Maharaja Agrasen Institute of Technology (MAIT)

Programme Outcomes (POs), Programme Specific Outcomes (PSOs) & Course Outcomes (POs)

Programme Outcomes (Pos):
B.Tech.

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

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

PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

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

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

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

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

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

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

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

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

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

Programme Specific Outcomes (PSOs):

B.Tech:

Bachelor of Technology is a 4 year course which includes the specification, design, implementation and testing of engineering systems to professional standards and within a code of ethics. All students get an opportunity to consolidate their knowledge of the fundamentals, as well as to specialize in various areas. After the completion of Bachelor of Technology degree, Students can work in the field of IT industries, telecommunication, power generation and transmission multimedia, Automobile and Mechanical Industries, *etc*.

Programme Specific Outcomes

B.Tech- Computer Science & Engineering:

On completion of the B.Tech(Computer Science & Engineering) degree the graduates will be able to

PSO1: Apply standard Software Engineering practices and strategies in real-time software project development using open-source programming environment or commercial environment to deliver quality product for the organization success

PSO2: Design and develop computer programs/computer-based systems in the areas related to algorithms, networking, web design, cloud computing, IoT and data analytics of varying complexity

PSO3: Acquaint with the contemporary trends in industrial/research settings and thereby innovate novel solutions to existing problems

PSO4: Able to provide socially acceptable technical solutions to complex computer science engineering problems with the application of modern and appropriate techniques for sustainable development relevant to professional engineering practice.

PSO5: Able to apply the knowledge of ethical and management principles required to work in a team as well as to lead a team.

PSO6: Able to comprehend and write effective project reports in multidisciplinary environment in the context of changing technologies.

B.Tech- Electronics and Communication Engineering:

On the completion of the B.E (ECE) degree the Electronics and Communication graduates will be able to

PSO1: Apply the fundamental concept of Electronics and Communication Engineering to design a variety of components and systems for applications including signal processing, Communication, Networking, Embedded systems, VLSI and control system.

PSO2: Select and apply cutting-edge engineering hardware and software tools to solve complex Electronics and Communication Engineering problems.

BTech- Mechanical Engineering:

On completion of the BTech(Mechanical Engineering) degree the graduates will be able to

PSO1: Graduates of the program will achieve excellence in product design, thermal engineering and manufacturing system by acquiring knowledge in mathematics, science and designing principles.

PSO2: Graduate will be able to analyze, interpret and provide solutions to the real life mechanical engineering problems

PSO3: Graduate will develop an approach to solve multidisciplinary problems of manufacturing and allied industries.

PSO4: Graduates will learn managerial skills to work effectively in a team and in a society by following ethical and environmental practices

PSO5: Able to apply the knowledge of ethical and management principles required to work in a team as well as to lead a team.

PSO6: Graduate will respond to the demand of the society by engaging in lifelong learning.

B.Tech -Electrical and Electronics & Engineering

On completion of the B.Tech (Electrical and Electronics & Engineering) degree the graduates will be able to

PSO.1 The application of fundamental knowledge to indentify, formulate and investigate various real time problems of Electrical Machines, Power Electronics, Control System, Instrumentation System, Power System and Power Electronic systems.

PSO.2 The application of recent techniques along with modern software tools (like MATLAB, MULTISIM etc) for designing, simulating and analyzing electrical systems as well as electronic system to engage in lifelong learning.

PSO.3 The utilization of knowledge regarding project management techniques and sustainable technologies for developing projects related to Smart Power Grid, Automatic Controllers, Advanced Power System Protection, Wireless System, Power Quality, Energy Saving, Embedded Systems etc.

B.Tech -Civil Engineering

PSO. 1 Apply principles of mechanics and basic sciences to analyze civil engineering structures

PSO. 2 Survey, map, measure and analyze data for sustainable infrastructure planning.

PSO. 3 Characterize and evaluate materials for adoptability in civil engineering projects

PSO. 4 Analyze and design concrete & steel structures, earthen embankments, irrigation structures, water supply, waste treatment systems and transport systems.

PSO. 5 Apply best management practices for construction and maintenance of infrastructure facilities.

PSO. 6 Predict and forecast societal needs, floods, droughts, pollution and travel demand.

PSO. 7 Work and lead in multi-disciplinary projects and demonstrate social responsibility and professional ethics.

