

Course Outcomes Department Wise

| Session :2023 - 24 | |
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| Department of Basic Science (First Year) | |
| 1FY104 | Communication Skills Year of study: 2023-24 |
| CO11FY104.1 | Students will develop communication skills and techniques which will felicitate their ability to work collaboratively with others. |
| CO11FY104.2 | Students will be able to use English grammer accurately that will increase their confidence in English writing and speaking |
| CO11FY104.3 | Students will be able to invent, draft, organize, abstract, elaborate and synthesize their own and other's ideas in formatted way, |
| CO11FY104.4 | Students will learn to use their imagination and produce something on their own after reading stories. |
| CO11FY104.5 | Students will be able to apply literary devices after reading stories and poems and also appreciate art in all forms. |
| 1FY201 | Engineering Mathematics-I Year of study: 2023-24 |
| CO11FY201.1 | Students will be able to evaluate volume and surface area of the solid formed by revolution of different curves. Also calculate definite integral through Beta and Gamma functions. |
| CO11FY201.2 | Students will be able to classify the concept of sequence, monotonic sequence, Cauchy's sequence and infinite series. Also apply various methods to test convergence and divergence of sequence and infinite series. |
| CO11FY201.3 | Learner will be able to identify to express a function in term of a series of sine and cosine. |
| CO11FY201.4 | Students will be able to evaluate maxima and minima of multivariable functions using the concept of partial differentiation. Also evaluate limit, continuity and differentiability of two variable function |
| CO11FY201.5 | Students will be able to evaluate double and triple integration and to apply the knowledge to determine area, volume, centre of mass and centre of gravity. Further apply the concept of differentiation and integration on vectors. |
| 1FY203 | Engineering Chemistry Year of study: 2023-24 |
| CO11FY203.1 | Student would be able to differentiate between hard and soft water. To describe the principles of water characterization and treatment for portable. To use various internal and external treatment softening methods for industry. |
| CO11FY203.2 | Student would be able to classify the fuels (solid, liquid and gaseous) like coal, coke, diesel, natural gas etc and describe their sources, manufacturing, refinement and uses. To learn calorific values and carbonization |
| CO11FY203.3 | Student would be able to explain the principle, causes and consequences of corrosion. To use its knowledge to minimize corrosion to improve industrial designs. |
| CO11FY203.4 | Student would be able to gain the basic knowledge of Inorganic Engineering materials like cement, glass, lubricants. To explain the types, properties, manufacturing and uses of cement and glass. To select lubricants for various purposes. |

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| CO11FY203.5 | Student would be able to explain the types of organic reactions and gain basic Knowledge of drugs (Paracetamol and Aspirin) |
| 1FY306 | Programming for Problem Solving Year of study: 2023-24 |
| CO12FY306.1 | Students will be able to write algorithms and draw flowcharts for various problems, using components of flowcharts. |
| CO12FY306.2 | Students will be able to describe architecture of computer and solve number system problems |
| CO12FY306.3 | Students will be able to memorize different data types and operators in C and to write, compile and debug programs in C language. |
| CO12FY306.4 | Students will be able to design flow charts and write programs with multiple instructions, involving decision structures and loops in C. |
| CO12FY306.5 | Students will be able to design flow chart and write programs involving functions and to handle file reading writing operations. |
| 1FY309 | Basic Civil Engineering Year of study: 2023-24 |
| CO11FY309.1 | List the scope and role of Civil Engineering in development of society. |
| CO11FY309.2 | Recognize the importance of surveying and Solve the problems on linear and angular measurement. |
| CO11FY309.3 | Explain the basic concept of building components and describe about the foundation. |
| CO11FY309.4 | Describe the importance of traffic and road safety. |
| CO11FY309.5 | Discuss the functional concept of eco-system and water quality parameter. |
| 2FY202 | Engineering Physics Year of study: 2023-24 |
| CO12FY202.1 | Students Would be able to learn and to apply the basic concepts of interference and diffraction on optical Phenomenon. To interpret the intensity variation of light due to interference and diffraction. To use the concept of Resolving Power. |
| CO12FY202.2 | Students would be able to explain the basic concepts of Quantum Mechanics and apply the knowledge to 1D and 3D potential box problem. |
| CO12FY202.3 | Students would be able to describe the concept of coherence and types of it. To explain working principle of laser, lasing action, various types of lasers and optical fibre. To list the uses of Laser and optical fibres in various fields. |
| CO12FY202.4 | Students would be able to differentiate the types of bonds, to explain the classification of solids according to Band theory and Hall effect. The bases for the band theory are focused to learn the types of Semiconductors and the role of carrier concentrations in conductivity. |
| CO12FY202.5 | Students would be able to formulate and solve the engineering problems on electromagnetism To construct Maxwell's equations from basic principles and use it to solve electromagnetic plane wave equations. |
| 2FY307 | Basic Mechanical Engineering Year of study: 2023-24 |
| CO11FY307.1 | Student will be able to analyze introduction of mechanical engineering and develop knowledge about steam boilers, steam turbines and power plants. |
| CO11FY307.2 | Student will be able to conclude basics of centrifugal, reciprocating pumps and internal combustion engine. Student will be able to create knowledge of various types of refrigeration and air conditioning system with their application. |

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| CO11FY307.3 | Student will be able to analyze basic of different types of power transmission systems such as belt, rope, gears and gear trains. |
| CO11FY307.4 | Student will be able to illustrate working of different manufacturing processes. |
| CO11FY307.5 | Student will be able identify different engineering material, their properties and various types of heat treatment processes. |
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| 2FY308 | Basic Electrical Engineering Year of study: 2023-24 |
| CO12FY308.1 | Design and analyse complex DC circuits incorporating electrical circuit elements (R, L, and C), voltage and current sources, and Kirchhoff's current and voltage laws using Series-Parallel circuits, Node voltage method, and Mesh current method. Apply the principles of Superposition, Thevenin's, Norton's, and Maximum Power Transfer theorems to optimize circuit performance. |
| CO12FY308.2 | Analyse single-phase AC circuits with R, L, C, RL, RC, and RLC combinations (series and parallel) using sinusoidal waveforms, phasor representation, and peak/r.m.s values. Evaluate power characteristics, including real power, reactive power, apparent power, and power factor. Understand resonance phenomena and voltage/current relationships in three-phase balanced circuits with star and delta connections. |
| CO12FY308.3 | Comprehend the principles of ideal and practical transformers, including the EMF equation and equivalent circuit. Evaluate losses in transformers and their impact on regulation and efficiency. |
| CO12FY308.4 | Analyse the generation of rotating magnetic fields and the construction/working of a three-phase induction motor, separately excited DC motor, and synchronous generators. Evaluate the significance of torque-slip characteristic, starting methods, speed control techniques for induction motors, and torque-speed characteristics. |
| CO12FY308.5 | Power Converters & Electrical Installations: Evaluate the characteristics of semiconductor devices such as PN junction diode, BJT, SCR, power transistor, and IGBT. Analyse the basic circuits of single-phase rectifier with R load, single-phase inverter, and DC-DC converter. Understand the layout of LT switchgear and the types of earthing (SFU, MCB, ELCB, MCCB). Apply power measurement techniques and perform elementary calculations for energy consumption in electrical installations. |
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| 2FY201 | Engineering Mathematics-II Year of study: 2023-24 |
| CO12FY201.1 | Students will be able to calculate rank of matrix, characteristic equation & characteristic roots & use the applicability of Cayley Hamilton Theorem to find inverse of matrix which is very important in many engineering application. |
| CO12FY201.2 | Students will able to implement various methods to solve ordinary differential equation of first and Higher order which place important role in all branches of Engineering. |
| CO12FY201.3 | Students will be able to apply various methods to solve ordinary differential equation of second order with variable coefficient which is useful for solving the practical problems which arise in the industry. |
| CO12FY201.4 | Students will be able to solve linear and non linear PDE with Lagrange's form, standard forms and Charpit's method |
| CO12FY201.5 | Students will be able to classify of second order PDE & solve by separation of variables methods on one dimensional heat and wave equations and two dimensional laplace equations. |
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| 2FY105 | Human Values Year of study: 2023-24 |
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| CO12FY105.1 | Students will identify the importance of happiness through the knowledge of values and skills. |
| CO12FY105.2 | Students will develop accuracy regarding the role of basic human aspirations in self and people around them. |
| CO12FY105.3 | Students will be able to create harmony in family ,in society along with trust and respect as foundational value of relationship. |
| CO12FY105.4 | Students will identify the interconnectedness among the four orders of nature, recyclability, co-existence and harmony at all level of existence. |
| CO12FY105.5 | Students will be prepared for humanistic education , professional competence and ethics and humanistic universal order. |

Computer Science Engineering Session 2023-24

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| 3CS201 | Advanced Engineering Mathematics Year of study: 2023-24 |
| CO23201.1 | Students are able to understand the concepts and principles of Random variable and Probability distribution, and able to apply in day to day life |
| CO23201.2 | Students are able to understand the concepts and able to apply different probability distribution to identify and solve real life problem |
| CO23201.3 | Students are able to understand the concepts of the formulation of different mathematical problems into optimization Problems |
| CO23201.4 | Students are able to understand the concepts and apply the principles of optimization using differential calculus |
| CO23201.5 | Students are able to understand the concepts of Liner Programming. |
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| 3CS102 | Technical Communication Year of study: 2023-24 |
| CO23102.1 | Students will be able to interpret and know how to follow the stages of the writing process (prewriting/writing/rewriting) and apply them to technical and workplace writing task |
| CO23102.2 | Students will develop skills related to the basic components of definitions, descriptions, process explanations, and other common forms of technical writing. |
| CO23102.3 | Students will be able to read, understand, and interpret material on technology. They will have an appreciation for some of the ideas, issues, and problems involved in writing about technology and in workplace writing. |
| CO23102.4 | Students will be able to get an in depth knowledge of technical communication used in professional life by getting to know all the forms and aspects of Technical Communication. |
| CO23102.5 | Students will be able to express themselves better in technical writing by understanding the concept, style and methodology used in Technical communication. |
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| 3CS304 | Digital Electronics Year of study: 2023-24 |
| CO23304.1 | Student will be able to show various number systems and will be able to relate their application in digital electronics. |
| CO23304.2 | Student will be able to apply K-map & QM technique to solve the Boolean function to the simplest form for the implementation of compact digital circuits. |
| CO23304.3 | Student will be able to classify logic families and analyze basic circuits of these families. |
| CO23304.4 | Student will be able to design combinational circuits like half adder full adder, MUX, DEMUX encoder, decoder. |
| CO23304.5 | Student will be able to design various synchronous and asynchronous sequential circuits like registers FLIP FLOP, and counters. |
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| 3CS405 | Data Structure and Algorithm Year of study: 2023-24 |
| CO23405.1 | Student will be able to design algorithms and convert those algorithms into a C language code to perform push and pop operation on stack data structure. Students also develop an ability to perform recursion and apply them to the tower of Hanoi problem. |
| CO23405.2 | Student will be able to design algorithms and convert those algorithms into a C language code to perform enqueue, dequeue and traversing operation on queue and Linked list data structure. Student will also able to list the advantages and disadvantages of Linked List. |
| CO23405.3 | Students will be able to write C code to implement Linear search, Binary Search, bubble sort, Insertion sort, selection sort, quick sort, heap sort, merge sort, radix sort and counting sort. |
| CO23405.4 | Students will be able to write C programming code to create binary tree and implement pre, post and in order traversing on the tree data structure. |
| CO23405.5 | Students will be able to write C programming code to implement Hashing. They should be able to perform breadth and depth first search operations on Graph data structure. |
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| 3CS406 | Object Oriented Programming Year of study: 2023-24 |
| CO23406.1 | Student should be able to list out different programming paradigm such as top down and bottom up. |
| CO23406.2 | Students should be able to apply various OOPs concept, they should be able to create classes and to call the properties of classes using objects. They should be able to apply access specifiers on the members of the class. |
| CO23406.3 | Students should be able to apply inheritance properties of one class into another. They should be able to apply the concept of virtual functions with aspect to multiple inheritance. |
| CO23406.4 | Students should be able to implement operator overloading function and can perform overriding of functions. |
| CO23406.5 | Student should be able to structure dynamic arrays using template programming. Also, he will be able to define generic functions who can perform operations on different datatypes. |
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| 3CS407 | Software Engineering Year of study: 2023-24 |
| CO23407.1 | Student will be summarize fundamental concepts in software engineering, SDLC, software requirements specification, formal requirements specification and verification |
| CO23407.2 | Student will be able to evaluate cost based online of code using Software Project Management . |
| CO23407.3 | Student will be able to structure various documents such as requirement analysis (SRS) and Structured analysis. |
| CO23407.4 | Student will be able to compare various software models based on software design . |
| CO23407.5 | Student will be able to design UML diagrams for a for a real life problem. |
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| 4CS201 | Discrete Mathematical Structure Year of study: 2023-24 |
| CO24201.1 | Students will be able to apply fundamental concepts of set theory, relations, functions and pigeon hole principle in solving various mathematical problems. |
| CO24201.2 | Students will be able to examine the relationship between varieties of arguments using logical notations and classify them as valid/invalid. |
| CO24201.3 | Students will be able to demonstrate the ability to find permutation, combination and lattice. |
| CO24201.4 | Students will be able to learn fundamental concepts of groups and rings. |
| CO24201.5 | Students will be able to calculate distances among the nodes of graph using different traversal methods. |
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| 4CS103 | Managerial Economics and Financial Accounting Year of study: 2023-24 |
| CO24103.1 | Students will be able to analyze economic problems and understand the principles of demand and supply in engineering-related scenarios. |
| CO24103.2 | Students will apply demand forecasting techniques and analyze the elasticity of demand and supply in engineering markets. |
| CO24103.3 | Students will demonstrate proficiency in production and cost analysis, optimizing production processes, and making cost-related decisions for engineering projects. |
| CO24103.4 | Students will evaluate and compare different market structures and understand the pricing theory for various types of markets in the context of engineering businesses. |
| CO24103.5 | Students will be able to analyze and interpret financial statements, perform financial ratio analysis, and apply capital budgeting techniques for engineering projects and investment decisions. |
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| 4CS304 | Microprocessor & Interfaces Year of study: 2023-24 |
| CO24304.1 | Student will be able to illustrate the 8085 microprocessor's architecture, pin description and its functionality in depth. Student will be able to explain about microprocessor-based system by designing logical circuitry in order to interface processor with memory and I/O devices. |
| CO24304.2 | Students will experiment with instructions of 8085 microprocessor, their classification |

