically observing the SHM and mechanical waves on the string.

C106	CS106ES	Programming for Problem Solving Lab	0-0-3 (L-T-P)	1.5 Cr

Course outcomes: At the end of the course, the student will be able to:

C106.1	Write the algorithms and draw flowcharts for solving Mathematical and Engineering problems.
C106.2	Apply data types and operators in data processing applications.
C106.3	Design and develop Computer programs using decision making statements, iteration, function a recursion.
C106.4	Demonstrate an understanding of computer programming language concepts using array and structures.
C106.5	Implement Computer programs, analyzes, and interprets the concept of pointers and file handlir and their usage.

C107	*MC109ES	Environmental Science	3-0-0 (L-T-P)	0 Cre

Course outcomes: At the end of the course, the student will be able to:

C107.1	gain knowledge about environment and ecosystem
C107.2	students will learn about natural resources its importance and environmental impacts of human activities on natural resources
C107.3	gain knowledge about the conservation of biodiversity and its importance
C107.4	aware students about problems of environment and pollution it impact on human ecosystem an control measures
C107.5	student will learn about increase in population growth and importance of the acts

I YEAR/II-SEMESTER

C108	MA201BS	Mathematics – II	3-1-0 (L-T-P)	4 Cre

Course outcomes: At the end of the course, the student will be able to:

C108.1	Identify whether the given differential equation of first order is exact or not.
C108.2	Apply the concept of higher differential equation to real World problems.
C108.3	Evaluate the multiple integrals and apply the concept to find areas volumes.
C108.4	Understand the importance of vector operators and their physical significance
C108.5	Evaluate the line, surface and volume integrals and converting them from one to another.

C109	CH202BS	CHEMISTRY	3-1-0 (L-T-P)	4 Cre

Course outcomes: At the end of the course, the student will be able to:

C109.1	The concept of molecular and atomic orbital's and band theory related to conductivity
C109.2	Application of different methods to convert hard water into soft water
C109.3	Apply the electrochemistry concept to control corrosion process
C109.4	Analysis of reaction mechanism of organic molecules and synthesis drug moleculesa
C109.5	Application of basic techniques of spectroscopy in medical and other field

C110	ME203ES	Engineering Mechanics	3-1-0 (L-T-P)	4 Cre
Course outcomes: At the end of the course, the student will be able to:				
C110.1	Draw free body diagrams for resultant forces and moments			
C110.2	Identify the centroid and moment of inertias for given sections.			
C110.3	Apply laws of mechanics for efficiency of simple machines with consideration of frictional forces			
C110.4	Analyse the motions of trajectory characteristics.			
C110.5	Apply D Alemberts principle for motions of rigid bodies.			

C111	ME205ES	Engineering Workshop	1-0-3 (L-T-P)	2.5 C
Course outcomes: At the end of the course, the student will be able to:				
C111.1	Apply suitable tools for preparing different components of engineering processes, including mat			
C111.2	Students are able to build tin metal parts in real-world applications.			
C111.3	Practice on tools in foundry, able to understand the properties of mould making			
C111.4	Apply basic electrical engineering knowledge to house wiring practice			
C111.5	Practice in fabrication of components using methods like welding and blacksmithy.			

C112	EN205HS	English	2-0-0 (L-T-P)	2 Cre
Course outcomes: At the end of the course, the student will be able to:				
C112.1	Better understanding of nuances of English language through audio-visual experience & group activities			
C112.2	classify the given texts and respond appropriately			
C112.3	illustrate confidently in various contexts and different cultures			
C112.4	acquire basic proficiency In english including reading and listening comprahension , writing and speaking skills			
C112.5	analyse the language emphasis on vocabulary and grammar			

C113	CH206ES	Engineering Chemistry Lab	0-0-3 (L-T-P)	1.5 Cr
Course outcomes: At the end of the course, the student will be able to:				
C113.1	Determination of parameters like hardness and chloride content in water			
C113.2	Estimation of rate constant of reaction from concentration –time relationship			
C113.3	Determination of physical properties like adsorption and viscosity			
C113.4	Calculation of Rf values of some organic molecules by TLC technique			
C113.5	Able to perform methods such as conductometry and potentiometry in order to find out			

C114	EN207HS	English Language and Communication Skills Lab	0-0-2 (L-T-P)	1 Cr
Course outcomes: At the end of the course, the student will be able to:				
C114.1	distinguish and understand the nuances aap English language through audio visual experience ar			
C114.2	neutralization of accent for intelligibility			
C114.3	interpretation of spoken skills with clarity and confidence which intern enhance their employabi skill			
C114.4	enhance the LSRW skills			
C114.5	improve self confidence and equip interview skills			

II YEAR/I-SEMESTER

C201	MA301BS	Probability and Statistics & Complex Variables	3-1-0 (L-T-P)	4 Cre

Course outcomes: At the end of the course, the student will be able to:

C201.1	Apply the concept of random variable, Probability, Distribution in the experimental data.
C201.2	Analyze the various types of distribution in the experimental data.
C201.3	Apply the concept of Test of Hypothesis to the parametric and non parametric data.
C201.4	Analyze the complex function with reference to their Analyticity, integration using Cauchy's inte and Residue's theorem
C201.5	Develop the Taylor's and Laurent's Series expansion of Complex functions

C202	ME302PC	Mechanics of Solids	3-1-0 (L-T-P)	4 Cre

Course outcomes: At the end of the course, the student will be able to:

C202.1	Understand the behaviour of solid bodies with different types of loads
C202.2	Apply the shear force and bending moment on different types of beams
C202.3	Analyze the deformation in members subjected to axial ,flexural and shear stresses
C202.4	Analyze compound stresses and use Mohr's circle for graphical solutions
C202.5	Analyze stress and strain in thin-walled cylindrical and spherical shells

C203	ME303PC	Material Science and Metallurgy	3-0-0 (L-T-P)	3 Cre

Course outcomes: At the end of the course, the student will be able to:

C203.1	Apply the knowledge of crystal structures and imperfections to understand the mechanical prop of materials.
C203.2	Analyze the Iron-Carbon phase diagram to explain the properties of different types of steels and irons.
C203.3	Interpret Isothermal Transformation (IT) diagrams for Fe-C alloys for the development of microstructures during heat treatments
C203.4	Analyze surface hardening processes and determine the appropriate process for different applications.
C203.5	Understand the principles of alloying steel ,the properties of copper and copper alloy,characteris of aluminum and aluminum-based alloys and applications of cast irons

C204	ME304PC	Production Technology	3-0-0 (L-T-P)	3 Cre

Course outcomes: At the end of the course, the student will be able to:

C204.1	Understand the steps involved in casting, requirements and applications of casting
C204.2	Classify various arc, gas, and resistance welding processes
C204.3	Inspect the defects and weldments by various NDT techniques
C204.4	Prepare sheet metal working processes like rolling, bending drawing and their applications to pr various shapes and products.
C204.5	Illustrate the concept of extrusion process and forging process for the typical component.