Course Outcomes (Cos):

B.Tech- Computer Science & Engineering:

Algoritms:

CO1:Analyze the pros and cons of applying the different design paradigms in different Contexts.
CO2:Exposure to randomization as a tool for developing algorithms.
CO3:Relevance of analysis to the design of efficient computer algorithms.
CO4:Identify the computational issues and apply suitable algorithms to solve it effectively
CO5:Conceptualize and design efficient and effective algorithmic solutions for different real-world problems.

Computer Networks:

CO1: Illustrate the concepts of Network Security and Compare Various Symmetric and Asymmetric Cryptographic methods used for Network Security.
CO2: Classify various Algorithms to be used at various TCP/IP Layers & to operate Digital Signature in Real World Situation
CO3: Summarize different Authentication Techniques & Describe programs like PGP & S/MIME
CO4: Implement IP Security Architecture &Transport Layer Security to identify the vulnerability of the Internet systems and recognize the mechanisms of the attacks, and apply them to design and evaluate counter-measure tools
CO5: Implement Firewall design principles and identify various intrusion detection systems and be able to achieve highest system security

Software Engineering:

CO1: Formulate problem by following Software Testing Life Cycle.
CO2: Design Manual Test cases for Software Project.
CO3:identify the realistic problem for different category of software.
CO4: Use automation testing tool students will be able test the software.
CO5: Follow the process related activity and testing techniques to work as team member.

Operating System:

CO1: Classify Linux Kernel mode with user mode & contrast between Kernel structures.
CO2: Identify and estimate process management & thread management strategies along with their different operations (Process creation)
CO3: Implement different system calls for various file handling operations.
CO4:determine paging and Caching techniques related to Virtual Memory.
CO5: construct shell scripts .
CO6: debate various case studies .

Artificial Intellegence:

CO1: Exhibit strong familiarity with a number of important AI techniques, including in particular search, knowledge representation, planning and constraint management.
CO2: Interpret the modern view of AI as the study of agents that receive percepts from the environment and perform actions.
CO3: Build awareness of AI facing major challenges and the complexity of typical problems within the field.
CO4: Assess critically the techniques presented and apply them to real world problems.
CO5: Develop self-learning and research skills to tackle a topic of interest on his/her own or as part of a team.

Cloud Computing:

CO1: Identify the appropriate cloud services for a given application.

CO2: Assess the comparative advantages and disadvantages of Virtualization technology.

CO3: Analyze authentication, confidentiality and privacy issues in cloud computing.

CO4: Identify security implications in cloud computing.

CO5: Understand the importance of protocols and standards in management for cloud services

Computer Graphics:

CO1: Describe different image representation, their mathematical representation and different their data structures used. K2

CO2: Classify different segmentation algorithm for given input K2

CO3: Create a 3D object from given set of images K3

CO4: Detect a moving object in video using the concept of motion analysis K3

CO5: Recognize the object using the concept of computer vision K4

Algoritm Analysis and Design

CO1: Identify Data Structures, Design paradigms and Computational complexity in the design of simple tools

CO2: Demonstrate relationships among NP-Complete Problems

CO3: Implement the approximate algorithms approach to solve some NP-Complete Problems.

CO4: Demonstraterandomness by solving some examples

CO5: Implement algorithms for geometry and large data-sets.

Cryptography and Network Security:

CO1: Identify Vulnerabilities in a Network

CO2: Solve Problems using various Algorithms

CO3: Identify Various Attacks and Formulate Defense Mechanism

CO4: Understand Wireless Security

CO5: Understand Web And DNS Security.

Distributed Database:

CO1: Aware of fundamentals of Distributed Database systems.
CO2: Use the different techniques of Distributed query processing.
CO3: Set the rules over management of transaction and concurrency control.
CO4: Familiar with parallel database system architecture.
CO5: Apprehend Machine Learning Algorithms.

Mobile Computing:

CO1: Understandand identify the GSM, GPRS and Bluetooth software model for mobile computing.
CO2: The ability to develop applications that are mobile-device specific and demonstrate current practice in mobile computing contexts.
CO3: Understanding of the characteristics and limitations of mobile hardware devices including their user-interface modalities
CO4: Analyze QoS over wire and wireless channels
CO5: Able to promote the awareness of the life-long learning,business ethics, professional ethics and current marketing scenarios.

Compiler Design:

CO1: Identify all essential steps for automatically converting source code into object code.(Understand)
CO2: Generate the low-level code for calling functions/methods in modern languages. (Apply)
CO3: Discuss opportunities for optimization introduced by naïve translation and approaches for achieving optimization such as instruction selection, instruction scheduling , register allocation, and peephole optimization.(Apply)
CO4: Interpret benefits and limitations of automatic memory management. (Understand)
CO5: Explain advantages, disadvantages and difficulties of just in time and dynamic recompilation.