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| | and different programming techniques. Student will be able to identify the addressing modes and length in bytes of instructions. |
| CO24304.3 | Student will be able to write, and analyze assembly language programs of 8085 microprocessor also will be able to categorize various interrupts available in 8085 microprocessor. |
| CO24304.4 | Students are able to demonstrate and explain the working & interfacing of 8085 microprocessor peripheral ICs. |
| CO24304.5 | Student will be able to evaluate communication protocols. |
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| 4CS405 | Data Base Management System Year of study: 2023-24 |
| CO24405.1 | Students will demonstrate their ability to prepare entity-relationship diagrams for Large Enterprises using appropriate database design principles. |
| CO24405.2 | Students will write queries using relational algebra and calculus. Students will be able to write SQL queries and execute them. |
| CO24405.3 | Students will apply normalization techniques to decompose relation into different normal forms. |
| CO24405.4 | Students will differentiate between conflict serializability and view serializability, and to test schedules for serializability. |
| CO24405.5 | Students will be able to identify the deadlock situations. Will also able to list various failure and recovery methods. |
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| 4CS406 | Theory of Computation Year of study: 2023-24 |
| CO24406.1 | Student able to design the base of fundamental concept of Automata theory, formal language, and computation models. |
| CO24406.2 | Student will be able to Analyze and identify differentiate between types of automata, such as finite automata, pushdown automata, and turning machine solve to complex problems. |
| CO24406.3 | Students are able to build Demonstrated proficiency in constructing finite automata , pushdown automata, and turning machine to solve specific computational problem. Comprehend the concept of formal language and Grammars, include regular languages, context-free languages, and context-sensitive languages. |
| CO24406.4 | Student are able to apply Relate the theory of computation to various real-world applications, such as compiler design and language processing and automata theory concept. |
| CO24406.5 | Students are able to evaluate approach can be extremely valuable, as it allows developers to automate the creation of programs or systems from high-level specifications, reducing human effort, and minimizing the potential for manual errors. |
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| 4CS407 | Data Communication & Computer Networks Year of study: 2023-24 |
| CO24407.1 | Students will be able to summarize the fundamental concepts of the data communication model and communications architecture. They will be able to explain characteristics of different communication mediums along with the classification of signals as digital and analog signals outlining their properties. |
| CO24407.2 | Students will be able to list the functions and protocols of the Data Link Layer. They will be able to apply error detection and correction techniques for reliable data transmission. |
| CO24407.3 | Students will be able to list of role and responsibilities of the Network Link Layer. They will be able to analyse different routing protocols, and distinguish the classful and classless IP addressing. |
| CO24407.4 | Students will be able to explain the underlying principles of transport layer protocols such as multiplexing, demultiplexing, reliable data transfer, flow and congestion control. They will be able to examine the UDP and TCP transport layer protocols and list the difference between them. |
| CO24407.5 | Student will be able to explain the underlying application level protocols used in various applications such as mail, file transfer, web browser, domain name resolution. They will be able to summarize the importance of network security. Also will be able to demonstrate the working |

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| | of various layers in real life situation. |
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| 5CS301 | Information Theory & Coding Year of study: 2023-24 |
| CO35301.1 | Student will be able to List the information measures used for continuous random variables. |
| CO35301.2 | Student will be able to distinguish Prefix code, Huffman code, Shanon-Fane codes and identify the fundamental limits of communication systems. |
| CO35301.3 | Students will be able to apply the principles and techniques of error detection and correction codes for error detection and correction in digital communication systems. |
| CO35301.4 | Students will be able to calculate the performance of error detection and correction codes, including measures such as minimum distance, error detection and correction capabilities, and error probability bounds. |
| CO35301.5 | Students will compare the performance of different coding schemes, considering error detection and correction codes' effectiveness |
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| 5CS402 | Compiler Design Year of study: 2023-24 |
| CO35402.1 | Students will be able to summarize major concepts in areas of language translation and compiler design. |
| CO35402.2 | Students will be able to identify, formulate, and solve computer engineering problems with proper systematic & semantic approach |
| CO35402.3 | Students will be able to Develop possible program constructs for further code generation with Type checking. |
| CO35402.4 | Students will be able to analyze various concepts of symbol tables, Run time environments, memory management strategy. |
| CO35402.5 | Students will get the concepts of Intermediate code generation, Code optimization and Code generations. |
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| 5CS403 | Operating System Year of study: 2023-24 |
| CO35403.1 | Students will be able to summarize principles of operating systems, design, and implementations, Understand the various components and functions of an operating system. |
| CO35403.2 | Students will be able to analyse and apply suitable Process Scheduling Algorithm and Memory Partition Techniques, apply appropriate techniques to avoid control problems such as mutual exclusion and deadlocks |
| CO35403.3 | Students will be able to memorize deadlock, Methods for handling deadlocks and memory management strategies |
| CO35403.4 | Students will be able to compare various memory management algorithm and CPU scheduling techniques. Implement and evaluate operating system components in Windows and Unix environments |
| CO35403.5 | Students will be able to measure and memorize various file and disk management strategies. |
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| 5CS404 | Computer Graphics & Multimedia Year of study: 2023-24 |
| CO35404.1 | Students can list various applications of computer graphics in different fields. Apply scan conversion algorithms to draw lines, circles, and ellipses on a raster display. Implement scan line polygon filling algorithms for area primitives. |
| CO35404.2 | Students can apply transformations to 2D objects using transformation matrices. Utilize composite transformations to efficiently combine multiple transformations. |
| CO35404.3 | Students can list the different methods of 3D display methods. Can apply 3D scaling, rotation, and translation transformations to manipulate objects in a 3D environment. |
| CO35404.4 | Students will be able to list the basic components of illumination models. Describe the purpose and applications of halftone patterns and dithering techniques in image representation. |

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| CO35404.5 | Students identify the techniques of morphing and tweening and their purposes. Can also describe how key frame systems and motion specifications contribute to creating smooth animations. |
| 5CS405 Analysis of Algorithms Year of study: 2023-24 | |
| CO35405.1 | Student will be able to design algorithms and to analyze the performance of algorithms by identify different aspects of time and space complexity of recursive and non recursive codes |
| CO35405.2 | Students will able to apply various algorithms for different computing problems using dynamic programming and branch and bound techniques and try to solve different more real time complex problems |
| CO35405.3 | Students will be able to design and evaluate algorithms using various algorithm design techniques for pattern matching algorithms |
| CO35405.4 | Students will be able to analyze randomized algorithms, Recite algorithms that employ randomization. |
| CO35405.5 | Students will be able to relate the concepts of NP Completeness for analyze and solving the complexity of real life problems. |
| 5CS512 Human-Computer Interaction Year of study: 2023-24 | |
| CO3512.1 | Student will be able to list the capabilities of both humans and computers from the viewpoint of human information processing. |
| CO3512.2 | Student will be able to describe typical human-computer interaction (HCI) models and styles, as well as various historic HCI paradigms. |
| CO3512.2 | Students will be able to apply an interactive design process and universal design principles to designing HCI systems. |
| CO3512.3 | Students will analyze and identify user models& support, socio-organizational issues, and stakeholder requirements of HCIs. |
| CO3512.3 | Students will be able to discuss tasks and dialogs of relevant HCI systems based on task analysis and dialog design. |
| 6CS301 Digital Image Processing Year of study: 2023-24 | |
| CO36301.1 | Students will be able to recall and List the fundamental concepts related to digital image representation, including pixel, resolution, color models, and image formats. |
| CO36301.2 | Students will be able to classify various intensity transformation functions, such as contrast stretching, gamma correction, and logarithmic transformations. |
| CO36301.3 | Students will be able to apply inverse filtering techniques to reverse the effects of blurring or degradation and recover the original image as closely as possible. |
| CO36301.4 | Students will be able to analyze various image compression techniques, both lossless and lossy, to recognize their principles, advantages, and limitations. |
| CO36301.5 | Students will assess the effectiveness of thresholding algorithms in segmenting images and evaluate their performance under different lighting conditions and image characteristics. |
| 6CS402 Machine Learning Year of study: 2023-24 | |
| CO36402.1 | Students will be able to compare various supervised machine learning techniques like LRM, NBCD tree, KNN, SVM, RFA etc. which is suitable for a given problem. |
| CO36402.2 | Students will be able to compare various unsupervised machine learning techniques like K means clustering, Hierarchical Clustering, Probabilistic clustering, ARM, AA, F-P growth algorithm and Gaussian Mixture model which are suitable for a given problem. |
| CO36402.3 | Students will be able to apply various data pre-processing and dimensionality reduction techniques to prepare data for modeling purpose |
| CO36402.4 | Students will be able to solve the problems using various models like policy iteration and value iteration, Q-learning, SARSA, Model based Reinforcement |

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| | Learning. |
| CO36402.5 | Students will be able to evaluate ANN system and apply it to solve a range of real-world applications, for example, in brain informatics, speech recognition etc. |
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| 6CS403 | Information Security System Year of study: 2023-24 |
| CO36403.1 | Students should be able to list different types of security attacks and malware. They should be able to apply substitution and transposition encryption and decryption techniques. |
| CO36403.2 | Students will be able to explain the working of block ciphers like AES and DES work. They'll also be able to list and describe various encryption and decryption modes. |
| CO36403.3 | Students will be able to write the process of how asymmetric key encryption algorithms such as RSA and Rabin cryptosystem works. |
| CO36403.4 | Students will be able to differentiate between the working of Hash functions and Digital signature. |
| CO36403.5 | Students will be able to explain the functioning and use of SSL protocol and Transport layer security protocol. They should be able to explain the symmetric key distribution using symmetric and asymmetric encryptions. |
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| 6CS404 | Computer Architecture and Organization Year of study: 2023-24 |
| CO36404.1 | Recall and identify various computer data types, such as integers, floating-point numbers, and characters, and explain the concept of complement representation. Describe the principles of fixed-point and floating-point number representation, analyze register transfer language, and explain the functioning of basic computer organization and its components. |
| CO36404.2 | Demonstrate the ability to write assembly language programs for basic arithmetic and logic operations, utilize program loops and subroutines, and design programs for I/O operations. |
| CO36404.3 | Analyze different addressing modes and instruction formats, compare and contrast RISC and CISC architectures, and explain the concepts of pipelining and Flynn's taxonomy in parallel processing. |
| CO36404.4 | Evaluate various arithmetic algorithms like Booth's multiplication and division algorithms, assess the benefits and challenges of floating-point arithmetic operations, and analyze input-output interfaces and communication techniques, including DMA and interrupt mechanisms. |
| CO36404.5 | Compare different input-output modes, multiprocessor characteristics, and interconnection structures, and synthesize knowledge to assess cache coherence and shared memory multiprocessors' impact on system performance. |
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| 6CS405 | Artificial Intelligence Year of study: 2023-24 |
| CO36405.1 | Student able to apply various Search algorithms which help intelligent agents to find solutions to various real life problems |
| CO36405.2 | Student can develop and implement various game playing strategies to make new versions of basic games. |
| CO36405.3 | Students are able to build various knowledge based database for AI system |
| CO36405.4 | Student are able to apply Machine learning algorithms and techniques to solve real world problems |
| CO36405.5 | Students are able to evaluate the performance of NLP tools and System |
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| 6CS406 | Cloud Computing Year of study: 2023-24 |
| CO36406.1 | Students will be able to summarize fundamentals and essentials of Cloud Computing. |
| CO36406.2 | Student will be able to compare various cloud infrastructures to understand the tradeoffs in power, efficiency and cost |
| CO36406.3 | Students will be able to apply different levels of virtualization |