C205	ME305PC	Thermodynamics	3-1-0 (L-T-P)	4 Cre

Course outcomes: At the end of the course, the student will be able to:

C205.1	Understand the basics of Thermodynamics
C205.2	Apply first and second laws of thermodynamics to different systems
C205.3	Determine the feasibility of a process w.r.to entropy changes
C205.4	Apply concepts of thermodynamic property relations to ideal gas and real gases
C205.5	Evaluate performance of power cycles and refrigeration cycles

C206	ME306PC	Production Technology Lab	0-0-2 (L-T-P)	1 Cre

Course outcomes: At the end of the course, the student will be able to:

C206.1	Analyze the given problem and conducts investigation on the experimental setup.
C206.2	Operate different types of welding machines
C206.3	Perform operations on mechanical press.
C206.4	get familiarity with processing of Plastics
C206.5	Effectively communicate and explain the experimental analysis.

C207	ME307PC	Machine Drawing Practice	0-0-2 (L-T-P)	1 Cre

Course outcomes: At the end of the course, the student will be able to:

C207.1	visualize an object and convert it into a drawing.
C207.2	Remember theconventional representation of various machining and mechanical details
C207.3	Remember the threads, bolts, nuts, stud bolts, tap bolts, set screws,Keys, cottered joints and knuckle joint
C207.4	To become conversant with 2-D and 3-D drafting
C207.5	To gain knowledge of Riveted joints, shaft coupling, pipe joints.

C208	ME308PC	Material Science and Mechanics of Solids Lab	0-0-2 (L-T-P)	1 Cre

Course outcomes: At the end of the course, the student will be able to:

C208.1	Understand the relationship between microstructure and material properties
C208.2	Understand the effects of alloying elements and carbon content on the properties of steels, cast irons, and non-ferrous alloys.
C208.3	Understand the crystal models to visualize how these affect material properties
C208.4	Evaluate the toughness of materials using impact tests to understand their performance under dynamic loads
C208.5	Select appropriate materials for specific applications based on their mechanical properties, microstructure, and behavior under different loading conditions

C209	*MC309	Constitution of India	3-0-0 (L-T-P)	0 Cre

Course outcomes: At the end of the course, the student will be able to:

C209.1	Understand features and perspectives of the Indian constitution
C209.2	Demonstrate fundamental rights, duties and directive principles
C209.3	Describe federal structure, parliament system, powers of president and amendment of constitut procedures
C209.4	Interpret emergency provisions and local self government
C209.5	Apply right to equality, right to life and personal liberty

II YEAR/II-SEMESTER

C210	EE401ES	Basic Electrical and Electronics Engineering	3-0-0 (L-T-P)	3 Cre

Course outcomes: At the end of the course, the student will be able to:

C210.1	Apply the concepts of KVL/KCL and network theorems in solving DC circuits
C210.2	Understand and Analyze the AC fundamentals, AC circuits, phase relation and quality factor
C210.3	Identify the application areas of a single phase two winding transformer as well as an auto transformer and calculate their efficiency. Also identify the connections of a three phase transfo
C210.4	Illustrate the working principles of induction motor, synchronous machine as well as DC machine employ them in different area of applications

C210.5	Describe the components of low voltage electrical installations and perform elementary calculat for energy consumption

C211	ME402PC	Kinematics of Machinery	3-1-0 (L-T-P)	4 Cre

Course outcomes: At the end of the course, the student will be able to:

C211.1	Design a kinematic mechanism for a machine
C211.2	Calculate the unknown velocity, acceleration of a machine component.
C211.3	Design a cam and follower for I.C engines
C211.4	Analyze the length of path of contact, arc of contact, contact ratio, maximum velocity of sliding, number of pairs of teeth in contact , angle turn, just making contact, just leaving contact, pitch
C211.5	Design mechanical drives for suitable application

C212	ME403PC	Thermal Engineering - I	3-1-0 (L-T-P)	4 Cre

Course outcomes: At the end of the course, the student will be able to:

C212.1	Understand main idea and importance behind the 2 - S and 4 - S IC engines.
C212.2	To analyse the working of the basic components in the IC engines, Compressors.
C212.3	Understand the combustion process and also how it does affect the performance of the IC engin
C212.4	Apply the thermodynamic principles in the design of an IC engines, compressors and refrigeratio system
C212.5	Compare different IC engines, and gas turbines.

C213	ME404PC	Fluid Mechanics and Hydraulic Machines	3-1-0 (L-T-P)	4 Cre

Course outcomes: At the end of the course, the student will be able to:

C213.1	Study the concepts of fluid properties and determine the pressure head of a fluid in a pipe by us manometer
C213.2	To analyse the stress-strain, humidity, force, torque and power of various instruments.
C213.3	Understand the Navier-Stoke's Equations and Boundary layer concepts
C213.4	calculate various parameters of given turbines for a hydropower plant.
C213.5	Identify the different hydraulic machines with their working principles

C214	ME405PC	Instrumentation and Control Systems	3-0-0 (L-T-P)	3 Cre

Course outcomes: At the end of the course, the student will be able to:

C214.1	To identify and eliminate the errors for measuring systems in typical instruments.
C214.2	To construct various transducers to measure the displacement, temperature and pressure.
C214.3	To apply the various methods to measure level, flow, speed, acceleration and vibration for instruments
C214.4	To analyse the stress-strain, humidity, force, torque and power of various instruments.
C214.5	To apply first and second order mechanical systems for different control systems.

C215	EE409ES	Basic Electrical and Electronics Engineering Lab	0-0-2 (L-T-P)	1 Cre

Course outcomes: At the end of the course, the student will be able to:

C215.1	Illustrate the application of KVL/KCL and network theorems to DC electrical circuit
C215.2	Analyze the power factor and measure power of single phase and three phase AC electrical circu
C215.3	Design and implement Sequential logic circuits.

C215.4	Calculate efficiency of a single-phase transformer and DC machine.
C215.5	Demonstrate speed measurement and speed reversal of three phase induction motor and identi the type of DC and AC machines based on their construction

C216	ME407PC	Fluid Mechanics and Hydraulic Machines Lab	0-0-2 (L-T-P)	1 Cr

Course outcomes: At the end of the course, the student will be able to:

C216.1	Perform experiments to determine the flow coefficient for Venturi &Orifice meters
C216.2	To find the coefficient of force acting by impact of jet on varity of vanes
C216.3	determine coefficient of friction and minor losses by apparatus
C216.4	Calibration by varing the flow rate on various water pumps
C216.5	perform test on various water turbines.

C217	ME408PC	Instrumentation and Control Systems Lab	0-0-2 (L-T-P)	1 Cr

Course outcomes: At the end of the course, the student will be able to:

C217.1	Identify and eliminate the errors for measuring systems in typical instruments.
C217.2	Construct various transducers to measure the displacement, temperature and pressure.
C217.3	Apply the various methods to measure level, flow, speed, acceleration and vibration for instrum
C217.4	Analyse the stress-strain, humidity, force, torque and power of various instruments.
C217.5	Apply first and second order mechanical systems for different control systems.