Dataware House and Datamining:

CO1: Understand the concepts of Big data and challenges in processing Big Data
CO2: Understand Hadoop architecture and eco-system.
CO3: Gainconceptual understanding of Hadoop Distributed File System.
CO4: Understand the concepts of map and reduce and functional programming
CO5: Identify appropriate techniques and tools to solve actual Big Data problems.

Multimedia Technologies:

CO1: Identify different media; representations of different multimedia data and data formats.
CO2: Analyze various compression techniques.
CO3: Compare various audio and video file formats.
CO4: Apply different coding technique for solving real world problems.
CO5: Choose optical storage media suitable for multimedia applications.

Data Structures:

CO1: Apply measures of efficiency to algorithms and Compare various linear data structures like Stack ADT, Queue ADT, Linked lists.

CO2: Analyze and compare linear data structures and analyze different searching and hashing techniques.
CO3: Analyze and compare various non – linear data structures like Trees and Graphs.
CO4: Analyze and compare various sorting algorithms, to select from a range of possible options, to provide justification for that selection, and to implement the algorithm in a particular context.
CO5: Understand and execute lab experiments and develop a small project along with his/her team members.

Computer Organization & Architecture:

CO1: Student will be able to Understand the Overview of von Neumann architecture and Pipelining
CO2: Student will be able to Demonstrate Hierarchical Memory Technology
CO3: Student will be able to Explain the Instruction level parallelism
CO4: Student will be able to Analyze the Multiprocessor Architecture
CO5: Student will be able to Analyze the Multiprocessor Architecture

Soft Computing:

CO1: Explain soft computing differentiating hard and soft computing and enumerate briefly overview of fuzzy systems , neural networks and genetic algorithms.
CO2: Demonstrate a fuzzy controller using fuzzy logic systems
CO3: Interpret pattern recognition using artificial neural network
CO4: Interpret Genetic algorithms and operations.

Machine Learning:

CO1: Understand and apply the differences among the styles of learning: supervised, reinforcement, unsupervised and parametric methods
CO2: Comprehend probabilistic methods for learning and for classification
CO3: Analyze the non parametric methods and decision trees to take the proper decision making.
CO4: Understand rule based knowledge and Kernel machines to reduce the cost of various statistical methods , Bayesian Estimation, HMM models

Project-I:

CO1: Identify and Finalize problem statement by surveying variety of domains.
CO2: Perform requirement analysis and identify design methodologies
CO3: Apply advanced programming techniques
CO4: Present technical report by applying different visualization tools and Evaluation metrics.

Project-II:

CO1: Review the literature and develop solutions for framed problem statement.
CO2: Implement hardware and/or software techniques for identified problems.
CO3: Test and analyze the modules of planned project.
CO4: Write technical report and deliver presentation.
CO5: Apply engineering and management principles to achieve project goal

B.Tech- Electronics & Communication Engineering

Basic Electronics Engineering:

CO1 Characterize semiconductors, diodes, transistors and operational amplifiers
CO2 Design simple analog circuits
CO3 Design simple combinational and sequential logic circuits
CO4 Identify functions of digital multimeter, cathode ray oscilloscope and transducers in the measurement of physical variables
CO5 Understand fundamental principles of radio

Analog Electronics:

CO1 Study and analyze the behavior of semiconductor devices.
CO2 Characterize the current flow of a bipolar transistor in CB,CE and CC configurations
CO3 Bias the transistors and FETs for amplifier applications.
CO4 Realize simple amplifier circuits using BJT and FET.
CO5 Design half wave and full wave rectifiers with filters

Digital Circuit Design:

CO1 Design and analyze combinational and sequential logic circuits through HDL models
CO2 Optimize combinational and sequential logic circuits
CO3 Understand fault detection techniques for digital logic circuits
CO4 Analyze a memory cell and apply for organizing larger memories

Signals and Systems:

CO1 Classify the signals as Continuous time and Discrete time
CO2 Analyze the spectral characteristics of signals using Fourier analysis.
CO3 Classify systems based on their properties and determine the response of LTI system using convolution.
CO4 Identify system properties based on impulse response and Fourier analysis.
CO5 Apply transforms techniques to analyze continuous-time and discrete-time signals and systems.