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| CO36406.4 | Students will be able to Apply best security Practices and techniques to ensure confidentiality ,Integrity and availability of cloud-based systems |
| CO36406.5 | Evaluate and select appropriate cloud Service Providers based on specific business requirements |
| 6CS5-13 | E-Commerce & ERP Year of study: 2023-24 |
| 6CS5-13.1 | Students will be able to Explain the characteristics of E-Commerce and ERP systems. |
| 6CS5-13.2 | Analyze the impact of E-Commerce on business models and strategies. |
| 6CS5-13.3 | Evaluate the role of ERP systems in streamlining business processes. |
| 6CS5-13.4 | Design and implement E-Commerce solutions considering security and usability. |
| 6CS5-13.5 | Configure and manage ERP systems for efficient resource planning and management. |
| 7CS401 | Internet of Things Year of study: 2023-24 |
| 7CS401.1 | Describe the definition and usage of the term “Internet of Things” in different contexts recognize the key components that make up an IoT system |
| 7CS401.2 | Distinguish between the levels of the IoT stack and be familiar with the key technologies and protocols employed at each layer of the stack |
| 7CS401.3 | Relate famous IoT relevant Operating systems and hardware. |
| 7CS401.4 | Identify the role of big data, cloud computing and data analytics in a typical IoT system |
| 7CS401.5 | Design and Develop IOT based applications such as Lake Monitoring System, Air Quality System and Smart Energy Meter. |
| 7AG6-60.2 | Environmental Engineering & Disaster Management Year of study: 2023-24 |
| 7AG660.1 | To identify the significance of a secure water supply system, describe the needs for domestic water in urban and rural locations, and depict various water supply sources, including intakes and delivery systems. |
| 7AG660.2 | To review drinking water quality, familiarise themselves with Indian Standards for drinking water, and comprehend the significance of water treatment for ensuring safe drinking water. Also recognise the importance of sanitation in maintaining public health. |
| 7AG660.3 | To examine the quantity, characteristics, and appropriate disposal methods of domestic wastewater in both urban and rural areas. To understand different sewer types, design discharge, and hydraulic design considerations for effective wastewater management. |
| 7AG660.4 | To identify the quantity, characteristics, and suitable disposal methods for solid waste in urban and rural areas. Discuss the concept of air pollution, the different types of pollutants, their properties, and their effects on living beings. |
| 7AG660.5 | To review various types of disasters and recognise the importance of disaster management. Illustrate the role of disaster management in mitigating the impact of disasters on communities and environments. |
| 8CS41 | Big Data Analytics Year of study: 2023-24 |
| 8CS41.1 | Explain the business decision which can be optimized, and competitive advantage created with Big Data. |
| 8CS41.2 | Apply the programming aspects of Map Reducing. |
| 8CS41.3 | Analyze Hadoop script to manage the Big Data Analytics. |
| 8CS41.4 | Interpret scripts with Hadoop to manage the Big Data Analytics. |
| 8CS41.5 | Design the script according to Hadoop architecture along with MapReduce Paradigm. |
| 8TT6-60.2 | Disaster Management Year of study: 2023-24 |

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| 8TT6-602.1 | Explain the concepts of disasters and hazards, understand their social and environmental implications, and assess risk and vulnerability in various scenarios. |
| 8TT6-602.2 | Identify different types of disasters, including hydro-meteorological disasters and geological disasters, and analyse the causes, impacts, and potential preventive measures for each type of disaster. |
| 8TT6-602.3 | Recognise various man-made disasters, such as textile processing industrial hazards, major power breakdowns, traffic accidents, and fire hazards. To understand the factors contributing to these disasters and explore ways to prevent or mitigate their effects. |
| 8TT6-602.4 | To understand the management roles in disaster mitigation specifically related to the textile industry and illustrate the strategies and policies implemented by management to reduce disaster risks and ensure business continuity. |
| 8TT6-602.5 | To comprehend the responsibilities of production personnel in disaster preparedness, response, and recovery, ensuring the safety of the workforce, and minimising production disruptions during disasters. |

| Civil Engineering Session 2023-24 | |
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| III Semester | |
| Subject Code :3CE2-01 | Subject Name: Advanced Engineering Mathematics - I |
| CO1: | Memorize a range of mathematical theorems and methods to solve routine and complex analytic and applied problems. |
| CO2: | Analyze data necessary for the solution of engineering problems. |
| CO3: | Test the effectiveness of proposed solutions to identified engineering problems. |
| CO4: | Recognize functions of several variables and mean value theorems. |
| CO5: | Recognize special functions to evaluate some proper and improper integrals using beta and gamma functions. |
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| Subject Code :3CE1-02 | Subject Name: Technical Communication |
| CO1: | Learner can execute and test his/her technical skills required at the industry Levels |
| CO2: | Learner can implement technical writing, grammar and speaking in the Industrial world |
| CO3: | Student can discuss the ways to write technical writings, its format and various uses. |
| CO4: | Learning the technical phrases and writing styles like descriptive, argumentative etc. for developing good technical documents for presentations or disseminating technical documents. |
| CO5: | Getting adapted with the technical generic formats/templates of technical writing of memos, technical report writing, technical presentations, technical proposal writing, minutes of meeting and the notes taking techniques. |
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| Subject Code :3CE3-04 | Subject Name: Engineering Mechanics |
| CO1: | Describe free body diagrams and Solve the resultant of forces and/or Moments. |
| CO2: | Apply laws of mechanics to determine efficiency of simple machines with Consideration of friction |
| CO3: | Execute solutions for planar frames and analyses the motion. |
| CO4: | Apply Newton's laws and conservation laws to elastic collisions and motion of rigid bodies. |
| CO5: | Solve the centroid and second moment of area of sections. |
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| Subject Code :3CE4-05 | Subject Name: Surveying |
| CO1: | Students will be able to memorize the concepts related to linear surveying used in field |
| CO2: | Students will learn to analyze levelling problems through various methods of check. |

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| CO3: | Students be able to analyzes the problems related to curve surveying in transportation planning. |
| CO4: | Students will be able to experiment horizontal & vertical distances through tachometric method of surveying. |
| CO5: | Students be able to define electronic distance method techniques and the concept of Total Station. |
| Subject Code :3CE4-06 | |
| Subject Name: Fluid Mechanics | |
| CO1: | Students will be able to remember the basic properties of fluid flow. |
| CO2: | Students will learn to analyze the pressure, buoyancy and types of flow and its characteristics. |
| CO3: | Students be able to solve problems related to Fluid Kinematics. |
| CO4: | Students will be able to apply concepts on flow parameters such as discharge, velocity, acceleration etc. on the basis of flow problems (Dynamics). |
| CO5: | Students be able to analyze the flow through pipes. |
| Subject Code :3CE4-07 | |
| Subject Name: Building Materials and construction | |
| CO1: | Define different materials especially eco-friendly materials and safety measures to be adopted at any construction site. |
| CO2: | Describe the various types of building materials and its Engineering application. |
| CO3: | Memorize the knowledge of modern equipment's and the recent techniques to be used |
| CO4: | Understanding the use of non-conventional Civil Engineering materials |
| CO5: | Understand use of arches, lintels and partition wall. And learn about stairs and damp-proof course and joints in construction |
| Subject Code :3CE4-08 | |
| Subject Name: Engineering Geology | |
| CO1: | Define different types of rocks & minerals found on earth. |
| CO2: | List types of faults and folds in earth crust. |
| CO3: | State the difference between several minerals by examining their physical & chemical properties. |
| CO4: | Understand the remote sensing process and application in various fields of civil engineering. |
| CO5: | Analyse Engineering consideration of faults, fold, joints and unconformities, Dip and strike. |
| Subject Code :3CE4-21 | |
| Subject Name: Surveying Lab | |

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| CO1: | Understand working of different type of surveying equipment's. |
| CO2: | Analyze the procedures involved in field work. |
| CO3: | Understand accurate measurements, field book, plotting and adjustment of errors. |
| CO4: | Solve distance, direction and elevation via measurement, angle measurement, differential levelling and contouring. |
| CO5: | Understand profile levelling, plot longitudinal and cross sections for road. |
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| Subject Code :3CE4-22 | Subject Name: Fluid Mechanics Lab |
| CO1: | Students will analyze and perform Bernoulli's theorem in practical sense |
| CO2: | Students will understand the concepts of Venturimeter and Orificemeter. |
| CO3: | Students will understand the concepts of Venturimeter and Orificemeter. |
| CO4: | Students will analyze the orificemeter and mouthpiece. |
| CO5: | Students will evaluate the problems related to fluid flow. |
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| Subject Code :3CE4-23 | Subject Name: Computer aided civil engineering drawing |
| CO1: | To understand the basic command, principles and features behind AutoCAD. |
| CO2: | Execute skills to draft the plan, elevation and sectional views of buildings |
| CO3: | Students can Sketch or draft 2D and 3D views of buildings |
| CO4: | Understand development of front elevation and sectional elevation from a given plan |
| CO5: | Understand development of plan, front elevation and sectional elevation from line diagram |
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| Subject Code :3CE3-24 | Subject Name: Civil Engineering Materials Lab |
| CO1: | Explain about fly ash, different stones, different glasses, aluminum and steel sections. |
| CO2: | To memorize the various properties of cement. |
| CO3: | Student can distinguish the various building materials by visual inspection. |
| CO4: | Identify the properties and utilization of fly ash, glass, timber, kota stone, aluminum and steel sections |
| CO5: | Understand the manufacturing and use of concrete hollow block |
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| Subject Code :3CE3-25 | Subject Name: Geology Lab |
| CO1: | Explain different types of rocks & minerals found on earth |
| CO2: | Explain faults and folds in earth crust |
| CO3: | Explain the difference between several minerals by examining their physical & chemical properties |
| CO4: | The students will interpret subsurface information such as thickness of soil, weathered zone, depth of hard rock and saturated zone by using geophysical method |

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| CO5: | The students will learn the techniques in the interpretation of LANDSAT Imageries to find out the lineaments and other structural features for the given area |
| IV Semester | |
| Subject Code :4CE2-01 | Subject Name: Advanced Engineering Mathematics - II |
| CO1: | Students understand to apply concepts of probability. |
| CO2: | Students will be able to use discrete and continuous probability distributions, including requirements, mean and variance, and making decisions |
| CO3: | Students are able to apply different probability distribution to identify and solve real life problem. understanding of Legendre's function, Rodrigues formula and Bessel function. |
| CO4: | Students are able to analyze the pair of variables are related or not, and predict the future value by using the regression equations |
| CO5: | Students use the statistical test to develop a better management system and provide good services or results in their future life journey |
| Subject Code :4CE1-03 | Subject Name: Managerial Economics and Financial Accounting |
| CO1: | Understanding the basic concepts of managerial economics. |
| CO2: | Understanding the economic goals of the firms and optimal Decision making. |
| CO3: | Basic concepts of Demand, Supply and Equilibrium and their Determinants. • Analyzing the effect of these factors on market dynamics. |
| CO4: | Understanding and estimating production function. • Law of DMR and three stages of production. • Isoquant and Isocost and finding out optimal combinations of inputs. |
| CO5: | Pricing and output decisions of monopolistic and oligopoly Firm. • Effect of non-price factors on products and services of monopolistic and oligopoly firms |
| CO6: | To understand the banking concepts |
| Subject Code :4CE3-04 | Subject Name: Basic Electronics for Civil Engineering Applications |
| CO1: | Learner can define introduction to Semiconductors, Diodes, V-I characteristics, Bi polar junction transistors uses. |
| CO2: | Learner can state data acquisition system and data processing. |
| CO3: | Students get to understand the basic of Sensors & Transducers Used in various instruments |
| CO4: | Understand the working of various instruments and measure the error. |
| CO5: | Understand the concept and processing of digital images. |
| Subject Code :4CE4-05 | Subject Name: Strength of Materials |
| CO1: | Analyze and design structural members subjected to tension, compression, torsion, bending and combined stresses using the fundamental concepts of stress, strain and elastic behavior of materials. |
| CO2: | Utilize appropriate materials in design considering engineering properties, |

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| | sustainability, cost and weight. |
| CO3: | Implement the skills for engineering work in accordance with ethical and economic constraints related to the design of structures. |
| CO4: | Understand the concept of torsion and columns. |
| CO5: | Determine deflection of beam by using various method |
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| Subject Code :4CE4-06 | Subject Name: Hydraulics Engineering |
| CO1: | Students will be able to analyze the process of deriving equation by using dimensional methods. |
| CO2: | Students will analyze the problems related to flow of fluids in channel. |
| CO3: | Students will be able to explain and remember the different types of turbines & pumps used. |
| CO4: | Student will be able to create economic sections for fluid channels. |
| CO5: | Students will be able to remember the concepts of Hydrology. |
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| Subject Code :4CE4-07 | Subject Name: Building Planning |
| CO1: | Remember the key concepts and terminology related to building design, site selection, and regulatory requirements. |
| CO2: | Understand the principles of sun considerations, climatic factors, and orientation criteria for tropical climates, and explain their impact on building design. |
| CO3: | Apply building by-laws, NBC regulations, and planning principles to create site plans and design functional layouts for both residential and non-residential buildings.. |
| CO4: | Analyze the effects of different sun shading devices, Vastu Shastra principles, and climatic conditions on building comfort and efficiency. |
| CO5: | Evaluate and Create effective design solutions for various building types, incorporating aspects such as lighting, ventilation, acoustics, and fire safety, ensuring they meet regulatory standards and comfort requirements. |
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| Subject Code :4CE4-08 | Subject Name: Concrete Technology |
| CO1: | Student will be able to understand the chemical and physical properties of cement and aggregates, and their role in concrete performance. |
| CO2: | Student will be able to apply principles of concrete mix design to achieve desired strength, workability, and durability. |
| CO3: | Student will be able to analyze the effects of various factors on the properties of fresh and hardened concrete |
| CO4: | Student will be able to analyze the performance of concrete structures using both standard and nondestructive testing methods. |
| CO5: | Student will be able to design and implement concrete construction practices that enhance the durability and sustainability of structures |
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| Subject Code :4CE4-21 | Subject Name: Material Testing Lab |
| CO1: | Determine the compressive and tensile strength of steel and HYSD bar. |
| CO2: | Determine the strength of cement and concrete cubes. |
| CO3: | Determine the hardness and impact of distinct materials. |
| CO4: | Explain basic material's properties like fatigue, torsion, modulus of rupture |