C218	*MC409	Gender Sensitization Lab	0-0-2 (L-T-P)	0 Cr

Course outcomes: At the end of the course, the student will be able to:

C218.1	Developed a better understanding of important issues related to gender in contemporary India.
C218.2	Basic dimensions of the biological, sociological, psychological and legal aspects of gender. This w achieved through discussion of materials derived from research, facts, everyday life, literature a film.
C218.3	How gender discrimination works in our society and how to counter it
C218.4	Acquire insight into the gendered division of labour and its relation to politics and economics
C218.5	Develop a sense of appreciation of women in all walks of life

III YEAR/I-SEMESTER

C301	ME501PC	Dynamics of Machinery	3-1-0 (L-T-P)	4 Cre

Course outcomes: At the end of the course, the student will be able to:

C301.1	Analyze the effect of a gyroscope on ships, aeroplanes and automobile
C301.2	Work on important machine elements like clutches, brakes, flywheels, governors.
C301.3	Analyze the theory involved in balancing of rotating and reciprocating members.
C301.4	Estimate the unbalanced forces in a multi-cylinder reciprocating engine.
C301.5	Understand longitudinal, transverse and torsional vibrations so as to avoid resonance.

C302	ME502PC	Design of Machine Members-I	3-0-0 (L-T-P)	3 Cre

Course outcomes: At the end of the course, the student will be able to:

C302.1	Apply the knowledge of the design, material selection, component behaviour subjected to loads criteria of failure.
C302.2	Analyse the cyclic loading for solid bodies

C302.3	Design a riveted, welded and bolted joints under bending, torsion and eccentric loading.
C302.4	Estimate the stresses in types of cotter and knuckle joints
C302.5	Design a solid, hallow shafts for combined loads and shaft coupling

C303	ME503PC	Metrology & Machine Tools	3-0-0 (L-T-P)	3 Cre

Course outcomes: At the end of the course, the student will be able to:

C303.1	Apply cutting mechanics to metal machining based on cutting force and power consumption
C303.2	Operate lathe, milling, drill press, grinding, shaping and planning machines etc.
C303.3	Improve the surface finish to improve the quality of the product.
C303.4	Inspect the machined components according to specifications through measuring instruments s as GO & NO GO gauges, bevel protractor ,sine bar, CMM etc.
C303.5	Evaluate the quality of the machine tool with alignment test.

C304	SM504MS	Business Economics and Financial Analysis	3-0-0 (L-T-P)	3 Cre

Course outcomes: At the end of the course, the student will be able to:

C304.1	Understand the various forms of business and the impact of economic variables on the Business.
C304.2	Apply the concepts of Demand and Supply under given market conditions.
C304.3	Apply the concepts of production function, Cost, Market Structure, Pricing and BEP analysis for managerial decision making.
C304.4	Ascertain financial performance and financial position of an organization.
C304.5	Analyze and interpret the financial statement through Ratio analysis and Funds flow statement a Cash flow statement.

C305	ME505PC	Thermal Engineering -II	3-0-0 (L-T-P)	3 Cre

Course outcomes: At the end of the course, the student will be able to:

C305.1	Describe a steam power cycle with its operational parameters and constraints, determine its hea input, power output and efficiency and also modify the cycle
C305.2	To Classify steam boilers and also explain the thermodynamic analysis of nozzles
C305.3	To Analyze the working principle of impulse turbines and determine the work done and efficienc the impulse turbines
C305.4	To Analyze the working of reaction turbines and determine the work done and efficiency of the reaction turbines
C305.5	To Compare the steam condensers and their thermodynamic analysis

C306	ME506PC	Operations Research	3-0-0 (L-T-P)	3 Cre

Course outcomes: At the end of the course, the student will be able to:

C306.1	Understand and analyze managerial problems in industry so that they will use resources (staffing capital,machine) more effectively and formulate mathematical models for quantitative analysis
C306.2	Formulate and Solve the optimum solution of transportation and integer programming models
C306.3	Analyze the sequencing Problem and Game theory problems and allocates jobs to machines appropriately without any loss of time
C306.4	find the path of the Que in Queing theory to solve the queing theory problems

C307	ME507PC	Thermal Engineering Lab	0-0-2 (L-T-P)	1 Cre

Course outcomes: At the end of the course, the student will be able to:

C307.1	Understand the complete operation of 2 stroke and 4 stroke I.C engines which can be further confirmed through V.T.D and P.T.D
C307.2	Find the performance of 2-S and 4-S engines and the variation of various performance paramete with load and speed.
C307.3	Know how to balance the heat energy available in engine cylinder after the combustion process
C307.4	Analyze the performance of the variable compression ratio engine with computerized set up whi enables the understanding of pressure variation with crank angle during a cycle of operation.
C307.5	Understand the working and performance evaluation of mechanical power consuming devices lil compressors

C308	ME508PC	Metrology & Machine Tools Lab	0-0-2 (L-T-P)	1 Cre

Course outcomes: At the end of the course, the student will be able to:

C308.1	Operate on lathe machine, shaper, planer & slotter for different shapes on work piece
C308.2	practice on grinding machine for surface finish.
C308.3	work on milling & drilling machine for holes and gear cuts.
C308.4	Demonstrate the use of instrument optical flates ,sine bars spirite level ,surface pale and alignm test .
C308.5	How to calibrate LVDT and resistance strain gaugeCalibration of Measuring Instruments by Vern Caliper, Micromete, Gear tooth Vernier Caliper, tool maker microscope .

C309	ME509PC	Kinematics & Dynamics Lab	0-0-2 (L-T-P)	1 Cre

Course outcomes: At the end of the course, the student will be able to:

C309.1	Investigate the effect of varying mass on the center of the sleeve in Porter and Proell governors
C309.2	Analyze and determine the state of balance for primary and secondary forces in machines,Perfo static and dynamic balancing for single rotating mass system
C309.3	Determine the time period, amplitude, and frequency for an un-damped free longitudinal vibrati single-degree spring-mass systems,Calculate the frequency of torsional vibrations for a given roc
C309.4	Analyze the motion of the follower based on the given cam profile and the effects of gyroscopic forces for various types of motion.
C309.5	Calculate the time period and natural frequency of a simple pendulum and compound pendulum

C310	*MC510	Intellectual Property Rights	3-0-0 (L-T-P)	0 Cr

Course outcomes: At the end of the course, the student will be able to:

C310.1	Understand Fundamentals of Intellectual property areas and its latest developments at National
C310.2	Understand Trademarks acquisition and its remedies for violation
C310.3	Determine the Fundamentals of Copyrights Law, Copyrights ownership and remedies available fo
C310.4	Apply their knowledge for Patent concept ,its filing and Registration
C310.5	Explain Trade secrets Law and its protection

III YEAR/II-SEMESTER

C311	ME601PC	Design of Machine Members-II	3-0-0 (L-T-P)	3 Cre

Course outcomes: At the end of the course, the student will be able to:

C311.1	Design a type of bearings by using different empirical relations
C311.2	Design a connecting rod and piston with different forces acting on it.
C311.3	Analyse the stresses and deflections on mechanical springs
C311.4	Evaluate the transmission of power, efficiencies on belts and pulleys
C311.5	Design of gears using AGMA procedure involving lewis and Buckingham equations.