Electro Magnetic Field and Theory:

CO1 Solve Maxwell's equations using vector calculus in three standard coordinate systems
CO2 Deduce EM wave propagation in free space and in dielectric medium
CO3 Analyze electromagnetic wave propagation in guiding structures under various matching conditions CO4 Understand the power flow mechanism in guiding structures and in unbounded medium

Communication System-I:

CO1 Compare the performance of AM, FM and PM schemes with reference to SNR
CO2 Understand noise as a random process and its effect on communication receivers
CO3 Evaluate the performance of PCM, DPCM and DM in a digital communication system
CO4 Identify source coding and channel coding schemes for a given communication link

Antennas and Propagation:

CO1 Understand the concept of radiation through mathematical formulation
CO2 Plot the characteristics of wire and aperture antennas

CO3 Develop the performance characteristics of array antennas
CO4 Measure the antenna parameters
CO5 Understand the behavior of nature on em wave propagation

Linear Integrated circuits And Applications:

CO1 Design op-amp circuits to perform arithmetic operations.
CO2 Analyze and design linear and non-linear applications using op-amps.
CO3 Analyze and design oscillators and filters using functional ICs.
CO4 Choose appropriate A/D and D/A converters for signal processing applications.

Communication System-II

CO1 Model a digital communication system.
CO2 Compute probability of error and inter symbol interference from eye diagram in data transmission.
CO3 Obtain the power spectra of digital modulated signals.
CO4 Design encoder and decoder schemes for error control.

Digital Signal Processing

CO1 Find DFT of a given signal through Fast Fourier Transform Techniques
CO2 Design FIR and IIR type digital filters.
CO3 Identify filter structures and evaluate the coefficient quantization effects
CO4 Understand sample rate conversion techniques.
CO5 Compare the architectures of DSP and General Purpose Processors.

Micro Controllers:

CO1 Understand the evolution of processor architectures
CO2 Write simple programs in assembly language of Pentium processor
CO3 Interface peripheral devices and memory with microcontrollers
CO4 Program an ARM processor for DSP Applications

Computer Networks:

CO1 Identify the issues and challenges in the architecture of a computer network.
CO2 Understand the ISO/OSI seven layers in a network.
CO3 Realize protocols at different layers of a network hierarchy.
CO4 Recognize security issues in a network.

Satellite Communication:

CO1 Understand the orbital and functional principles of satellite communication systems
CO2 Architect, interpret, and select appropriate technologies for implementation of specified satellite communication systems
CO3 Analyse and evaluate a satellite link and suggest enhancements to improve the link performance.
O4 Select an appropriate modulation, multiplexing, coding and multiple access schemes for a given satellite communication link.
CO5 Specify, design, prototype and test analog and digital satellite communication systems as per given specifications.

Embedded Systems:

CO1 Identify the hardware and software components of an embedded system
CO2 Choose appropriate embedded system architecture for the given application
CO3 Write programs for optimized performance of an embedded system and validate

Optical Fiber Communication:

CO1 Identify and characterize different components of an Optical Fiber Communication link.

CO2 Analyze optical source, Fiber and Detector operational parameters

CO3 Compute optical fiber link design parameters

CO4 Understand WDM, Optical Amplifiers, Optical Switching and networking technology concepts.

Cellular and Mobile Communications:

CO1 Understand the evolution of cellular communication systems upto and beyond 3G

CO2 Design a cellular link and estimate the power budget.

CO3 Choose proper multiple accessing methods depending on channel model

CO4 Identify traffic channels for call processing

CO5 Calculate key performance metrics of a cellular communication system.

LINEAR CONTROL SYSTEMS:

CO1 Analyze electromechanical systems using mathematical modeling

CO2 Determine Transient and Steady State behavior of systems using standard test signals

CO3 Analyze linear and non-linear systems for steady state errors, absolute stability and relative stability

CO4 Design a stable control system satisfying requirements of stability and reduced steady state error

COMMUNICATION SYSTEMS:

CO1 Understand different modulation and demodulation schemes for analog communications.

CO2 Design analog communication systems to meet desired application requirements

CO3 Evaluate fundamental communication system parameters, such as bandwidth, power, signal to quantization noise ratio etc.

CO4 Elucidate design tradeoffs and performance of communications systems.

MICROPROCESSOR SYSTEMS:

CO1 Develop basic understanding of microprocessor architecture.

CO2 Design Microprocessor and Microcontroller based systems.

CO3 Understand C, C++ and assembly language programming

CO4 Understand concept of interfacing of peripheral devices and their applications

ELECTRONIC MEASUREMENTS AND INSTRUMENTAION:

CO1 Apply knowledge of instruments for effective use

CO2 Select suitable instruments for typical measurements.