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| | etc |
| CO5: | Explain the characteristics involved in finalizing the selection of material for a specific work |
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| Subject Code :4CE4-22 | Subject Name: Hydraulics Engineering Lab |
| CO1: | Students will be able to analyze the process of deriving equation by using dimensional methods. |
| CO2: | Students will analyze the problems related to flow of fluids in channel |
| CO3: | Students will be able to explain and remember the different types of turbines & pumps used. |
| CO4: | Students will be able to create economic sections for fluid channels |
| CO5: | Students will be able to remember the concepts of Hydrology. |
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| Subject Code :4CE4-23 | Subject Name: Building Drawing |
| CO1: | Learner can sketch, plan and do drawing of residential building with details of site plan, foundation plan, furniture plan, water supply and sanitary plan |
| CO2: | Learner can sketch, plan and do drawing of institutional building with details of site plan, foundation plan, furniture plan |
| CO3: | Learner can sketch and do the drawing of commercial building with details of site plan, foundation plan, furniture plan |
| CO4: | Draw the details of parts of buildings. |
| CO5: | Draw the details of parts of buildings. |
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| Subject Code :4CE4-24 | Subject Name: Advanced Surveying Lab |
| CO1: | Test the relative altitudes and distance of different points onground |
| CO2: | Perform the tests for setting of horizontal curves in field |
| CO3: | Test the Survey work using Total-station |
| CO4: | Prepare the map of area by Plane Table |
| CO5: | Measurement of area of horizontal and vertical angle by TotalStation |
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| Subject Code :4CE4-25 | Subject Name: Concrete Lab |
| CO1: | To determine the different properties of building materials like cement, concrete, aggregates through practical(s). |
| CO2: | To design concrete mix (M-20 and M-40) in lab |
| CO3: | Learner can state what a Non Destructive testing is. |
| CO4: | Test the properties of fresh concrete mix. |
| CO5: | Design concrete mix for various grades of concrete according to IS recommendations with and without admixture |
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| V Semester | |
| Subject Code :5CE3-01 | Subject Name: Construction technology and equipment |
| CO1: | Understand the objective, scope, and fundamental concepts of construction technology and equipment. |
| CO2: | Apply principles of engineering economy to evaluate cost efficiency in construction projects, including minimum cost point analysis, breakeven point analysis, and equipment depreciation. |

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| CO3: | Analyze safety concerns in construction, including accident causes and classifications, and implement safety measures for building construction, material handling, demolition, and fire safety as per NBC guidelines |
| CO4: | Develop construction planning strategies by understanding the constructional resources, team roles, scheduling, job layout, and quality control, along with effective materials management. |
| CO5: | Identify and manage various construction equipment, including earth-moving equipment, hauling equipment, drilling, blasting, tunneling, and pile driving equipment, to optimize construction operations. |
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| Subject Code :5CE4-02 | Subject Name: Structural Analysis-I |
| CO1: | Students will be able to classify and analyze statically indeterminate structures using various analytical method. |
| CO2: | Students will master the Area Moment, Conjugate Beam, and Three Moments Theorem for structural analysis. |
| CO3: | Students will effectively use the Slope-Deflection and Moment-Distribution methods in the analysis of continuous beams and frames. |
| CO4: | Students will gain a foundational understanding of structural vibrations and the behavior of SDOF systems. |
| CO5: | Students will enhance their ability to solve complex structural problems considering both static and dynamic loads |
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| Subject Code :5CE4-03 | Subject Name:Design of concrete Structures |
| CO1: | Recall fundamental concepts, design principles, and relevant IS CO35403.2 Understanding codes associated with reinforced concrete (RC) structures. |
| CO2: | Understand the role of different types of reinforcement, design assumptions, and the principles of Working Stress Method and Limit State Design (LSM). |
| CO3: | Apply LSM principles to design RC beams, slabs, and columns for various structural conditions. |
| CO4: | Apply LSM principles to design RC beams, slabs, and columns for various structural conditions. |
| CO5: | Evaluate the structural performance of RC members, ensuring safety, stability, and adherence to design standards. |
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| Subject Code :5CE4-04 | Subject Name: Geotechnical Engineering |
| CO1: | Student will be able to Explain different types of soil present on Earth crust. |
| CO2: | Student will be able to Explain different types of soil properties And their use in engineering fields. |
| CO3: | Students will be able to Analyze engineering properties of soil Like compaction, permeability, and shear strength. |
| CO4: | Students will be able to Analyze engineering properties of soil Like compaction, permeability, shear strength |
| CO5: | Students will be able to Compute the lateral thrust due to backfill On the retaining walls |
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| Subject Code :5CE4-05 | Subject Name: Water Resource Engineering |

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| CO4: | Able to impart knowledge on the various factors governing Engineering behavior of soils and the suitability of soils Geotechnical Engineering applications |
| CO5: | Able to characterize stress-strain behaviour of soils, criteria and to evaluate the shear strength and compressibility Parameters of soils. |
| Subject Code :5CE4-23 | |
| Subject Name: Water Resource Engineering | |
| CO1: | Various components of the hydrologic cycle that affect the movement of water in the earth |
| CO2: | Various Stream flow measurements technique. the concepts of movement of groundwater beneath the earth |
| CO3: | The basic requirements of irrigation and various irrigation techniques, requirements |
| VI Semester | |
| Subject Code :6CE3-01 | |
| Subject Name: Wind and seismic analysis | |
| CO1: | Students will be able to understand the types of structures, symmetry and asymmetry in Building forms, shear walls and multi-storey configurations. |
| CO2: | Students will be able to analyze design loads for different types of buildings |
| CO3: | Students will be able to calculate wind load on flat roof, pitched roof and single sloped Roof buildings. |
| CO4: | Students will be able to calculate earthquake loads on framed structures and design of Earthquake Resistant Construction. |
| CO5: | Students will apply wind & seismic load for analyzing the structure to evaluate the response of lateral load |
| Subject Code :6EC4-02 | |
| Subject Name: Structure analysis -II | |
| CO1: | Students will be able to calculate deflections in determinate and indeterminate structures using the unit load method and energy methods. |
| CO2: | Students will be proficient in analyzing and interpreting influence line diagrams for beams and frames under various loading conditions. |
| CO3: | Students will understand the analysis of three-hinged, two-hinged, and fixed arches, including the calculation of horizontal thrust |
| CO4: | Students will be able to analyze the effects of unsymmetrical bending, including locating the neutral axis and calculating resulting stresses and deflections |
| CO5: | Students will gain the ability to apply approximate methods like the portal and cantilever methods to analyze multistory frames under lateral loads. |
| Subject Code :6CE4-03 | |
| Subject Name: Environmental Engineering | |
| CO1: | Understand demand for water supply to households, industry and public services. |
| CO2: | Understand source of water and their quality parameter. |
| CO3: | Analyze the impact of pollutants and assess pollution control measures. |
| CO4: | Analyze wastewater treatment processes and recommend disposal |

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| | methods. |
| CO5: | Explain an integrated air and noise pollution control plan for an urban or industrial area. |
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| Subject Code :6CE4-04 | Subject Name: Design of steel structures |
| CO1: | Learner will be able to solve the designing of tension and compression members. |
| CO2: | Learner will be able to solve the designing of beams and beam columns. |
| CO3: | Learner will be able to solve the designing of bolt and weld connections. |
| CO4: | Learner will be able to solve the designing of the gantry girder. |
| CO5: | Classify and design the structural steel components of industrial building. |
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| Subject Code :6CE4-05 | Subject Name: Estimating and costing |
| CO1: | Identify and define key concepts related to estimation, costing, and valuation in civil engineering. |
| CO2: | Explain the principles of estimating and rate analysis, and describe their applications in various civil engineering projects. |
| CO3: | Utilize standard methods to calculate quantities, prepare estimates, and perform rate analyses for different construction activities. |
| CO4: | Examine and differentiate between various types of estimates and rate analysis techniques to determine their appropriateness for specific projects. |
| CO5: | Develop detailed and accurate estimates and cost analyses for civil engineering projects, integrating industry standards and financial considerations. |
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| Subject Code :6CE5-12 | Subject Name: Solid and Hazardous waste management |
| CO1: | To list the solid waste management and disposal techniques. |
| CO2: | To define the waste management rules to generators of solid waste And its generation rate. |
| CO3: | To state what biomedical waste management and hazardous solid Waste management are |
| CO4: | To understand the environment and health impacts of solid waste Mismatchment. |
| CO5: | Understand the engineering, financial and technical options for waste Management. |
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| Subject Code :6CE5-16 | Subject Name:Geographic Information system and remote system |
| CO1: | Student will be able to Understand the basic concept of Remote Sensing and know about different types of satellite and sensors. |
| CO2: | Student will be able to Apply the concepts of Photogrammetric and its applications such as determination of heights of objects on terrain. |
| CO3: | Students will be able to Express the principles of aerial and satellite remote sensing, Able to comprehend the energy interactions with earth surface features, spectral properties of water bodies. |

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| CO4: | Students will be able Illustrate spatial and non-spatial data features in GIS and understand the map projections and coordinates systems |
| CO5: | Students will be able Develop knowledge on conversion of data from analogue to digital and working with GIS software |
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| Subject Code :6CE4-21 | Subject Name: Environmental engineering design and Lab |
| CO1: | Understand about the water quality parameters and their permissible limits as per the standards |
| CO2: | Analyze the physical tests to be conducted for the water before supply. |
| CO3: | Analyze chemical tests to be conducted for the water before supply. |
| CO4: | Analyze chemical tests to be conducted for the water before supply. |
| CO5: | Calculate physical chemical properties by lab experiments for sewage sample |
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| Subject Code :6CE4-22 | Subject Name: Steel Structures design |
| CO1: | Learner will be able to solve the designing of tension and compression members. |
| CO2: | Learner will be able to solve the designing of beams and beam columns. |
| CO3: | Learner will be able to solve the designing of bolt and weld connections. |
| CO4 | Learner will be able to solve the designing of the gantry girder. |
| CO5 | Classify and design the structural steel components of industrial building. |
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| Subject Code :6CE4-23 | Subject Name: Quantity surveying and valuation |
| CO1: | Students will evaluate the estimate of quantities for a Residential Building & Abstract cost Estimate. |
| CO2: | Students will be able analyze the rates of work quantities and labour. |
| CO3: | Students will be able to evaluate the calculation regarding earth work quantity for roads and canals, Analyse different types of contracts, tender document for building & valuation |
| CO4 | Students will remember the concepts of Valuation |
| CO5 | Student will create Bill of Quantities |
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| Subject Code :6CE4-24 | Subject Name: Water and earth retaining structures design |
| CO1: | Student will create Bill of Quantities |
| CO2: | Design the torsion, continuous and curve beam |
| CO3: | Design of circular domes and water tank |
| CO4: | Analyze Yield line theory and design retaining wall |
| CO5: | Design the culvert and bridge |
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| VII Semester | |
| Subject Code :7CE4-01 | Subject Name:Transportation Engineering |

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| CO1: | Students will be able to Apply principles of highway planning, alignment, and design using IRC guidelines. |
| CO2: | Students will Analyze and select appropriate construction materials for highways based on their properties and testing standards. |
| CO3: | Students will be able to Design both flexible and rigid pavements in accordance with IRC provisions, including IRC 37 and IRC 58. |
| CO4 | Students will Understand and implement modern highway construction techniques, equipment, and quality control processes. |
| CO5 | Students will Gain foundational knowledge in railway, airport, and harbour engineering for transportation infrastructure development. |
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| Subject Code :7CE6-60.2 | Subject Name: Environmental Engineering and Disaster Management |
| CO1: | To identify the significance of a secure water supply system, describe the needs for domestic water in urban and rural locations, and depict various water supply sources, including intakes and delivery systems. |
| CO2: | To review drinking water quality, familiarise themselves with Indian Standards for drinking water, and comprehend the significance of water treatment for ensuring safe drinking water. Also recognise the importance of sanitation in maintaining public health. |
| CO3: | To examine the quantity, characteristics, and appropriate disposal methods of domestic wastewater in both urban and rural areas. To understand different sewer types, design discharge, and hydraulic design considerations for effective wastewater management. |
| CO4: | To identify the quantity, characteristics, and suitable disposal methods for solid waste in urban and rural areas. Discuss the concept of air pollution, the different types of pollutants, their properties, and their effects on living beings. |
| CO5: | To review various types of disasters and recognise the importance of disaster management. Illustrate the role of disaster management in mitigating the impact of disasters on communities and environments. |
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| Subject Code :7CE4-21 | Subject Name: Road Material Testing Lab |
| CO1: | Understand the importance and determination of physical properties of aggregates. |
| CO2: | Understand the importance and determination of physical properties of bitumen. |
| CO3: | Evaluate and analyze the suitability of materials from data collected by physical tests done on aggregates and bitumen. |
| CO4 | Design of different bituminous layers of flexible pavement and compare their results with IRC/MoRTH recommendations. |
| CO5 | Design of different bituminous layers of flexible pavement and compare their results with IRC/MoRTH recommendations. |
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| Subject Code :7CE4-22 | Subject Name: Professional Practices & field Engineering lab |