C312	ME602PC	Heat Transfer	3-1-0 (L-T-P)	4 Cre

Course outcomes: At the end of the course, the student will be able to:

C312.1	Application of Fourier's Law and Heat Conduction Equations
C312.2	Develop insights into the practical applications of transient and steady-state conduction in engineering, including thermal system design and process optimization
C312.3	Analyze the physical and thermal behavior of different convective systems in engineering applica
C312.4	Emphasizes the theoretical, analytical, and practical skills necessary for understanding and desig systems involving internal flows, free convection, and heat exchangers
C312.5	Theoretical understanding, analytical techniques, and practical applications required for phase-change and radiation heat transfer systems

C313	ME603PC	CAD & CAM	3-0-0 (L-T-P)	3 Cre

Course outcomes: At the end of the course, the student will be able to:

C313.1	Develop the objects in 2D & 3D space.
C313.2	Analyse the complicated shapes through behavior of curves and surfaces.
C313.3	Fabricate industrial components through CNC programming.
C313.4	Optimize the material using design softwares.
C313.5	Improves quality and standards of a product through proper planning

C314	ME611PE	Unconventional Machining Processes (PE-1)	3-1-0 (L-T-P)	4 Cre

Course outcomes: At the end of the course, the student will be able to:

C314.1	Differentiate conventional and Unconventional Machining Processes and Ultrasonic Machining
C314.2	Understand the process capabilities of abrasive, water jet and electro-chemical machining proce
C314.3	Understand the working principle & important features of electrical discharge machining proces
C314.4	Understand the process parameters, accuracy and surface finish of electron beam & laser beam
C314.5	Understand the working principle & metal removal rate of plasma arc machining and abrasive

C315	CS601OE	Fundamentals of management (OE-I)	3-0-0 (L-T-P)	0 Cre

Course outcomes: At the end of the course, the student will be able to:

C315.1	Students should be able to demonstrate basic functional areas and approaches to Management
C315.2	Students should be able to understand and analyse the strategic planning, decision making anc Problem solving skills
C315.3	To understand organisational principles, frame work and various functional areas of HRM

C315.4	Students should be able to apply Leadership and motivational concepts.
C315.5	Students should be able to institute effective control system.

C316	ME604PC	Finite Element Methods	3-0-0 (L-T-P)	0 Cre

Course outcomes: At the end of the course, the student will be able to:

C316.1	Analyse degrees of freedom at each node of bars, trusses, beams, triangular, isoparametric and symmetric elements
C316.2	Apply finite element method to solve problems in solid mechanics, fluid mechanics and heat tran
C316.3	Formulate and solve problems in one dimensional structures including trusses, beams and frame
C316.4	Formulate FE characteristic equations for two dimensional elements and analyze plain stress, pla
C316.5	Use of ANSYS, ABAQUS, NASTRAN, etc.

C317	ME605PC	Heat Transfer Lab	0-0-2 (L-T-P)	1 Cr

Course outcomes: At the end of the course, the student will be able to:

C317.1	Perform steady state conduction experiments to estimate thermal conductivity of different materia
C317.2	Perform transient heat conduction experiment
C317.3	Estimate heat transfer coefficients in forced convection, free convection, condensation and correl with theoretical values
C317.4	Obtain variation of temperature along the length of the pin fin under forced and free convection
C317.5	Perform radiation experiments. Determine surface emissivity of a test plate and Stefan- Boltzmann constant and compare with theoretical value

C318	ME606PC	CAD & CAM Lab	0-0-2 (L-T-P)	1 Cre

Course outcomes: At the end of the course, the student will be able to:

C318.1	Develop the objects in 2D & 3D space.
C318.2	Analyse the complicated shapes through behavior of curves and surfaces.
C318.3	Fabricate industrial components through CNC programming.
C318.4	Optimize the material using design softwares.
C318.5	Improves quality and standards of a product through proper planning

C319	EN608HS	Advanced Communication Skills lab	0-0-2 (L-T-P)	1 Cre

Course outcomes: At the end of the course, the student will be able to:

C319.1	Improve the student' fluency in English,with a focus on vocabulary
C319.2	Enable them to listen to English spoken at normal conversational speed by educated English spe
C319.3	Respond appropriately in different socio-cultural and professional contexts
C319.4	Communicate their ideas relevantly and coherently in writing
C319.5	Preparing the students for placements

C320	*MC609	Environmental Science	3-0-0 (L-T-P)	0 Cre

Course outcomes: At the end of the course, the student will be able to:

C320.1	gain knowledge about environment and ecosystem
C320.2	students will learn about natural resources its importance and environmental impacts of human activities on natural resources
C320.3	gain knowledge about the conservation of biodiversity and its importance
C320.4	aware students about problems of environment and pollution it impact on human ecosystem an

C320.5	student will learn about increase in population growth and importance of the acts

IV YEAR/I-SEMESTER

C401	ME701PC	REFRIGERATIO& AIR CONDITIONING	3-0-0 (L-T-P)	3 Cr

Course outcomes: At the end of the course, the student will be able to:

C401.1	Apply the basics prinples of Refrigeration & air conditioning in practical cycles .
C401.2	Analysis of suitable compressors,condensers,evaporators and expansion devices in applications .
C401.3	selection of suitable refrigerant for the given system .
C401.4	Analyse psychrometry and human comfort conditions
C401.5	Calculate cooling load for air conditioning systems used for various applications

C402	ME711PE	ADDITIVE MANUFACTURING (PE-II)	3-0-0 (L-T-P)	3 Cr

Course outcomes: At the end of the course, the student will be able to:

C402.1	Understand the Rapid Prototype process chain.
C402.2	Understand the Liquid and solid based rapid prototyping systems.
C402.3	Understand the powder based rapid prototyping systems and rapid Tooling systems
C402.4	Understand the Rapid Prototyping Data Formats.
C402.5	Understand the additive manufacturing in different streams of applications.

C403	ME723PE	Power Plant Engineering (PE-III)	3-0-0 (L-T-P)	3 Cre

Course outcomes: At the end of the course, the student will be able to:

C403.1	Understand the knowledge on different types of HVDC transmission system, various converter configurations and analyze the Greatz circuit
C403.2	Analyze different control strategies in HVDC system
C403.3	Analyze the power flow in HVDC transmission system and solve problems in HVDC system to pro
C403.4	Demonstrate effect of faults and different protection schemes in HVDC system
C403.5	Understand effects of harmonics and designing of filter circuits for minimizing Harmonics

C404	ME733PE	Fluid power systems(PE-IV)	3-0-0 (L-T-P)	3 Cr

Course outcomes: At the end of the course, the student will be able to:

C404.1	Understand the Properties of fluids, Fluids for hydraulic systems
C404.2	Understand the governing laws. distribution of fluid power
C404.3	Design and analysis of typical hydraulic circuits.
C404.4	Understand the accessories used in fluid power system & Filtration systems
C404.5	Understand the maintenance of system.

C405	MM701OE	Surface Engineering (OE-II)	3-0-0 (L-T-P)	3 Cr

Course outcomes: At the end of the course, the student will be able to:

C405.1	Understand the need of surface engineering
C405.2	Analyze the different methods of surface engineering
C405.3	Apply the methods used in the development and use of coating technology
C405.4	Understand aspects associated with industrial applications of surface engineering
C405.5	Create engineering solutions to related industrial needs

C406	ME702PC	Industrial Oriented Mini Project/ Summer Internship	0-0-0 (L-T-P)	2* Cr

Course outcomes: At the end of the course, the student will be able to:

C406.1	Identify and define a real-world industrial problem, creating a project plan with clear objectives a timelines.
C406.2	Apply course knowledge and technical skills to design and implement a solution
C406.3	Use relevant tools and technologies to develop a working prototype or proof-of-concept.
C406.4	Collaborate within a team to manage tasks and deliver the project on time.
C406.5	Present the project results with clear documentation and demonstrations, showcasing its industr relevance.