CO3 Identify various transducers to measure strain, temperature and displacement.

CO4 Understand data acquisition system and general purpose interfacing bus.

B.Tech- Mechanical Engineering:

Manufacturing Process

CO1. Understand and analyze foundry practices like pattern making, mold making, Core making and Inspection of defects.

CO2. Understand and analyze Hot and Cold Working, Rolling, Forging, Extrusion and Drawing Processes.

CO3. Understand different plastic molding processes, Extrusion of Plastic and Thermoforming

CO4. Understand different Welding and joining processes and its defects

CO5. Understand, Design and Analyze different sheet metal working processes

CO6. Understand the constructional details and Working of Centre Lathe

Engineering Thermodynamics:

CO1. Will able to Apply various laws of thermodynamics to various processes and real systems.
CO2. Apply the concept of Entropy, Calculate heat, work and other important thermodynamic properties for various ideal gas processes.
CO3. Estimate performance of various Thermodynamic gas power cycles and gas refrigeration cycle and availability in each case.
CO4. Estimate the condition of steam and performance of vapour power cycle and vapour compression cycle.
CO5. Estimate Stoichiometric air required for combustion, performance of steam generators and natural draught requirements in boiler plants.
CO6. Use Psychromertic charts and estimate various essential properties related to Psychrometry and processes

Material Science:

CO1. Understand the basic concepts and properties of Material.
CO2. Understand about material fundamental and processing.
CO3. Select proper metal, alloys, nonmetal and powder metallurgical component for specific requirement
CO4. Detect the defects in crystal and its effect on crystal properties.
CO5. Evaluate the different properties of material by studying different test
CO6. Recognize how metals can be strengthened by cold-working and hot working

Strength of Materials:

CO1. Apply knowledge of mathematics, science for engineering applications
CO2. Design and conduct experiments, as well as to analyze and interpret data
CO3. Design a component to meet desired needs within realistic constraints of health and safety
CO4. Identify, formulate, and solve engineering problems
CO5. Practice professional and ethical responsibility
CO6. Use the techniques, skills, and modern engineering tools necessary for engineering practice

Fluid Mechanics:

CO1. Use of various properties in solving the problems in fluids
CO2. Use of Bernoulli's equation for solutions in fluids
CO3. Determination of forces drag and lift on immersed bodies

Kinemarics of Machines:

CO1. Identify mechanisms in real life applications.
CO2. Perform kinematic analysis of simple mechanisms.
CO3. Perform static and dynamic force analysis of slider crank mechanism.
CO4. Determine moment of inertia of rigid bodies experimentally.
CO5. Analyze velocity and acceleration of mechanisms by vector and graphical methods.

Operation Research:

CO1. Identify and develop operational research models from the verbal description of the real System or production system.
CO2. Understand the mathematical tools that are needed to solve optimization of engineering and production problem
CO3. Develop a report that describes the model and the solving technique, analyze the results and propose recommendations in language understandable to the decision making processes in Management Engineering

Machine Drawing

CO1. Orthographic projections and sectioned views of the machine components.
CO2. Assembly drawings of rigid and flexible couplings, joints and their sectional views.
CO3. Threaded fasteners, riveted joints and drawings of engine sub assemblies.

Internal Combustion Engines:

CO1. Engines classification and applications (propulsion, power production, cogeneration)
CO2. Performance criteria, sizing and influence ofatmospheric conditions. Gas exchange processes, supercharging and turbocharging. Formation, characteristics, vaporization and combustion of sprays.
CO3. Combustion in Spark-Ignition and Compression-Ignition engines.Classical and alternative fuels
CO4. P-theta and P-V diagrams -Heat release rate.Pollutant formation and control: NOx, CO, HC etc. particulates.Engine heat transfer and cooling systems

Heat and Mass Transfer:

CO1. Understand the basic laws of heat transfer.
CO2. Account for the consequence of heat transfer in thermal analyses of engineering systems.
CO3. Analyze problems involving steady state heat conduction in simple geometries.
CO4. Develop solutions for transient heat conduction in simple geometries.
CO5. Understand the fundamentals of convective heat transfer process. I.e. Natural, forced and mixed convection in various type offlow. i.e. internal and external flow.
CO6. Analyze heat exchanger performance by using the method of log mean temperature difference. and heat exchanger performance by using the method of heat exchanger effectiveness.
CO7. Calculate radiation heat transfer between surfaces.
CO8. To solve complex problems where heat and mass transfer processes are combined with chemical reactions, as in combustion

Machine Design:

CO1. Understand 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 failure
CO3. Practice systematicapproaches to mechanical design and analysis procedures

Project:

CO1: Review the literature and develop solutions for framed problem statement.
CO2: Implement hardware and/or software techniques for identified problems.
CO3: Test and analyze the modules of planned project.
CO4: Write technical report and deliver presentation.
CO5: Apply engineering and management principles to achieve project goal

B.Tech- Electrical & Electronics Engineering

Basics of Electrical Engineering:

CO1: Students will gain knowledge regarding the various laws and principles associated with electrical systems.
CO2 : Students will gain knowledge regarding electrical machines and apply them for practical problems.
CO3 : Students will gain knowledge regarding various types' semiconductors.
CO4 : Student will gain knowledge digital electronics.
CO5 : Student will gain knowledge on electronic systems.
CO6 : Students will acquire knowledge in using the concepts in the field of electrical engg. Projects and research.

Circuit Theory:

CO1: To analyze behavior of basic circuit elements and to apply concept of mesh and node analysis in circuit theory.
CO2: Apply various network theorems to determine the circuit response / behavior.
CO3: To apply transformation of a network to analyze time domain , differential eq.
CO4: To study necessary conditions for driving point functions , transfer function for their application to a given network for analyzing circuit design.
CO5: To analyze the sinusoidal steady state for different electric network and apply concepts of Fourier series for analyzing non sinusoidal periodic waveforms.

Electrical Power Generation:

CO1: To impart knowledge on arrangement, construction and working of thermal and hydro power plant.
CO2: To impart knowledge on arrangement, construction and working of nuclear and diesel power plant.
CO3: Students will be able to estimation of solar radiation and their constants for power generation in different technologies.
CO4: Students will be able to understand the principles of electrical generation with wind energy and terminology.
CO5: Students will be able to learn to different technique of conversion of biomass. biofuels, geothermal energy and MHD power generation.

Electrical Measurement and Measuring Instruments:

CO1: Get ability use, measure and analysis the instruments.
CO2: Calculate all the parameters related to measurements.
CO3: Understand about different instruments that are used for measurement purpose.
CO4: Identify the appropriate instruments for measurement of different quantities.
CO5: Understand various transducer and sensor.

CO6: Understand measurement of various parameters of frequency.

Electrical Machine -I:

CO1: Understand electrical principle, laws, and working of DC machines.

CO2: Analyze the construction and characteristics and application of various type of DC generators.

CO3: Analyze the construction and characteristics and application of various type of DC motors and testing of motors according to Indian standard.

CO4: Understand electrical principle , laws, and working of 1 phase transformer and losses . and also conduct various test on the transformer.

CO5: Understand electrical principle , laws, and working of 3 phase transformer and losses . and also conduct various test on the transformer.

CO6: Analyze the transformer and convert 3 phase transformer to multi phase transformer.

Electromagnetic Field Theory:

CO1: Apply vector calculus in orthogonal coordinate system.

CO2: Analyze behavior of static electric fields in standard configurations.

CO3: Analyze behavior of dynamic electric fields in standard configurations.

CO4: Analyze behavior of static magnetic fields in standard configurations .

CO5: Analyze behavior of dynamic magnetic fields in standard configurations.

CO5: Describe and analyze electromagnetic wave propagation in free space.

Control System:

CO1: . Students will be able to learn the basics of various types of control systems and automatic systems.

CO2: Students will be able to build the mathematical model of system from differential equation and vice versa and shall know the better effects of feedback due to parameter variations.

CO3: Students will be able to apply the basic knowledge to formulate the input output relationship of various component used in control system and their applications in building control system.

CO4: Students will be able to perform and study a time domain analysis of control system and different performance measures and finally know about behavior of the system.

CO5: Students will be able to learn the concept of stability , poles and zeros , using routh Hurwitz criteria and relative stability by bode plot, polar plot, Nyquist plot and be able to design and analyze the given system in frequency domain.

CO6: Students will be able to build state space model of system in different forms.

Analog and Digital Electronics

CO1: Understand the basics of opamp and its characteristics.

CO2: Apply the basic knowledge of opamp in developing various linear , non linear application of opamp.

CO3: Learn about the other linear IC's like 723,78**,79**,555 timer, 565 PLL and their applications.

CO4: Understand the digital characteristics of various logic circuits like NMOS, CMOS, TTL, ECL.

CO5: Design various combinational circuits and hence can develop more complicated once.

CO6: Analyze sequential circuit and can apply the knowledge of flip flops in designing more complicated circuits.