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| CO1 | Understand the Different types of Knots Site plan, index plan, layout plan, plinth area, floor area of buildings |
| CO2 | Understand the Foundation plan layout infield. |
| CO3 | Analysis of Bar bending schedule |
| CO4 | Understand the Specifications- For different classes of building and Civil Engineering works |
| CO5 | Understand the Valuation of buildings and properties |
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| Subject Code :7CE4-23 | Subject Name: Soft Skill Lab |
| CO1: | To encourage the all-round development of students by focusing on soft skills |
| CO2: | To make the engineering students aware of the importance, the role and the content of soft skills through instruction, knowledge acquisition, demonstration and practice |
| CO3: | To test the practices about Time management |
| CO4 | To develop and nurture the soft skills of the students through individual and group activities. |
| CO5 | To expose students to right attitudinal and behavioral aspects and to build the same through activities |
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| Subject Code :7CE4-24 | Subject Name: Environmental Monitoring and design Lab |
| CO1: | Analyze characteristics of water and wastewater |
| CO2: | Estimate the quantity of drinking water and domestic wastewater generated. |
| CO3: | Design components of water supply systems. |
| CO4: | Accumulate the information about water supply fittings. |
| CO5: | Calculate physical chemical properties by lab experiments for sewage sample. |
| VIII Semester | |
| Subject Code :8EC4-01 | Subject Name:Project planning and construction management |
| CO1 | Students will be able to understand construction risk management, the roles and responsibilities of all constituencies involved in the design and construction process. |
| CO2 | Students will be able to understand concept of network analysis CPM and PERT methods and network rules and regulations |
| CO3 | Students will be able to design a network diagram to create the project schedules, Critical path, slack in between activities using CPM & PERT techniques. |
| CO4 | Students will be able to Identify the project cost and time control using network techniques. |
| CO5 | Students be able to Analyze about the contract management. |
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| Subject Code :8TT6-60.2 | Subject Name:Disaster Management |

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| CO1 | Explain the concepts of disasters and hazards, understand their social and environmental implications, and assess risk and vulnerability in various scenarios. |
| CO2 | Identify different types of disasters, including hydro-meteorological disasters and geological disasters, and analyse the causes, impacts, and potential preventive measures for each type of disaster. |
| CO3 | Recognise various man-made disasters, such as textile processing industrial hazards, major power breakdowns, traffic accidents, and fire hazards. To understand the factors contributing to these disasters and explore ways to prevent or mitigate their effects. |
| CO4 | To understand the management roles in disaster mitigation specifically related to the textile industry and illustrate the strategies and policies implemented by management to reduce disaster risks and ensure business continuity. |
| CO5 | To comprehend the responsibilities of production personnel in disaster preparedness, response, and recovery, ensuring the safety of the workforce, and minimising production disruptions during disasters. |
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| Subject Code :8CE4-21 | Subject Name:Project planning and construction management Lab |
| CO1 | Students will be able to understand construction risk management, the roles and responsibilities of all constituencies involved in the design and construction process |
| CO2 | Students will be able to understand concept of ne work analysis CPM and PERT methods and network rules and regulations |
| CO3 | Students will be able to design a network diagram to create the project schedules, Critical path, slack in between activities using CPM & PERT techniques. |
| CO4 | Students will be able to Identify the project cost and time control using network techniques. |
| CO5 | Students be able to Analyze about the contract management. |
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| Subject Code :8CE4-22 | Subject Name:Pavment Design |
| CO1: | Identify the pavement components, functions and the differences between different types of pavement |
| CO2: | Relate the response characteristics of soil, aggregate, asphalt, and asphalt mixes |
| CO3: | Analyzing the flexible pavement using empirical and semi empirical methods |
| CO4: | Analyze the warping, friction, wheel load stress and calculate the combined stress |
| CO5: | Design rigid pavements by IRC method and evaluate the pavements |

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III Semester

| Subject Code :3EC2-01 | Subject Name: Advanced Engineering Mathematics - I |
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| CO1: | To learn the concepts of various methods to solve the numerical problems. |
| CO2: | Students apply the knowledge of Fourier Transformation, z-transform and calculus in study of Signal Processing, Control Theory etc. |
| CO3: | Employ appropriate numerical methods to solve algebraic and transcendental equations and analysis the circuit problem. |
| CO4: | Students apply the knowledge of Laplace transform in various engineering problem. |
| CO5: | Student able to apply the concept of z-transform in designing the circuit. |
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| Subject Code :3EC1-02 | Subject Name: Technical Communication |
| CO1: | Students will be able to learn and understand how to follow the various stages of the writing process like prewriting, writing and rewriting and apply them to technical and workplace writing. |
| CO2: | Students will be able to learn and understand how to follow the various stages of the writing process like prewriting, writing and rewriting and apply them to technical and workplace writing. |
| CO3: | Students will be able to read, understand and interpret material on technology. |
| CO4: | They will have appreciation for some of the ideas, issues and problems involved in writing about technology and in workplace writing |
| CO5: | Students will be able to get an in-depth knowledge of technical communication used in professional life by getting to know all the forms and aspects of technical communication. They will be able to express themselves better in technical writing by understanding the concept, style and methodology used in technical communication |
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| Subject Code :3EC4-04 | Subject Name: Digital System Design |
| CO1: | Develop the understanding of number system and its application in digital electronics. |
| CO2: | Development and analysis of K-map to solve the Boolean function to the simplest form for the implementation of compact digital circuits. |
| CO3: | Design various combinational and sequential circuits using various metrics: switching speed, throughput/latency, gate count and area, energy dissipation and power. |
| CO4: | Understanding Interfacing between digital circuits and analog component using Analog to Digital Converter (ADC), Digital to Analog Converter (DAC) etc. |
| CO5: | Design and implement semiconductor memories, programmable logic devices (PLDs) and field programmable gate arrays (FPGA) in digital electronics. |

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| Subject Code :3EC4-05 | Subject Name: Signal & Systems |
| CO1: | Classify different types of signals and system properties |
| CO2: | Demonstrate continuous and discrete systems in time and frequency domain using different transforms. |
| CO3: | Analyze whether the system is stable. |
| CO4: | Design and Develop Sampling and reconstruction circuit . |
| CO5: | Evaluate the output of the MIMO systems. |
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| Subject Code :3EC4-06 | Subject Name: Network Theory |
| CO1: | Students will be able to understand the basic circuit laws. |
| CO2: | Students will be able to apply the knowledge of basic circuit law to simplify the network using network theorems. |
| CO3: | Students will be able to Distinguish the frequency domain techniques in different applications. |
| CO4: | Students will be able to apply Laplace Transform for steady state and transient analysis. |
| CO5: | Students will be able to evaluate transient response and two-port network parameters. |
| | |
| Subject Code :3EC4-07 | Subject Name: Electronics Devices |
| CO1: | Understanding the semiconductor physics of the intrinsic, P and N materials. |
| CO2: | Understanding the characteristics of current flow in a bipolar junction transistor and MOSFET. |
| CO3: | Understand and Apply the mathematical models of semiconductor junctions and MOS transistors for circuits and systems. |
| CO4: | Analyze the characteristics of different electronic devices such as Amplifiers, LEDs, Solar cells, etc. |
| CO5: | Theoretical as well as experimental understanding of Integrated circuit fabrication. |
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| Subject Code :3EC4-21 | Subject Name: Electronics Devices Lab |
| CO1: | Understand the characteristics of different Electronic Devices. |
| CO2: | Verify the rectifier circuits using diodes and implement them using hardware. |
| CO3: | Design various amplifiers like CE, CC, common source amplifiers and implement them using hardware and also observe their frequency responses |
| CO4: | Understand the construction, operation and characteristics of JFET and MOSFET, which can be used in the design of amplifiers. |
| CO5: | Understand the need and requirements to obtain frequency response from |

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| | a transistor so that Design of RF amplifiers and other high frequency amplifiers is feasible |
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| Subject Code :3EC4-22 | Subject Name:Digital System Design Lab |
| CO1: | To Verify the TTL ICs functionality with the datasheet. |
| CO2: | To minimize the complexity of digital logic circuits. |
| CO3: | To design and analyse combinational logic circuits. |
| CO4: | To design and analyse sequential logic circuits. |
| CO5: | Able to implement applications of combinational & sequential logic circuits. |
| | |
| Subject Code :3EC4-23 | Subject Name: Signal Processing lab |
| CO1: | Able to generate different Continuous and Discrete time signals. |
| CO2: | Understand the basics of signals and different operations on signals. |
| CO3: | Develop simple algorithms for signal processing and test them using MATLAB |
| CO4: | Able to generate the random signals having different distributions, mean and variance. |
| CO5: | Design and conduct experiments, interpret and analyse data and report results. |
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| IV Semester | |
| Subject Code :4EC2-01 | Subject Name: Advanced Engineering Mathematics - II |
| CO1: | Gain knowledge about basic concepts of complex analysis and understand how to retrieve real and imaginary part of a given functions and will be able to apply it in engineering problem. Further learn how to map the points from one space to another one. |
| CO2: | Able to understand singularity, poles and region of convergence that can be apply to solve the circuit problems. The knowledge of Taylor series and Laurent series is applied to obtain analytical part of a function and identifications of singularities respectively. |
| CO3: | Evaluating definite and indefinite integrals. |
| CO4: | Students will be able to analyze the electronics problem like frequency modulation, transmission lines, and telephone equations with the help of Bessel function. |
| CO5: | The study of linear algebra enables student to solve many circuits problem and in communication section it is used in the form of image processing which is used now a days a lot. |
| | |
| Subject Code :4EC1-03 | Subject Name: Managerial Economics and Financial Accounting |
| CO1: | Understanding the basic concepts of managerial economics. |
| CO2: | Understanding the economic goals of the firms and optimal decision making. |
| CO3: | Basic concepts of Demand, Supply and Equilibrium and their determinants. <ul style="list-style-type: none"> Analyzing the effect of these factors on market dynamics. |

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| CO4: | Understanding and estimating production function. • Law of DMR and three stages of production. • Isoquant and Isocost and finding out optimal combinations of inputs. |
| CO5: | Pricing and output decisions of monopolistic and oligopoly firm. • Effect of non-price factors on products and services of monopolistic and oligopoly firms |
| CO6: | To understand the banking concepts |
| Subject Code :4EC4-04 | |
| Subject Name: Analog Circuits | |
| CO1: | Understand the characteristics of diodes and transistors |
| CO2: | Design and analyze various rectifier and amplifier circuits |
| CO3: | Design sinusoidal and non-sinusoidal oscillators |
| CO4: | Understand the functioning of OP-AMP and design OPAMP based circuits |
| CO5: | Understanding the designing of ADCs and DACs |
| Subject Code :4EC4-05 | |
| Subject Name: Microcontrollers | |
| CO1: | Students will get basic knowledge of assembly language programming skills. |
| CO2: | Students will be able to build interfacing of peripherals like I/O, A/D, D/A, timer etc. |
| CO3: | Students will be able to categorize different types of microcontrollers on the basis of speed, power consumption and response time. |
| CO4: | Students will be able to design and develop interfacing circuit for memory organization. |
| CO5: | Students will be able to compare RISC architecture with CISC architecture based systems and design ARM microcontroller based system. |
| Subject Code :4EC3-06 | |
| Subject Name: Electronics Measurements & Instruments | |
| CO1: | Describe the use of various electrical/electronic instruments, their block diagram, applications, and principles of operation, standards errors and units of measurements. |
| CO2: | Develop basic skills in the design of electronic equipment's |
| CO3: | Analyze different electrical/electronic parameters using state of equipment's of measuring instruments which is require to all types of industries |
| CO4: | Solve: Identify electronics/ electrical instruments, understanding associated with the instruments |
| CO5: | Explain use of transducers in different types of field applications |
| Subject Code :4EC4-07 | |
| Subject Name: Analog and digital Communication | |
| CO1: | Analyze and compare different analog modulation schemes for their efficiency and bandwidth |
| CO2: | Analyze the behaviour of a communication system in presence of noise |
| CO3: | Investigate pulsed modulation system and analyze their system |

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| | performance |
| CO4: | Analyze different digital modulation schemes and can compute the bit error performance |
| CO5: | Design a communication system comprised of both analog and digital modulation techniques |
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| Subject Code :4EC4-21 | Subject Name: Analog and Digital Communication Lab |
| CO1: | Understand different analog modulation schemes and evaluate modulation index |
| CO2: | Able to understand the principle of superhetrodyne receiver |
| CO3: | Develop time division multiplexing concepts in real time applications |
| CO4: | Develop and able to comprehend different data formatting schemes |
| CO5: | Comprehend and analyze the concepts of different digital modulation techniques in communication. |
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| Subject Code :4EC4-22 | Subject Name: Analog Circuits Lab |
| CO1: | Discuss and observe the operation of a bipolar junction transistor and field-effect transistor in different region of operations. |
| CO2: | Analyze and design of transistor Amplifier and Oscillators. Importance of negative feedback. |
| CO3: | Analyze the frequency response of amplifiers and operational amplifier circuits. Develop an intuition for analog circuit behavior in both linear and nonlinear operation. |
| CO4: | Design op-amps for specific gain, speed, or switching performance. Compensate operational amplifiers for stability |
| CO5: | Design and conduct experiments, interpret and analyze data, and report results. |
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| Subject Code :4EC4-23 | Subject Name: Microcontrollers Lab |
| CO1: | Develop skills related to assembly level programming of microprocessors and microcontroller. |
| CO2: | Interpret the basic knowledge of microprocessor and microcontroller interfacing, delay generation, waveform generation and Interrupts. |
| CO3: | Interfacing the external devices to the microcontroller and microprocessor to solve real time problems. |
| CO4: | Illustrate functions of various general purpose interfacing devices. |
| CO5: | Develop a simple microcontroller and microprocessor based systems |
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| Subject Code :4EC4-24 | Subject Name: Electronics Measurement & Instrumentation Lab |
| CO1: | Understanding of the fundamentals of Electronic Instrumentation. Explain and identify measuring instruments. |
| CO2: | Able to measure resistance, inductance and capacitance by various methods. |
| CO3: | Design an instrumentation system that meets desired specifications and requirements. |
| CO4: | Design and conduct experiments, interpret and analyze data, and report results. |
| CO5: | Explain the principle of electrical transducers. Confidence to apply instrumentation solutions for given industrial applications. |