C407	ME703PC	Seminar	0-0-2 (L-T-P)	1 Cre

Course outcomes: At the end of the course, the student will be able to:

C407.1	Conduct research and understand current technical topics in the mechanical engineering field
C407.2	Create and organize seminar content in a PPT
C407.3	Present technical content effectively and confidently to an audience
C407.4	Integrate information from various sources to support the seminar topic
C407.5	Collaborate with peers to give and receive feedback on presentations

C408	ME704PC	Project Stage - I	0-0-6 (L-T-P)	3 Cre

Course outcomes: At the end of the course, the student will be able to:

C408.1	Identify the problem by the knowledge.
C408.2	Analyze executable project modules .
C408.3	Choose efficient tools for designing project modules
C408.4	Combine all the modules through effective team work .
C408.5	Elaborate the completed task with project report

IV YEAR/II-SEMESTER

C409	MM813PE	Composite Materials (PE-V)	3-0-0 (L-T-P)	3 Cr

Course outcomes: At the end of the course, the student will be able to:

C409.1	Understand the basic mechanical behaviour of composite materials and make sound prediction on the likely behaviour of new combinations of materials
C409.2	Apply the choices made for using certain types of composites in certain applications with reference to composite properties.
C409.3	Understanding of composite properties and fabrication techniques
C409.4	Evaluation of composite behaviour, able to make realistic suggestions
C409.5	Analyse the micromechanical properties of fibre reinforced composites.

C410	ME821PE	Industrial Management (PE-VI)	3-0-0 (L-T-P)	3 Cr

Course outcomes: At the end of the course, the student will be able to:

C410.1	Apply principles of management and design the organization structure
C410.2	Apply techniques for plant location, design plant layout and value analysis
C410.3	Carry out work study to find the best method for doing the work and establish standard time for
C410.4	Apply various quality control techniques and sampling plans
C410.5	Evaluating the job and network analysis.

C411	EE800OE	BASICS OF POWER PLANT ENGINEERING (OE-III)	3-0-0 (L-T-P)	3 Cr

Course outcomes: At the end of the course, the student will be able to:

C411.1	Create awareness about various sources of energy, working of thermal power plants and combu process
C411.2	Understand how Diesel and gas power plants are functioning
C411.3	Remember about Nuclear power plants
C411.4	Understand how power is achieved from renewable sources of energy and functions of hydroele
C411.5	Apply the concepts of economics in power plants

C412	ME801PC	Project Stage - II	0-0-14 (L-T-P)	7 Cre

Course outcomes: At the end of the course, the student will be able to:

C412.1	Investigate and solve complex engineering problems faced during the project work.
C412.2	Apply tools and techniques to complex engineering activities with an understanding of limitation the project work.
C412.3	Prepare a well-organized report employing elements of technical writing and critical thinking
C412.4	Demonstrate the ability to describe, interpret and analyse technical issues and develop compete in presenting
C412.5	Effectively communicate by making an oral presentation before an evaluation committee.

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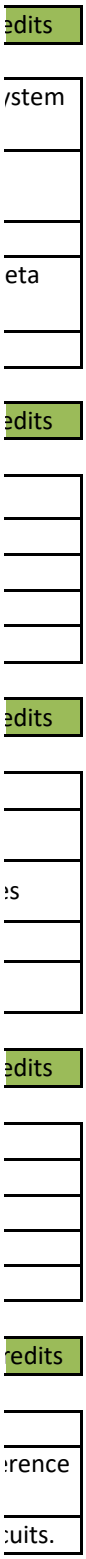

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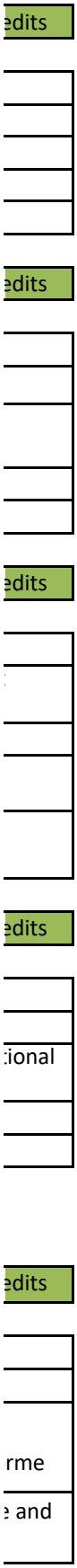
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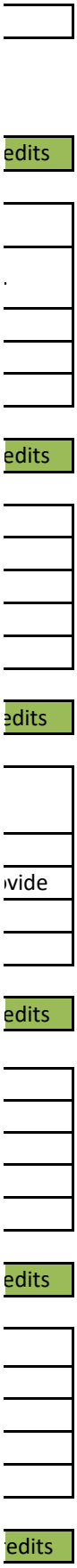
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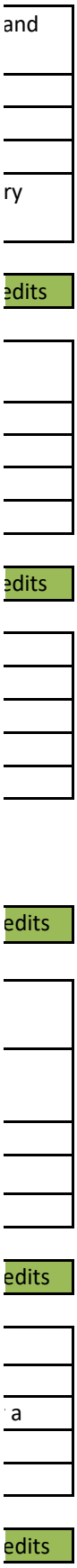
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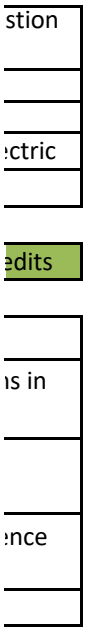
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MBA
COURSE OUTCOMES

MBA SEMESTER – I (J-22)

COURSE OUTCOMES

22MBA01: MANAGEMENT AND ORGANIZATIONAL BEHAVIOR
CO1**:** Understand the foundations of management, its evolution, and key managerial roles and skills.
CO2**:** Develop effective planning and decision-making skills within an organizational context.
CO3: Design and implement effective organizational structures and control systems.
CO4: Analyze individual and group behavior within organizations to foster effective teamwork.
CO5**:** Understand and apply leadership theories and motivational techniques to effectively lead and motivate others.

22MBA02: BUSINESS ECONOMICS
CO1**:** Understand fundamental economic principles and their application in business decision-making.
CO2**:** Analyze demand and supply, including elasticity and forecasting, to understand market dynamics.
CO3**:** Analyze production functions and cost structures to optimize resource allocation and production decisions.
CO4**:** Evaluate pricing and output decisions in various market structures, including perfect competition, monopoly, and oligopoly.
CO5**:** Understand different pricing strategies and their implications for businesses, considering factors like market structure and competition.

22MBA03: FINANCIAL REPORTING AND ANALYSIS
CO1**:** Understand the fundamental concepts, principles, and processes of accounting, including the double-entry system and GAAP.
CO2**:** Master the accounting process, including journal entries, ledger postings, trial balance preparation, and the creation of financial statements.
CO3**:** Learn to value various assets, including inventory and goodwill, and understand the impact of depreciation on financial statements.
CO4**:** Analyze financial statements using techniques like working capital analysis, funds flow analysis, and ratio analysis to assess liquidity, solvency, and profitability.
CO5**:** Analyze and interpret financial statements using advanced techniques, including Du Pont analysis, and understand the role of accounting standards in financial reporting.