Microprocessor and Microcontroller:

CO1: Learn internal organization of some popular microprocessor / microcontroller.
CO2: Impart the knowledge about the instruction set.
CO3: Understand the basic idea about data transfer schemes and its applications.
CO4: Learn hardware and software interaction and integration.
CO5: Learn the design of microprocessor / microcontroller base system.

Electrical Drives:

CO1: Students will be able to understand definition, scope, objectives, and limitation of electric drives, power transistor and SCR.
CO2: Student will be analyze the construction and characteristics and application of D.C. motor .
CO3: Students will be able to analyze the construction and characteristics and application of three phase induction motor .
CO4: Students will be able to analyze the speed control methods of A.C. and D.C. motor .
CO5: Students will be able to analyze the construction and characteristics and application of sensor, transducer and switches. Students will be able to analyze the industrial applications of electric drives.

Electrical Machine II:

CO1: To impart the knowledge on fundamental of AC rotating machine
CO2: To impart the knowledge on constructional details, principle of operation of 3 phase alternator and synchronous motor
CO3: To impart the knowledge on constructional details, principle of operation, performance, starter, speed control and braking of 3 phase induction motor.
CO4: To impart the knowledge on constructional details, principle of operation, type of 1 phase induction motor and special machine.

Transmission and Distribution of Electrical Power:

CO1: Students will be able to learn the basics of various fundamentals of electrical power generation , transmission & distribution.
CO2: Students will be able to learn transmission line parameters, their calculations also the effects on transmission lines & its effects on the communication system.
CO3: Students will be able to learn electrical characteristics of transmission line such as types of transmission lines, various effects on transmission & per unit representation of power system.
CO4: Students will be able to learn load flow studies and its equation, Comparison of various methods like GS & NR.
CO5: Students will be able to learn Mechanical design along with the types of insulators also the knowledge of voltage distribution across the string and introduction to HV, LV and EHV.
CO6: Students will be able to learn information regarding conductors and insulation, different types of underground cable parameters.

Power Electronics:

CO1: To illustrate the construction, characteristics of thyristor family and understand the basic principle of operation of SCR.
CO2: To illustrate the operation of various triggering circuits for series and parallel operation of SCR's and various protection circuits of thyristors.

CO3: To analysis and design AC/DC rectifier circuit.
CO4: To analysis and design DC/AC inverter circuit.
CO5: To analysis and design DC/DC converter circuit. 6. To examine different applications of power converters.

Computer Application in Power System:

CO1: Students will be able to learn the applications of transformer and induction motor and application regarding representation using piece wise linearization and least square error method.
CO2: Students will be able to formulate the mathematical modelling of transformer design, output equation, design dimension of core and yoke.
CO3: Students will be able to learn the fundamentals of electrical circuits and thermal circuits of cooling method.
CO4: Students will be able to learn the basics of induction motor stator design, electrical and magnetic loading, types and design of winding.
CO5: Students will be able to learn the concept of air-gap length design, mmf calculations, magnetizing components, etc.
CO6: Students will be able to learn the mathematical modelling of core loss from design data, winding resistance and leakage reactance from designed data also parameters effect on performance.

Power System Operation an Control:

CO1: Students will be able to make students express Economic operation of power system and importance of LFC control.
CO2: Students will be able to allow students discuss about thermal and power plants operation in meeting the load demand optimally. (State and central wide installation).Also expressing importance of reactive power control through seminars.
CO3: Students will be able to improve student's ability in solving problems (numerical problems at present) by posing different problem models related to Economic Load Dispatch, Load Frequency Control and reactive power control.
CO4: Students will be able to apply their knowledge in PSOC for competitive exams like GATE, IES, and Public sector etc.
CO5: Students will be able to discuss single area load frequency control and two area load frequency control.
CO6: Students will be able to model and design turbine and Automatic controller.
CO7: Students will be able to express variation of frequency in the power system with varying load.

Switch Gear and Protection:

CO1: Theory & application of main components used in power system protection
CO2: Protection systems used for electric machines, transformers, bus bars, transmission lines.
CO3: Theory, construction, and applications of main types of circuit breakers.
CO4: Design the protection systems needed for each main part of a power system
CO5: Theory and construction of static relay with application

Digital Signal Processing:

CO1: Represent discrete-time signals analytically and visualize them in the time domain.