V Semester

| Subject Code :5EC3-01 | Subject Name: Computer Architecture |
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| CO1: | Develop an ability to understand the design and interconnection of various parts of a computer |
| CO2: | Develop an ability to understand and apply the basic computer arithmetic operations |
| CO3: | Design & Develop interfacing circuitry an ability memories and input/output organization to CPU. |
| CO4: | Learn the different types of serial communication techniques. |
| CO5: | Summarize the Instruction execution stages. |
| Subject Code :5EC4-02 | Subject Name: Electromagnetics Waves |
| CO1: | Describe the concepts of coordinate system. |
| CO2: | Analyze the basic laws of electromagnetic field. |
| CO3: | Explain the concepts of EMI & EMC. |
| CO4: | Describe the complete overview of microwave components |
| CO5: | Analyze different types of microwave components |
| Subject Code :5EC4-03 | Subject Name:Control system |
| CO1: | To identify the various machines, working Principle, Characteristics and their applications. |
| CO2: | To analyze the principles of system modeling, feedback control and evaluate feedback control systems with desired performance. |
| CO3: | To understand system stability, sensitivity, transient and tracking performance. |
| CO4: | To control system design such as design of feedback controllers, such as PID, lead and lag compensators, pole placement designs, to meet desired system performance specifications. |
| CO5: | Evaluate the output of the MIMO systems. |
| Subject Code :5EC4-04 | Subject Name: Digital Signal Processing |
| CO1: | Classify different types of signals and system properties. |
| CO2: | Demonstrate continuous and discrete systems in time and frequency domain using different transforms. |
| CO3: | Analyze the output of IIR and FIR system . |
| CO4: | Design and Develop Sampling and reconstruction circuit . |
| CO5: | Evaluate the output of the MIMO Systems. |
| Subject Code :5EC4-05 | Subject Name: Microwave Theory & Techniques |
| CO1: | Explain the working of rectangular waveguides in different modes. |
| CO2: | Evaluate impedance , admittance ,current gain and voltage gain using different types of parameters. |
| CO3: | Illustrate the working of microwave passive components. |
| CO4: | Calculate microwave measurements such as VSWR ,power measurements etc. |
| CO5: | Develop the MW devices and its application, and transmission of microwave over the satellite channel. |

| Subject Code :5EC5-12 | | Subject Name: Embedded Systems | |
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| CO1: | | Discuss the evolution of MP technology | |
| CO2: | | Learn the depth knowledge of applying the concepts of real time applications. Demand of energy in India in various sectors. | |
| CO3: | | Identify, formulate, and solve engineering problems in MP based and to analyze their outcomes. | |
| CO4: | | Design and Develop Embedded system and Programmed, debug and test it. | |
| CO5: | | Evaluate the response time of the embedded systems. | |
| Subject Code :5EC4-21 | | Subject Name: RF Simulation Lab | |
| CO1: | | Understand the characteristics of the rectangular and circular waveguide. | |
| CO2: | | Analyze the design of impedance matching and tuning using lumped and distributed elements of different transmission line. | |
| CO3: | | Analysis and study characteristics of different microwave component like coupler, divider and ring. | |
| CO4: | | Analysis and study characteristics of different microwave amplifier. | |
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| Subject Code :5EC4-22 | | Subject Name: Digital Signal Processing Lab | |
| CO1: | | Able to generate different continuous and discrete time signals | |
| CO2: | | Develop Image enhancement, compression and edge detection using MATLAB | |
| CO3: | | Develop IIR & FIR Filters using different approximation methods using MATLAB | |
| CO4: | | Implementing algorithms for Digital Image processing | |
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| Subject Code :5EC4-23 | | Subject Name: Microwave Lab | |
| CO1: | | Analyze the performance parameters of radio frequency circuits and identify design trade-off of radio frequency communication systems. | |
| CO2: | | Able to plot V-I characteristics of microwave components | |
| CO3: | | Able to work with various microwave instruments. | |
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| VI Semester | | | |
| Subject Code :6EC3-01 | | Subject Name: Power Electronics | |
| CO1: | | Student will be able to explain switching characteristics of various Power Semiconductor devices and able to design and simulate their base/gate drive circuits. | |
| CO2: | | Student will be able to summarize and synthesize the different controlled rectifier circuits and computing their performances. | |
| CO3: | | Students will be able to analyze different dc-dc converter circuits (isolated and non-isolated type) and computing their performances | |
| CO4: | | Students will be able to apply knowledge of single phase and three phase Voltage Source Inverter circuit topology with Sin PWM control, Space Vector PWM control and computing their performances. | |
| CO5: | | Students will be able interpret and predict correct speed motors. | |
| Subject Code :6EC4-02 | | Subject Name: Computer Network | |
| CO1: | | Students will learn how networked computing devices pass data to each | |

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| | other along data connections |
| CO2: | Student will study different application level protocols such as FTP, SMTP and, HTTP |
| CO3: | Students will study different routing algorithms. The will be able to apply the concept of sub-netting and derived IPs for subnets. |
| CO4: | Student should learn and apply the leaky and token bucket algorithms for traffic shaping. |
| CO5: | Students will learn about types of errors, and error detection & correction methods such as stop and weight, Go-Back-N. They will also study about ALOHA and Slotted ALOHA. |
| | |
| Subject Code :6EC4-03 | Subject Name: Fiber Optics Communications |
| CO1: | Explain basic knowledge of Ray theory principle & optical fiber working concepts. . |
| CO2: | The knowledge of optical communication subject helps the students to perform various experiments in laboratories which will help in understanding theory more clearly. |
| CO3: | Analyze the use of modern upcoming technologies in optical communication. |
| CO4: | Design tools for optical system design, test and evaluation. |
| CO5: | Evaluate the performance of optical components. |
| Subject Code :6EC4-04 | Subject Name: Antennas and Propagation |
| CO1: | Define various performance parameters of antenna. |
| CO2: | Illustrate techniques for antenna parameter measurements. |
| CO3: | Students will apply concepts of antenna on transmitting message with high signal to noise ratio. |
| CO4: | Synthesize the various applications of antennas |
| CO5: | Evaluate the output of the MIMO systems. |
| Subject Code :6EC4-05 | Subject Name:5G Communication |
| CO1: | Recall key concepts and terminology related to 5G communication, including definitions of important technologies (e.g., massive MIMO, network slicing). |
| CO2: | Explain the fundamental principles of 5G communication and the differences between 5G and previous generations (e.g., 4G). |
| CO3: | Apply 5G technologies to propose solutions for specific communication challenges in real-world contexts |
| CO4: | Evaluate different 5G applications and assess their potential impacts on various industries, considering benefits and challenges. |
| CO5: | Assess the effectiveness of proposed 5G solutions in addressing specific needs or problems in various contexts. |
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| Subject Code :6EC5-11 | Subject Name: Introduction to MEMS |
| CO1: | Understand the characteristic techniques of micro system fabrication process |
| CO2: | Describe the methods for processing MEMS and nano scale materials |
| CO3: | Describe the evolution of Nano technology and its applications |

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| CO4: | Analyze the various nano materials and measurements techniques and nano scale manufacturing |
| CO5: | Analyse & compare the various micromachining methods |
| Subject Code :6EC4-21 | Subject Name: Computer Network Lab |
| CO1: | Understanding of routing and network management techniques |
| CO2: | Recognize the different internetworking devices and their functions |
| CO3: | Analyze the features and operations of various protocols working on different layers in a network |
| Subject Code :6EC4-22 | Subject Name: Antenna and Wave Propagation Lab |
| CO1: | Understand the radiation phenomena and pattern of various antennas. |
| CO2: | Analyse different characteristics and can discriminate various antennas on the basis of their electrical performance. |
| CO3: | Understand the optical fiber network links. |
| Subject Code :6EC4-23 | Subject Name: Electronics Design Lab |
| CO1: | Understand the functionality & datasheet of Op-Amp & 555 timer IC. |
| CO2: | Design Linear ICs based circuits using IC 741 such as amplifier , filter etc. |
| CO3: | Design Timer circuits using IC 555. |
| Subject Code :6EC4-24 | Subject Name: Power Electronics Lab |
| CO1: | Acquire knowledge of V-I characteristics of various Power Semiconductor devices and able to design and simulate their base/gate drive circuits |
| CO2: | Understand the design of cosine controlled triggering circuit of SCR |
| CO3: | Validate the output performances of different controlled rectifier circuits with various loading conditions. |
| CO4: | Understand the design of different DC-DC converter circuits (isolated and non-isolated type) and verifying through experimentation. |
| CO5: | Understand the design and operation of single phase Voltage Source Inverter circuit topology with SinPWM control and simulation of the same circuit in MATLAB-SIMULINK platform. |

Electrical Engineering ,2023-24

VII Semester

| Subject Code: 7EE5-11 | Wind and Solae Energy System |
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| CO1 | Student will be able to summarize and categorize the environmental aspects of non-conventional energy resources. |
| CO2 | Student will be able to explain and relate the need of renewable energy resources, historical and latest developments. |
| CO3 | Students will be able to analyze the use of solar energy and the various components used in the energy production with respect to applications like-heating, cooling, desalination, power generation, drying, cooking etc. |
| CO4 | Students will be able to demonstrate the need of Wind Energy and the various components used in energy generation and show the classifications. |

| Subject Code: 7AG6-60.2 | Environmental Engineering and Disaster Management |
|-------------------------|---|
| CO1 | To identify the significance of a secure water supply system, describe the needs for domestic water in urban and rural locations, and depict various water supply sources, including intakes and delivery systems. |
| CO2 | To review drinking water quality, familiarise themselves with Indian Standards for drinking water, and comprehend the significance of water treatment for ensuring safe drinking water. Also recognise the importance of sanitation in maintaining public health. |
| CO3 | To examine the quantity, characteristics, and appropriate disposal methods of domestic wastewater in both urban and rural areas. To understand different sewer types, design discharge, and hydraulic design considerations for effective wastewater management. |
| CO4 | To identify the quantity, characteristics, and suitable disposal methods for solid waste in urban and rural areas. Discuss the concept of air pollution, the different types of pollutants, their properties, and their effects on living beings. |
| CO5 | To review various types of disasters and recognise the importance of disaster management. Illustrate the role of disaster management in mitigating the impact of disasters on communities and environments. |

| Subject Code: 7EE4-21 | Embedded System Lab |
|-----------------------|---|
| CO1 | To teach the fundamentals of Embedded sytems |
| CO2 | To clarify the way in which circuits are designed using Microcontrollers AND MICROPROCESSOR for various applications. |
| CO3 | To make the Student understand use of microcontroller and microprocessor in real life application |
| CO4 | To give students an intuitive feeling of how microcontroller circuits operate |
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| Subject Code: 7EE4-22 | Advance control system lab |
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| CO1 | Ability to formulate transfer function for given control system problems. |
| CO2 | Ability to formulate transfer function for given control system problems. |
| CO3 | Ability to formulate transfer function for given control system problems. |
| CO4 | Ability to formulate transfer function for given control system problems. |
| CO5 | Ability to design PID controllers for given control system model |

VIII Semester

| Subject Code: 8EE4-11 | HVDC Transmission System |
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| CO1 | Student will be able to explain HVDC transmission and HVDC converters and the applicability and construct the advantage of HVDC transmission over conventional AC transmission. |
| CO2 | Student will be able to formulate and solve mathematical problems related to rectifier and inverter control methods and learn about different control schemes as well as starting and stopping of DC links |
| CO3 | Students will be able to analyze the different harmonics generated by the converters and their variation with the change in firing angles. |
| CO4 | Students will be able to develop harmonic models and use the knowledge of circuit theory to design filters and assess the requirement and type of protection for the filters. |
| CO5 | Student will be able to apply and identify the nature of faults happening on both the AC and DC sides of the converters and prepare protection schemes for the same |

| Subject Code: 8AN6-60.2 | Disaster Management |
|-------------------------|--|
| CO1 | Explain the concepts of disasters and hazards, understand their social and environmental implications, and assess risk and vulnerability in various scenarios. |
| CO2 | Identify different types of disasters, including hydro-meteorological disasters and geological disasters, and analyse the causes, impacts, and potential preventive measures for each type of disaster. |
| CO3 | Recognise various man-made disasters, such as textile processing industrial hazards, major power breakdowns, traffic accidents, and fire hazards. To understand the factors contributing to these disasters and explore ways to prevent or mitigate their effects. |
| CO4 | To understand the management roles in disaster mitigation specifically related to the textile industry and illustrate the strategies and policies implemented by management to reduce disaster risks and ensure business continuity. |
| CO5 | To comprehend the responsibilities of production personnel in disaster preparedness, response, and recovery, ensuring the safety of the workforce, and minimising production disruptions during disasters. |

| Subject Code: 8EE4-21 | Energy Systems Lab |
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| CO1 | To teach the fundamentals of Energy systems. |