22MBA04: RESEARCH METHODOLOGY AND STATISTICAL ANALYSIS
CO1**:** Understand the fundamentals of research, including its types, processes, ethical considerations, and the importance of variable conceptualization and measurement.
CO2**:** Design and conduct effective research, including selecting appropriate research designs, sampling methods, and data collection techniques.
CO3**:** Analyze and interpret data using descriptive statistics, including measures of central tendency and dispersion, and apply statistical tests like t-tests to draw inferences.
CO4**:** Conduct advanced statistical analyses, including ANOVA, Chi-square tests, correlation analysis, and regression analysis to identify relationships and patterns in data.
CO5**:** Analyze time series data, construct and interpret index numbers, and effectively communicate research findings through clear and concise report writing.

22MBA05: LEGAL AND BUSINESS ENVIRONMENT
CO1**:** Master company law principles, including incorporation, director roles, and winding-up procedures.
CO2**:** Apply contract law principles to business transactions, including sale of goods.
CO3**:** Understand negotiable instruments and their legal implications.
CO4**:** Analyze the impact of government policies on the business environment.
CO5**:** Understand legal frameworks for consumer protection, competition, and environmental sustainability.

22MBA06A: BUSINESS ETHICS AND CORPORATE GOVERNANCE (OPEN ELECTIVE - I)
CO1: Understand the foundations of business ethics, including ethical theories and the stages of moral development.
CO2: Analyze ethical considerations in various professional contexts, including marketing, HR, finance, and healthcare.
CO3: Understand the principles and importance of corporate governance, including key theories and the challenges faced by companies.
CO4: Analyze corporate governance frameworks and guidelines, including those from global organizations and Indian regulators.
CO5: Understand the concept of Corporate Social Responsibility (CSR), its implementation, and its role in sustainable business development.

22MBA07 BUSINESS COMMUNICATION LAB
CO1**:** Master effective communication principles in various contexts.
CO2**:** Develop professional writing skills for business documents.
CO3**:** Master the process of writing effective business reports and proposals.
CO4**:** Develop strong oral communication skills for presentations and job searches.
CO5**:** Understand contemporary trends and challenges in business communication.

22MBA08: STATISTICAL DATA ANALYSIS LAB
CO1: Understand the functionalities and features of statistical software (MS Excel or SPSS).
CO2: Efficiently manage and manipulate data within the software, including data entry, editing, formatting, and basic operations.
CO3: Import and analyze data from external sources, create and use templates, and generate insightful reports using charts and graphs.
CO4: Perform basic data analysis, including descriptive statistics, correlation, and regression analysis.
CO5: Conduct advanced statistical analyses, including t-tests, ANOVA, Chi-square tests, and time series forecasting.

MBA SEMESTER - II

22MBA09: HUMAN RESOURCE MANAGEMENT
CO1: Understand the evolution, role, and functions of HRM in a dynamic and globalized business environment.
CO2: Master the recruitment and selection process, including job analysis, sourcing candidates, and conducting effective interviews.
CO3: Understand the importance of training and development, and implement effective performance management systems.
CO4: Develop compensation and benefits strategies that align with organizational goals and motivate employees.
CO5: Understand and manage employee relations, including collective bargaining, grievance handling, and ensuring employee safety and well-being.

22MBA10: MARKETING MANAGEMENT
CO1: Understand the fundamentals of marketing, including its scope, concepts, and the importance of market research.
CO2: Analyze consumer behavior and develop effective product and brand strategies.
CO3: Develop customer-driven strategies through market segmentation, targeting, and positioning.
C04: Design effective distribution and promotional strategies to reach target markets.
CO5: Determine pricing strategies and understand the role of personal communication, digital marketing, and ethical considerations in marketing.

22MBA11: FINANCIAL MANAGEMENT
CO1**:** Understand the role and goals of the finance function, including risk-return trade-offs and the time value of money.
CO2**:** Evaluate investment decisions using various capital budgeting techniques and determine the appropriate cost of capital.
CO3**:** Analyze the impact of capital structure decisions on firm value, considering different capital structure theories.
CO4**:** Determine optimal dividend policies considering their impact on firm value and shareholder wealth.
CO5**:** Manage working capital efficiently by optimizing cash, receivables, and inventory levels.

22MBA12: QUANTITATIVE ANALYSIS FOR BUSINESS DECISIONS
CO1**:** Understand the fundamentals of Operations Research, including its applications, modeling process, and limitations.
CO2**:** Formulate and solve Linear Programming problems using graphical and simplex methods.
CO3**:** Solve assignment and transportation problems using appropriate algorithms and techniques.
CO4**:** Make effective decisions under uncertainty using decision theory and analyze project schedules using network analysis (PERT/CPM).
CO5**:** Analyze and model queuing systems and understand the principles of game theory.

22MBA13: ENTREPRENEURSHIP AND DESIGN THINKING
CO1: Understand the entrepreneurial mindset, its characteristics, and the role of entrepreneurship in economic development.
CO2: Develop strategic perspectives for entrepreneurial ventures, including growth strategies and managing challenges at different stages.
CO3: Identify and evaluate entrepreneurial opportunities, develop a business plan, and understand the challenges and support systems for new ventures.
CO4: Understand the principles and process of design thinking, including problem identification and analysis.
CO5: Apply design thinking principles to develop and test business ideas, create prototypes, and launch successful entrepreneurial ventures.

22MBA14: LOGISTICS AND SUPPLY CHAIN MANAGEMENT
CO1: Understand the fundamentals of supply chain management, its objectives, and the key challenges and opportunities.
CO2: Understand the role of logistics in the supply chain, including transportation, warehousing, and third-party logistics providers.
CO3: Design effective supply chain networks considering factors like distribution channels and e-business.
CO4: Evaluate supply chain performance, address the bullwhip effect, and understand the challenges of global supply chains.
CO5: Understand the importance of coordination within the supply chain and explore strategies for building strong partnerships and improving collaboration.

22MBA15C: INTERNATIONAL BUSINESS (OPEN ELECTIVE - II)
CO1**:** Understand the drivers, opportunities, and challenges of international business in a globalized world.
CO2**:** Analyze international trade theories and understand the factors influencing international trade flows.
CO3**:** Evaluate the benefits and challenges of economic integration and analyze major regional trade agreements.
CO4**:** Develop and implement effective international business strategies, including strategic alliances.
CO5**:** Understand and manage key international business operations, including production, marketing, finance, and human resources.

SUMMER INTERNSHIP

Course Outcomes: Students will be able to understand

a) Management Functions and Organizational Structure

b) Organizational Dynamics in terms of Organizational Behavior, Culture and Climate

c) Functional Domain Knowledge of an organization

d) Processes and Systems of an organization

e)External and Internal Environment Impact on the Organization

MBA SEMESTER – III

22MBA16: PRODUCTION AND OPERATIONS MANAGEMENT
CO1**:** Understand the fundamentals of Operations Management, its role within organizations, and key concepts like productivity and sustainability.
CO2**:** Analyze and design product development processes, considering factors like process planning and value engineering.
CO3**:** Determine optimal plant locations and design effective plant layouts to maximize efficiency and minimize costs.
CO4**:** Develop and implement effective scheduling strategies to optimize production flow and minimize delays.
CO5**:** Manage materials effectively through inventory control, purchasing, and stores management, ensuring efficient and cost-effective operations.

22MBA17: MANAGEMENT INFORMATION SYSTEMS
CO1: Understand the fundamentals of information systems, their role in business, and the ethical and social implications of their use.
CO2: Analyze the applications of information systems in various business functions, including CRM, ERP, and e-commerce.
CO3: Understand the processes of information systems planning, acquisition, and implementation, including various development methodologies.
CO4: Analyze and design information systems using appropriate methodologies and tools, considering organizational change and business process redesign.
CO5: Understand the threats and vulnerabilities associated with cybercrime and learn about security measures and best practices for protecting information systems.

22MBA18: BUSINESS ANALYTICS
CO1: Understand the fundamentals of data analytics, including its importance, types of data, and basic data exploration techniques.
CO2: Apply descriptive statistical measures and probability distributions to analyze and summarize data.
CO3: Utilize predictive analytics techniques, such as regression analysis, to forecast future trends and make informed decisions.
CO4: Apply data mining techniques, including clustering and classification, to discover hidden patterns and insights within large datasets.
CO5: Understand and apply simulation techniques, such as Monte Carlo simulation, to model and analyze complex systems and assess risk.

Elective Subjects

MBA MARKETING ELECTIVE

22MBA19M1: DIGITAL MARKETING
CO1: Understand the fundamentals of digital marketing, its importance, and the key components of a successful digital marketing strategy.
CO2: Explore the various channels of digital marketing, including search engine marketing, social media marketing, and email marketing.
CO3: Develop and implement effective digital marketing plans, including setting objectives, defining target audiences, and allocating budgets.
CO4: Understand search engine marketing (SEM) principles, including keyword research, online advertising, and display ad strategies.
CO5: Master social media marketing techniques and analyze the performance of digital marketing campaigns across various channels.

22MBA20M2: SALES AND PROMOTION MANAGEMENT
CO1: Understand the concept of promotion, its various tools (advertising, sales promotion, etc.), and their effective utilization in marketing.
CO2: Analyze advertising strategies, media planning, and advertising effectiveness, while considering ethical and legal aspects.
CO3: Understand the principles of sales management, including sales force planning, management, and evaluation.
CO4: Explore the role and impact of sales promotion techniques, considering ethical and legal considerations.
CO5: Analyze distribution channels, understand their role in the marketing process, and manage channel relationships effectively.

22MBA21M3: CONSUMER BEHAVIOR
CO1: Understand the fundamentals of consumer behavior, its importance in marketing, and the key factors influencing consumer decisions.
CO2: Analyze the impact of environmental factors, such as culture, social class, and family, on consumer behavior.
CO3: Understand individual consumer characteristics, including personality, motivation, perception, and attitudes.
CO4: Analyze the consumer decision-making process, from problem recognition to post-purchase behavior.
CO5: Understand the principles of consumerism, consumer rights, and ethical considerations in marketing.

MBA FINANCE ELECTIVE

22MBA19F1: SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT
CO1: Understand the fundamentals of investment, the Indian financial system, and the investment process.
CO2: Apply portfolio theory concepts to construct and evaluate investment portfolios.
CO3: Analyze and value fixed-income securities, considering factors like interest rates, bond yields, and duration.
CO4: Value equity securities using various valuation models and understand the principles of fundamental and technical analysis.
CO5: Understand derivative markets, evaluate mutual fund performance, and apply investment principles to real-world scenarios.

22MBA20F2: RISK MANAGEMENT AND FINANCIAL DERIVATIVES
CO1: Understand the fundamentals of risk management, its importance, and the various types of risks faced by financial institutions.
CO2: Learn about risk measurement tools, including capital adequacy ratios and risk metrics like VaR and CaR, with a focus on Basel Accords.
CO3: Understand the characteristics and functions of derivative markets, focusing on forward and futures contracts.
CO4: Analyze option contracts, understand option pricing models, and evaluate various option strategies.
CO5: Explore the characteristics and applications of swap contracts, including interest rate swaps, currency swaps, and equity swaps.

22MBA21F3: STRATEGIC COST AND MANAGEMENT ACCOUNTING
CO1: Understand the fundamentals of cost and management accounting, its role in decision-making, and key cost concepts.
CO2: Apply cost accounting techniques like job costing, process costing, and activity-based costing for decision-making and control.
CO3: Utilize CVP analysis to understand cost-volume-profit relationships and make informed business decisions.
CO4: Implement and evaluate budgetary control systems for effective planning and performance management.
CO5: Analyze variances between actual and standard costs to identify areas for improvement and enhance operational efficiency.

MBA HUMAN RESOURCES ELECTIVE

22MBA19H1: TALENT AND PERFORMANCE MANAGEMENT SYSTEMS
CO1: Understand the fundamentals of Talent Management, its importance, and the key competencies required for effective implementation.
CO2: Integrate competencies with key HR processes like recruitment, development, and performance management for effective talent management.
CO3: Understand the importance of performance management, its role in organizational success, and the various approaches to implementing effective performance management systems.
CO4: Implement the performance management process, including goal setting, performance measurement, and feedback mechanisms.
CO5: Develop employee development plans, implement effective reward systems, and ensure legal compliance within the performance management framework.

22MBA20H2: LEARNING AND DEVELOPMENT
CO1: Understand the fundamental concepts of learning, learning theories, and the learning process.
CO2: Develop and implement a strategic training and development process, including training needs assessment and program design.
CO3: Analyze and select appropriate training methods, including traditional methods, e-learning, and blended learning approaches.
CO4: Understand and implement effective employee development strategies, considering formal education, job experiences, and career planning.
CO5: Address contemporary training and development issues, including diversity training, team training, and virtual work arrangements.

22MBA21H3: EMPLOYEE RELATIONS
CO1: Understand the fundamentals of Industrial Relations, including its evolution, key players (trade unions, employers), and the legal framework governing labor relations in India.
CO2: Analyze the process of collective bargaining, including its legal framework, challenges, and its role in shaping labor-management relations.
CO3: Understand the importance of tripartism and social dialogue in promoting harmonious industrial relations.
CO4: Understand key labor legislations in India, including those related to wages, social security, and workplace safety.
CO5: Analyze the recent reforms in labor laws in India and their impact on industrial relations and the workforce.

MBA SEMESTER - IV

22MBA23: STRATEGIC MANAGEMENT
CO1: Understand the fundamentals of strategic management, including the strategic management process, environmental analysis, and competitive advantage.
CO2: Apply strategic analysis tools to assess industry attractiveness and competitive position, and formulate appropriate competitive strategies.
CO3: Implement strategic plans effectively by aligning organizational structure, leadership, and culture.
CO4: Analyze and implement turnaround strategies, diversification strategies, and internationalization strategies.
CO5: Evaluate strategic performance, monitor the competitive environment, and ensure continuous strategic adaptation and improvement.

MBA MARKETING ELECTIVE

22MBA24M4: INTERNATIONAL MARKETING
CO1: Understand the fundamentals of international marketing, its scope, challenges, and the factors driving internationalization.
CO2: Analyze the global environment, including political, economic, and legal factors, and their impact on international business.
CO3: Understand global customer behavior, select target markets, and choose appropriate market entry modes.
CO4: Develop and implement global marketing strategies, including product, pricing, distribution, and promotion decisions.
CO5: Implement global marketing programs, including export procedures, negotiations, and managing international marketing channels.