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| CO2 | To clarify Experiment of solar Charge controller, PWM, MPPT with boost converter and algorithms. |
| CO3 | To make the Student understand study of wind turbine generators with DC generators, DFIG , PMSG etc |
| CO4 | To design and simulate hybrid wind-solar power generation system using simulation software. |
| CO6 | Ability to design Lead, Lag, Lead-Lag systems in control systems. |

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| Subject Code: 5EE4-23 M | Subject Name: Microprocessor Lab |
| CO1 | To perform the micro programs like addition, subtraction etc. |
| CO2 | To perform the transfer a block of data from memory loction XXOO to another memory location XXOO in forward and reverse order. |
| CO3 | To perform the operation on peripheral devices |

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| Subject Code: 5EE4-21 | Subject Name: Power System-I Lab |
| CO1 | Ability to express types of substations, various bus–bar arrangements. |
| CO2 | Ability to explain basic schemes and single line diagram of hydro, thermal, nuclear and gas power plants. |
| CO3 | Study of high voltage testing of electrical equipment: line insulator, cable, bushing, power capacitor, and power transformer. |
| CO4 | Design an EHV transmission line. |
| CO5 | Ability to design an EHV transmission line. |
| CO6 | Ability to explain flash over voltage testing of insulators. |

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| Subject Code: 5EE4-24 | Subject Name: System programing Lab |
| CO1 | Ability to express programming & simulation for engineering problems. |
| CO2 | Ability to find importance of this software for Lab Experimentation. |
| CO3 | Articulate importance of software’s in research by simulation work. |
| CO4 | In-depth knowledge of providing virtual instruments on LabVIEW Environment. |
| CO5 | Ability to write basic mathematical ,electrical ,electronic problems in Matlab. |
| CO6 | Ability to simulate basic electrical circuit in Simulink. |

| Course Outcome (COs) of ME Department | |
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| Department of Mechanical Engineering | |
| 3ME-201 | Advanced Engineering mathematics Year of study: 2023-24 |
| CO1 | Apply a range of mathematical theorems and methods to solve routine and complex analytic and applied problem |
| CO2 | Analyze data necessary for the solution of engineering problems |
| CO3 | Examine the effectiveness of proposed solutions to identified engineering problem |
| CO4 | Examine the Fourier Series Analysis. |
| CO5 | Examine Z transform and Understand Basic Mathematical Calculation |
| | |
| 3ME-102 | Technical Communication Year of study: 2023-24 |
| CO1 | Students will be able to learn and understand how to follow the various stages of the writing process like prewriting, writing and rewriting and apply them to technical and workplace writing. |
| CO2 | Students will understand the basic components of definitions, descriptions, process explanations, and other common technical writings |
| CO3 | Students will be able to read, understand and interpret material on technology. |
| CO4 | They will have appreciation for some of the ideas, issues and problems involved in writing about technology and in workplace writing. |
| CO5 | Students will be able to get an in-depth knowledge of technical communication used in professional life by getting to know all the forms and aspects of technical communication. They will be able to express themselves better in technical writing by understanding the concept, style and methodology used in technical communication |
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| 3ME3-04 | Engineering Mechanics Year of study: 2023-24 |
| CO1 | Students will be able to demonstrate knowledge of mathematics and mechanics with logics in resolution and composition of force systems |
| CO2 | Students will be able to demonstrate the ability to relate kinematics with kinetic equations on linear displacement, velocity and acceleration |
| CO3 | Students will be able to develop the confidence for self learning in application of equilibrium conditions for co-planar and nonco-planar force system |
| CO4 | Students will be able to correlate power; work and energy to solve practical problems. |
| CO5 | Students will be able to solve practical examples related to curvilinear motion |
| | |
| 3ME4-05 | Engineering Thermodynamics Year of study: 2023-24 |
| CO1 | Explain the basic principles and applications of the thermodynamics to the various real life systems. |
| CO2 | Describe fundamental laws of thermodynamics. |
| CO3 | Apply the concepts such as Entropy, Energy Balance also the calculations of heat, work and other important thermodynamic properties for various ideal gas processes. |
| CO4 | Estimate performance of various thermodynamic gas power cycles and gas refrigeration cycle and availability in each case. |
| CO5 | Estimate Pure Substance problem and Analysis of Substance |
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| 3ME4-06 | Material Science Engineering Year of study: 2023-24 |
| CO1 | Student will be able to apply core concepts in Materials Science to solve engineering problems |
| CO2 | Student will be able to interpret about material fundamental and material processing |
| CO3 | Students will be able to distinguish the defects in crystal and its effect on crystal properties. |

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| CO4 | Students will be able to figure out the different mechanical properties of material by studying different destructive and non-destructive testing |
| CO6 | Students will be able to understand, articulate and utilize corrosion prevention strategies and estimate corrosion behavior of materials and components |
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| 3ME4-07 | Mechanics of Solids Year of study: 2023-24 |
| CO1 | To understand the basics of material properties, stress and strain |
| CO2 | To apply knowledge of mathematics, science, for engineering applications |
| CO3 | Ability to identify, formulate, and solve engineering & real life problems |
| CO4 | Ability to design and conduct experiments, as well as to analyze and interpret data |
| CO5 | To Design Pressure Vessels and Find Stress Concentration Factor |
| | |
| 3ME4-21 | Machine Drawing Practice Year of study: 2023-24 |
| CO1 | Learn the basic concepts and to draw the views of section of solids, orthographic projections and threaded fasteners. |
| CO2 | Create assembly and get the detailed drawing of machine components. |
| CO3 | Represent tolerances and the levels of surface finish of machine elements. |
| CO4 | Develop the ability to apply Limits, Fits, and Dimensional Tolerances, as well as Geometric Tolerances to components and assemblies on Engineering Drawings. |
| CO5 | Develop an ability to create 2D drawings from 3D models. |
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| 3ME4-22 | Material Testing Lab Year of study: 2023-24 |
| CO1 | Learn the principles of materials science and engineering through lab investigation. |
| CO2 | Learn the basic skills required to properly use materials science Instrument. |
| CO3 | Analyze mechanical properties of materials. |
| CO4 | Perform Rockwell hardness tester for measurement of hardness. |
| CO5 | Analyze impact test, fatigue test and bending test. |
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| 3ME4-23 | Basic Mechanical Engineering Lab Year of study: 2023-24 |
| CO1 | Do hands on assembling and disassembling of SI & CI Engine. |
| CO2 | Do hands on assembling and disassembling of bicycle & sewing machine. |
| CO3 | Understand working principles & classification of boilers and their accessories. |
| CO4 | Understand working principles & classification of pumps. |
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| 3ME4-24 | MATLAB Year of study: 2023-24 |
| CO1 | Use MATLAB effectively to analyze and visualize data. |
| CO2 | Apply numeric techniques and computer simulations to solve engineering-related problems. |
| CO3 | Apply a top-down, modular, and systematic approach to design, write, test, and debug sequential MATLAB programs to achieve computational objectives. |
| CO4 | Design and document computer programs and analyses in a careful and complete manner so as to effectively communicate results, to facilitate evaluation. |
| CO5 | Create and control simple plot and user-interface graphics objects in MATLAB. |
| | |
| 4ME2-01 | Data Analytics Year of study: 2023-24 |
| CO1 | Describe Data Analytics and the skill sets need for a data analyst. |
| CO2 | Explain statistical inference and probability distribution commonly used as foundation for statistical modelling |

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| CO3 | Explain statistical inference and probability distribution commonly used as foundation for statistical modelling |
| CO4 | Identify common approaches and algorithms for basic features selection, decision trees and factor analysis. |
| CO5 | Apply common approaches and algorithms used for Cluster analysis and Time series model |
| | |
| 4ME1-03 | Managerial Economics and Financial Accounting Year of study: 2023-24 |
| CO1 | Understanding the basic concepts of managerial economics. |
| CO2 | Understanding the economic goals of the firms and optimal decision making. |
| CO3 | Basic concepts of Demand, Supply and Equilibrium and their determinants. • Analyzing the effect of these factors on market dynamics. |
| CO4 | Understanding and estimating production function. • Law of DMR and three stages of production. • Isoquant and Isocost and finding out optimal combinations of inputs. |
| CO5 | Pricing and output decisions of monopolistic and oligopoly firm. • Effect of non-price factors on products and services of monopolistic and oligopoly firms |
| CO6 | To understand the banking concepts |
| | |
| 4ME3-04 | Digital Electronics Year of study: 2023-24 |
| CO1 | Basic knowledge of the fundamental concepts and techniques used in digital electronics |
| CO2 | Understand and examine the structure of various number systems and its application in digital design. |
| CO3 | Understand, analyze and design various combinational and sequential circuits. |
| CO4 | Identify basic requirements for a design application and propose a cost effective solution. |
| CO5 | Identify and prevent various hazards and timing problems in a digital design |
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| 4ME4-05 | Fluid Mechanics & Machines Year of study: 2023-24 |
| CO1 | Students will summarize the fundamental concepts of fluid mechanics including continuum, velocity field, surface tension, flow visualization etc |
| CO2 | Students can create the basic equation of fluid statics to determine forces on planer and curved surfaces that are submerged in a static fluid. |
| CO3 | Students will be able to formulate the forces and moments on surfaces of various shapes and simple machines |
| CO4 | Students will able to combine Euleŕs and Bernoulliŕs equations and the conservation of mass to determine velocities, pressures, and accelerations for incompressible and in viscid fluids |
| CO5 | Students will be able to arrange pipe fittings arrangement as perthe requirements. |
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| 4ME4-06 | Manufacturing Processes Year of study: 2023-24 |
| CO1 | Students will be able to understand materials, types and allowances of patterns used in casting and analyze the components of moulds |
| CO2 | Student will be able to design core, core print and gating system in metal casting processes |
| CO3 | Students will be able to understand arc, gas, solid state and resistance welding processes. |
| CO4 | Students will be able to develop process-maps for metal forming processes using plasticity principles |
| CO5 | Students will be able to Identify the effect of process variables to manufacture defect free products. |
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| 4ME4-07 | Theory of Machines Year of study: 2023-24 |
| CO1 | Understand the principles of kinematic pairs, chains and their classification, DOF, inversions, equivalent chains and planar mechanisms |
| CO2 | Analyze the planar mechanisms for position, velocity and acceleration. |

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| CO3 | Synthesize planar four bars and slider crank mechanisms for specified kinematic conditions. |
| CO4 | Evaluate gear tooth geometry and select appropriate gears for the required applications. |
| CO5 | Design cams and followers for specified motion profiles. |
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| 4ME3-21 | Digital Electronics Lab Year of study: 2023-24 |
| CO1 | Distinguish between analog and digital systems. |
| CO2 | Identify the various digital ICs and understand their operation. |
| CO3 | Apply Boolean laws and K-map to simplify the digital circuits. |
| CO4 | Understand the function of elementary digital circuits under real and simulated environment. |
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| 4ME4-22 | Fluid Mechanics Lab Year of study: 2023-24 |
| CO1 | Conduct experiments for a given purpose |
| CO2 | Analyze experimental data and develop empirical equations |
| CO3 | Verify the basic principles and equations of fluid mechanics |
| CO4 | Work individually and as a team |
| CO5 | Communicate in written reports and oral presentation. |
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| 4ME4-23 | Production practice-I Year of study: 2023-24 |
| CO1 | Learn about material removal in various modern manufacturing processes. |
| CO2 | Gaining knowledge of Foundry and Welding, etc. |
| CO3 | Analyze the processes and evaluate the role of each process parameter during machining of various advanced materials. |
| CO4 | Solve the various problems for the given profiles to be imparted on the work specimens. |
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| 4ME4-24 | Theory of Machine Lab Year of study: 2023-24 |
| CO1 | Get the practical knowledge about various mechanisms. |
| CO2 | Learn about applications of various mechanisms. |
| CO3 | Go through and observe the various experiments/working of different mechanism like cam-follower mechanism, four bar chain, steering mechanism etc. |
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| 5ME3-01 | Mechatronics Year of study: 2023-24 |
| CO1 | Understand key elements of Mechatronics system, representation into block diagram |
| CO2 | Understand & describe principles of sensors, its characteristics, interfacing with DAQ microcontroller |
| CO3 | Understand the concept of PLC system and code the ladder programming, and significance of PLC systems in industrial application |
| CO4 | Understand control actions such as Proportional, derivative and integral and study its significance in industrial applications |
| CO5 | Understand about PLC |
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| 5ME4-02 | Heat Transfer Year of study: 2023-24 |
| CO1 | Understand the basic modes of heat transfer & Determine Thermal Conductivity |
| CO2 | Compute temperature distribution in steady-state and unsteady-state heat conduction & Determine Stefan Boltzmann Constant |
| CO3 | Understand and analyse heat transfer through extended surfaces. & Estimate heat transfer coefficient & Measure heat transfer coefficient in free convection |
| CO4 | Interpret and analyze forced and free convection heat transfer & To Study and Compare |

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| | LMTD and Effectiveness |
| CO5 | Understand the principles of radiation heat transfer and basics of mass transfer |
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| 5ME4-03 | Manufacturing Technology Year of study: 2023-24 |
| CO1 | Analyze and select the appropriate manufacturing process for a given application. This outcome would involve the ability to evaluate a specific manufacturing need and determine which process or combination of processes would be most appropriate for achieving the desired outcome. |
| CO2 | Demonstrate proficiency in using CNC machines and programming techniques. This outcome would involve demonstrating practical skills related to programming and operating CNC machines, including understanding of G-code, tool selection, and workpiece setup |
| CO3 | Apply principles of additive manufacturing to design and produce a part. This outcome would involve the ability to conceptualize and produce a part using additive manufacturing techniques, such as 3D printing, while adhering to principles such as tolerancing, material selection, and production time/cost optimization |
| CO4 | Evaluate the quality of a finished product and identify potential process improvements. This outcome would involve the ability to identify and evaluate key factors in the quality of a finished product, such as surface finish, dimensional accuracy, or material properties, and then suggest potential modifications to the manufacturing process to improve quality |
| CO5 | Communicate effectively about manufacturing technologies and processes. This outcome would involve the ability to effectively communicate about manufacturing processes and their benefits/limitations to both technical and non-technical audiences. This could involve written reports, oral presentations, or other forms of communication |
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| 5ME4-04 | Design of Machine Element-I Year of study: 2023-24 |
| CO1 | Explain the fundamental scientific principles of mechanical design (stress, strain, material properties, failure theories, fatigue phenomena, fracture mechanics) and their importance and use in design analysis |
| CO2 | Develop practical experience with the function, design and analysis of actual machine components including prediction of their life and failures |
| CO3 | Reorganize systematic approaches to mechanical design and analysis procedures |
| CO4 | Summarize component behavior subjected to loads and identify the failure criteria. |
| CO5 | Design a machine component using theories of failure. |
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| 5ME4-05 | Principles of Management Year of study: 2023-24 |
| CO1 | Explain the role of a manager and how it relates to the organization's mission. |
| CO2 | To combine management, its four basic functions and skills. |
| CO3 | Summarize critical management theories and philosophies and how to apply them. |
| CO4 | Comply the concept of social responsiveness and its benefits. |
| CO5 | Comply the part communication plays in the management function. |
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| 5ME5-12 | Automobile Engineering Year of study: 2023-24 |
| CO1 | Student will be able to understand the basic lay-out of an automobile |
| CO2 | Student will be able to understand the operation of engine cooling, lubrication, ignition, electrical and air conditioning systems |
| CO3 | Students will be able to understand the principles of transmission, suspension, steering and braking systems. |
| CO4 | Students will be able to understand automotive electronics. |
| CO5 | Students will be able to understand latest developments in automobiles |

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| 5ME3-21 | Mechatronics Lab Year of study: 2023-24 |
| CO1 | Identification of key elements of mechatronics system and its representation in terms of block diagram |
| CO2 | Understanding the concept of signal processing and use of interfacing systems such as ADC, DAC, digital I/O |
| CO3 | Interfacing of Sensors, Actuators using appropriate DAQ micro-controller |
| CO4 | Time and Frequency domain analysis of system model (for control application) |
| CO5 | PID control implementation on real time systems |
| CO6 | Development of PLC ladder programming and implementation of real life system. |
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| 5ME4-22 | Heat Transfer Lab Year of study: 2023-24 |
| CO1 | Determine Thermal Conductivity. |
| CO2 | Determine Stefan Boltzmann Constant. |
| CO3 | Estimate heat transfer coefficient. |
| CO4 | Measure heat transfer coefficient in free convection |
| CO5 | To Study and Compare LMTD and Effectiveness |
| CO6 | Analyze rates of heat transfer for different materials |
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| 5ME4-23 | Production Engineering Lab Year of study: 2023-24 |
| CO1 | Perform Linear and Angular measurements. |
| CO2 | Understand the concept of Slip gauges. |
| CO3 | Perform tests to measure gear tooth profiles and screw threads. |
| CO4 | To measure flatness and surface defects in the given test specimen |
| CO5 | Force measurements during turning, drilling and milling operations. |
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| 5ME4-24 | Machine Design Practice-I Year of study: 2023-24 |
| CO1 | Understand the problem and draw the design specifications. |
| CO2 | Solve problems related to fits and tolerances |
| CO3 | Understand component behavior subjected to loads and identify the failure criteria |
| CO4 | Design beams, cotters and knuckle etc |
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| 6ME3-01 | Measurement & Metrology Year of study: 2023-24 |
| CO1 | Student will be able to explain the basics of measurement, limits, fits. |
| CO2 | Student will be able to identify the uses of gauges and comparators. |
| CO3 | Students will be able to understand the significance of measurement system, errors. |
| CO4 | Students will be able to understand interpret measurement of field variables like force, torque |
| CO5 | Students will be able to comprehend the fundamentals of thermocouple and strain. |
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| 6ME4-02 | Computer Integrated Manufacturing System Year of study: 2023-24 |
| CO1 | The students will be able to use computers in manufacturing and to combine the advanced knowledge in manufacturing tools, solutions to industrial applications |
| CO2 | Students will be able to apply knowledge about Computer Aided Quality control and Process Planning Control. |
| CO3 | Students will be able to apply knowledge about Computer Aided Quality control and Process Planning Control. |
| CO4 | Generate habit of individual critical thinking in analysing a complex problem in the |

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| | computer aided designing, manufacturing and optimization |
| CO5 | Formulate CNC part programs using CADEM simulation package for simulation of machining operations such as Turning, Drilling & Milling. |
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| 6ME4-03 | Mechanical Vibration Year of study: 2023-24 |
| CO1 | Explain the causes and effects of vibration in mechanical systems |
| CO2 | Formulate schematic models for physical systems and formulate governing equations of motion. |
| CO3 | Explain the role of damping, stiffness and inertia in mechanical systems |
| CO4 | Summarise rotating and reciprocating systems and compute critical speeds. |
| CO5 | Reorganize and design machine supporting structures, vibration isolators and absorbers. |
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| 6ME4-04 | Design of Machine Element-II Year of study: 2023-24 |
| CO1 | Ability to design mechanical system for fluctuating loads. |
| CO2 | Ability to decide optimum design parameters for mechanical systems |
| CO3 | Ability to analyze the stress and strain of mechanical components and understand, identify and quantify failure modes for mechanical part. |
| CO4 | Enhancement in proficiency of CAD software for designing Mechanical systems and to generate production drawing. |
| CO5 | Making actual models of machine elements like bearings, gears connecting rod with all calculations |
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| 6ME4-05 | Quality Management Year of study: 2023-24 |
| CO1 | Making actual models of machine elements like bearings, gears connecting rod with all calculations |
| CO2 | Making actual models of machine elements like bearings, gears connecting rod with all calculations |
| CO3 | Students will be able to Construct and interpret control charts for variables such as x-bar, r, s charts. |
| CO4 | Students will be able to Construct the sampling plan and OC curve etc |
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| 6ME5-12 | Non-Conventional Machining Methods Year of study: 2023-24 |
| CO1 | Understand the principles and applications of refrigeration systems. |
| CO2 | Understand vapour compression refrigeration system and identify methods for performance improvement. |
| CO3 | Study the working principles of air, vapour absorption, thermoelectric and steam-jet refrigeration systems. |
| CO4 | Analyze air-conditioning processes using the principles of psychrometry. |
| CO5 | Evaluate cooling and heating loads in an air-conditioning system. |
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| 6ME4-21 | Computer Integrated Manufacturing Lab Year of study: 2023-24 |
| CO1 | Create the G-code program (with a standard computer post processor) of a work-piece on a standard numerically controlled machine tool with CNC controls. |
| CO2 | Create basic and advanced CNC programs from imported CAD data using several CAM systems. |
| CO3 | Use effectively CAD / CAM systems in order to produce the final NC code for the manufacturing of various mechanical parts and carry out exchange of data between CAD and CAM systems |
| CO4 | Compare the operation and programming of CNC machine tool using manual programming |
| CO5 | Compare the operation and programming of CNC machine tool using CAM systems. |

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| 6ME4-22 | Vibration Engineering Lab Year of study: 2023-24 |
| CO1 | Design on experiment to measure the periodic time of free-vibrations of single degree and multi degree of freedom system |
| CO2 | Analyze the mechanical vibrations to determine the material properties of mechanical elements used |
| CO3 | Understand the fundamental of vibration measurement in the real world |
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| 6ME4-23 | Machine Design Practice – II Year of study: 2023-24 |
| CO1 | Design mechanical components under fatigue loading. |
| CO2 | Design helical compression, tension and torsional springs. |
| CO3 | Design of bolts subjected to variable stresses. |
| CO4 | Design of spur, bevel and helical gears. |
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| 6ME4-24 | Thermal Engineering Lab-1 Year of study: 2023-24 |
| CO1 | Differentiate between SI & CI Engines. |
| CO2 | Differentiate between 2-stroke & 4-stroke Engines |
| CO3 | Understand theoretical and actual working cycles of SI & CI Engines. |
| CO4 | Demonstrate steering system. |
| CO5 | Demonstrate Ignition & Fuel Supply System. |
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| 7ME5-11 | IC Engine Year of study: 2023-24 |
| CO1 | Explain working and performance of IC Engines through thermodynamic cycles. |
| CO2 | Explain the combustion phenomena in SI and CI engines and factors influencing combustion chamber design. |
| CO3 | To summarize formation mechanism of IC engines, its effects and the legislation standards. |
| CO4 | Explain working principles of instrumentation used for engine performance and emission parameters. |
| CO5 | Develop methods for improving the IC engine performance. |
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| 7AG6-60.2 | Environmental Engineering and Disaster Management Year of study: 2023-24 |
| CO1 | Analyse characteristics of water and wastewater. |
| CO2 | Estimate the quantity of drinking water and domestic wastewater generated. |
| CO3 | Design components of water supply systems. |
| CO4 | Accumulate the information about water supply fittings. |
| CO5 | Calculate physical chemical properties by lab experiments for sewage sample. |
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| 7ME4-21 | Finite Element Analysis Lab Year of study: 2023-24 |
| CO1 | Demonstrate the ability to create models for trusses, frames, plate structures, machine parts, and components using ANSYS general purpose software |
| CO2 | Model multi-dimensional heat transfer problems using ANSYS |
| CO3 | Demonstrate the ability to evaluate and interpret FEA analysis results for design and evaluation purposes |
| CO4 | Develop a basic understanding of the limitations of the FE method and understand the possible error sources in its use. |
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| 7ME4-22 | Thermal Engineering Lab-II Year of study: 2023-24 |
| CO1 | Conduct constant speed and variable speed tests on IC engines and interpret their performance. |
| CO2 | Estimate energy distribution by conducting heat balance test on IC engines |
| CO3 | Evaluate performance parameters of steam power plant. |
| CO4 | Determine performance parameters of refrigeration and air-conditioning systems |
| CO5 | Evaluate the performance of turbo machines. |
| 7ME4-23 | Quality Control Lab Year of study: 2023-24 |
| CO1 | Understand the role of statistical tools in quality improvement. |
| CO2 | Understand the different types of variability, rational subgroups, and how a control chart is used to detect assignable causes. |
| CO3 | Construct and interpret control charts for variables such as x-bar, r, s, and individuals charts. |
| CO4 | Conduct the experiments related to probability distribution. |
| CO5 | Solve the SQC problems using MINITAB software. |
| 8ME5-12 | Supply & Operations Management Year of study: 2023-24 |
| CO1 | Summarize the fundamental operations concepts, key principles of its management, and relevant analysis approaches. |
| CO2 | Develop the ability to understand a real-world unstructured problem, and gather necessary information and data to formulate into a structured problem |
| CO3 | To develop quantitative and qualitative analysis framework and solution methods, and appropriately implement them to obtain meaningful solutions |
| CO4 | Set up strengths and weaknesses of alternative solutions and obtain relevant managerial insights. |
| CO5 | Setup Facilities Layout , Facility Location and Enhance Product Qulaity. |
| 8TT6-60.2 | Disaster Management Year of study: 2023-24 |
| CO1 | Student will be able to categorize the different types of disaster andtheircharacteristics |
| CO2 | Students will be able to make an Evaluation of hazard and vulnerability |
| CO3 | Students will be able to outline the concept of capacity building and strengthening capacity to reduced is asterrisk |
| CO4 | Students will be able to write Disaster coping strategies, industrialsafety plan, safety norms, mass media and disaster management intextile industry. |
| CO5 | Students will be able to describe Planning in disaster management,formulatingriskreductionplanandtounderstand actandpolices in India |
| 8ME4-21 | Industrial Engineering Lab-II Year of study: 2023-24 |
| CO1 | Apply industrial engineering concept in industrial environment. |
| CO2 | Understand different concepts regarding Organization and Productivity in industries. |
| CO3 | Manage and implement different concepts involved in work and method study and understanding of work contents in different situations. |
| CO4 | Undertake small case study based project works regarding work measurement and time study. |
| 8ME4-22 | Metrology Lab Year of study: 2023-24 |
| CO1 | Develop quality standards of engineering products in industries |
| CO2 | Demonstrate work in quality control departments of industries and to ensure quality of products. |

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| CO3 | Analyze the measurement of the surface roughness and perform alignment tests. |
| CO4 | Develop the ability to apply the principles in instruments and measuring techniques. |
| CO5 | Demonstrate work in designing the instrumentation for a particular purpose and special purpose devices |