22MBA25M5: SERVICES MARKETING
CO1: Understand the unique characteristics of services, the growth of the service sector, and the key challenges faced by service businesses.
CO2: Analyze consumer behavior in the context of services, understand customer expectations, and build strong customer relationships.
CO3: Understand the importance of service innovation and quality, and explore methods for improving service quality and customer satisfaction.
CO4: Analyze service operations, including service delivery processes, demand and supply management, and the role of employees and customers.
CO5: Develop and implement effective service strategies, including managing distribution channels, pricing, and promotion.

22MBA26M6 MARKETING ANALYTICS
CO1: Understand the fundamentals of marketing analytics, its importance, and the role of tools like MS Excel in its implementation.
CO2: Summarize and analyze marketing data using techniques like pivot tables and data visualization to identify key trends and patterns.
CO3: Conduct customer analytics, including customer journey mapping, customer segmentation, and customer lifetime value analysis.
CO4: Apply pricing analytics techniques, including price elasticity analysis, price optimization, and price bundling, to maximize revenue and profitability.
CO5: Utilize segmentation and promotion analytics techniques, including cluster analysis, conjoint analysis, and media selection models, to optimize marketing campaigns.

MBA FINANCE ELECTIVE

22MBA24F4: INTERNATIONAL FINANCIAL MANAGEMENT
CO1: Understand the fundamentals of international financial management (IFM), its distinctions from domestic financial management, and the recent challenges in the global financial landscape.
CO2: Analyze the balance of payments (BOP), international flow of funds, and the role of institutions in facilitating international financial transactions.
CO3: Understand the evolution of the international monetary system, the current floating exchange rate regime, and the European Monetary Union (EMU).
CO4: Analyze the foreign exchange market, its participants, transactions, and currency quotations. Explore risk management strategies and international parity conditions.
CO5: Apply international financial management techniques to foreign direct investment, international capital budgeting, portfolio management, and international financing decisions. Analyze international cash flow and trade finance methods.

22MBA25F5: STRATEGIC FINANCIAL MANAGEMENT
CO1: Understand the strategic approach to financial management, including financial planning, decision-making, and agency theory.
CO2: Evaluate investment decisions under risk and uncertainty, considering factors like risk analysis, capital rationing, and the cost of capital.
CO3: Analyze strategic investment decisions, including real options, project abandonment, and the impact of inflation.
CO4: Determine optimal capital structure and dividend policies, considering factors like agency costs, financial flexibility, and the impact of financial distress.
CO5: Evaluate mergers and acquisitions, understand value-based management principles, and apply them to enhance shareholder value.

22MBA26F6: FINANCIAL ANALYTICS
CO1: Analyze financial statements using techniques like ratio analysis, trend analysis, and cash flow analysis to assess a company's financial performance.
CO2: Understand the time value of money concepts and calculate future and present values using various methods.
CO3: Evaluate investment projects using capital budgeting techniques, including NPV, IRR, and payback period, and consider risk in investment decisions.
CO4: Value equity securities using the CAPM, understand risk and return relationships, and conduct fundamental and technical analysis.
CO5: Analyze and value bonds, understand bond duration, and implement bond immunization strategies.

MBA HUMAN RESOURCES ELECTIVE

22MBA24H4: INTERNATIONAL HUMAN RESOURCE MANAGEMENT
CO1: Understand the foundations of International HRM, its importance in a globalized world, and the key challenges facing multinational corporations.
CO2: Analyze the role of IHRM in supporting the strategic objectives of multinational corporations and understand the link between HRM practices and competitive strategy.
CO3: Understand global human resource planning processes, including workforce demand forecasting, recruitment, and selection of global talent.
CO4: Develop and implement effective global training and development programs, including strategies for managing international assignments and expatriates.
CO5: Design and implement effective global performance management and compensation systems for a multinational workforce.

22MBA25H5: LEADERSHIP AND CHANGE MANAGEMENT
CO1: Understand the fundamentals of leadership, including its role, characteristics, and different leadership styles.
CO2: Analyze various leadership theories, including contingency theories, transformational leadership, and charismatic leadership.
CO3: Understand the role of leadership in organizational change and explore different change management models.
CO4: Analyze the impact of organizational culture, power dynamics, and employee resistance on organizational change.
CO5: Develop strategies for managing organizational change effectively, including the use of OD interventions and techniques

22MBA26H6: HR ANALYTICS
CO1: Understand the evolution of HRM to HCM and the significance of HR Analytics in today's business environment.
CO2: Understand the principles of HR Analytics, data collection methods, and key HR metrics relevant for analysis.
CO3: Apply HR Analytics techniques to analyze key HR processes, including recruitment, training, performance management, and compensation.
CO4: Utilize data visualization and descriptive analytics tools, such as MS Excel, to analyze and present HR data effectively.
CO5: Apply predictive and prescriptive analytics techniques to forecast HR trends, optimize decision-making, and improve business outcomes.

DEPARTMENT OF MBA VISION, MISSION, PEO 'S, PO'S & PSO'S

Vision

"Excel human capital with managerial competencies to cater the Global needs."

Mission

Providing Value-based Professional education to the managerial aspirants through innovative intellectual methodologies and enabling them as competent for the Business world challenges.

Programme Educational Objectives (PEOs)

PEO – 1: Students will exhibit themselves as an effective management professional by solving realistic problems through the use of managerial knowledge and with attention to team work, effective communication, critical evaluation and problem solving skills.

PEO – 2: Students will improve professional skills that make them for an immediate employment and for life-long learning in advanced areas of management and related fields.

PEO – 3: Students will illustrate their ability to adapt to a rapidly changing environment by having learned and apply new skills and competencies.

PEO – 4: Students will be offered with an educational foundation that drives towards excellence, leadership roles along with professional ethics for diversified career paths.

PEO – 5: Students will evaluate different business and economic issues and formulate the strategies in the global context.

PROGRAM OUTCOMES

P01: Apply conceptual business foundations to solve practical decision-making problems, both individually and as part of teams using techniques such as case studies, projects and assignments.

PO2: An ability to develop a systematic understanding of global trends.

PO3: An ability to deploy a critical awareness of current issues (e.g., diversity, social responsibility, sustainability, invention & innovation, knowledge management, etc.) in business and management which is inferred by leading edged research and practice in the field.

PO4: An ability to work effectively on multi-disciplinary teams.

PO5: An ability to analyze a problem identifies, formulate and execute the appropriate managerial skills for its solution.

P06: Recognize and address ethical issues and values and its application in organizational environment.

P07: An understanding of professional, ethical, legal, financial, marketing, sales, logistical security and social issues and responsibilities.

P08: An ability to communicate effectively through Speaking and Writing skills.

PO9: ability to synthesize and analyze an organizational data through scanning for effective decision making.

PO10: An awareness of contemporary issues.

PO11: An ability to apply latest techniques, skills, and tools necessary for managerial practice.
PO12: An ability to demonstrate integrated knowledge to play an effective managerial role.

PROGRAM SPECIFIC OUTCOMES

PS01: Examine various conditions, introspect the situations and act accordingly."

PSO2: Plan and implement strategically, by analyzing and integrating various resources effectively.