CO2: Understand the meaning and implications of the properties of systems and signals.
CO3: Understand the Transform domain and its significance and problems related to computational complexity.
CO4: Specify and design any digital filters using MATLAB

Power System Stability:

CO1: Explain the various power system instabilities and dynamics in power systems.
CO2: Apply and explain different methods for analyzing power system stability.
CO3: Create mathematical models for dynamic and stability analysis of power systems.
CO4: Explain different power system controls, and their impact on the system stability.
CO5: Demonstrate how the transient stability of a power system can be analyzed by using equal area criterion.
CO6: Analyze electromechanical modes in power systems.

Project-I:

CO1: Identify and Finalize problem statement by surveying variety of domains.
CO2: Perform requirement analysis and identify design methodologies
CO3: Present technical report by applying different Simulation tools and Evaluation metrics.

Project-II:

CO1: Review the literature and develop solutions for framed problem statement.
CO2: Implement hardware and/or software techniques for identified problems.
CO3: Test and analyze the modules of planned project.
CO4: Write technical report and deliver presentation.
CO5: Apply engineering and management principles to achieve project goal

B.Tech- Civil Engineering:

Fluid Mechanics- 1

CO 1. Determine pressures and forces on submerged bodies.
CO 2. Analyze flow rates, velocities, energy losses and momentum flux for fluid system
CO 3. Measure and describe fluid flow phenomena.
CO 4. Set up a relation among various parameters based on dimensional analysis and model study.

Rock Mechanics & Engineering Geology

CO 1. Learn geology and its types, various features like fault, fissures, weathering etc., minerals, rocks, and rock formations in relation to civil engineering structures.
CO 2. Understand various techniques to determine engineering properties of rock set.
CO 3. Understand various techniques to analyze and to made possible solutions for various Geological Engineering problems.

Strength of Material

CO 1. Apply the linear laws of elasticity as related to stress and strain.
CO 2. Understand the concept of a complex stress system.
CO 3. Understand of the behavior of columns and struts under axial loading.

Surveying

CO 1. Understand various methods and techniques of surveying and its applications (leveling, compass survey, contouring and curve settings etc.)
CO 2. Apply the concept of Tachometry in surveying difficult and hilly terrains to obtain the topographical map of area.
CO 3. Ability to use survey instruments in carrying out survey, collect data, write reports and able to perform required calculations to achieve the objective.

Building Material & Construction

CO 1. Extend the knowledge about the characteristics, sources and defects in various materials.
CO 2. Design and test the materials either in the laboratory or in the field before actual use at the site.
CO 3. Attain the knowledge of different components of building, their classification, materials and methods of construction and causes of their failures.
CO 4. Know the various services to be provided and the defects in the building salong with the remedial measures for proper maintenance of the buildings.

Geomatics Engineering

CO 1. Develop firm understanding of remote sensing and data analysis from aircraft and satellite sensors. Manipulate and represent geographical data.
CO 2. Demonstrate a firm understanding of GPS for navigation and resolving the location related problems.
CO 3. Apply the electronic technology for surveying work.

Construction Machinery & Works Management

CO 1. Device a plan and manage construction project and know the time value of money.
CO 2. Plan project by various methods finding the time estimates and controlling the projects while deterring and flowing the critical path.
CO 3. Determine minimum total cost in minimum time by conducting a crash programme and hence updating and rescheduling a project.
CO 4. Make aware of various construction equipment

Design of Concrete Structure

CO 1. Understand the properties and role of various constituent materials used in concrete making.
CO 2. Understand the properties of concrete and various design mix techniques for concrete.
CO 3. Apply the fundamental concepts, techniques in analysis and design of reinforced concrete elements i.e. beam & slab.
CO 4. Apply the design principles by undertaking simple design examples.

CO 5. Apply the various codal requirements related to RC members i.e. slab & beam.

Fluid Mechanics-II

CO 1. Identify and analyze the appropriate flow and subsequent effect in field
CO 2. Analyze the effect of wind and water if any civil structure is placed in flowing fluid
CO 3. Calculate the resistance forces of fluid on structure and select appropriate technique to minimize it.
CO 4. Analyze forces and design most economical open channel.

Irrigation Engineering

CO 1. Demonstrate the concepts, techniques and modernization of Irrigation.
CO 2. Plan, design and execute by applying various concepts in the irrigation structures.
CO 3. Analyze and manage irrigation and water resource system for sustainable development by applying managerial skills.

Structure Analysis –1

CO 1. Visualize the concepts of loads, supports and displacements.
CO 2. Analyze statically determinate structural systems.
CO 3. Choose a suitable method and technique for determination of structural displacement and force resultants.
CO 4. Visualize the effect of loads, rolling loads and/or reactions, support displacements and temperature on the structural response
CO 5. Utilize the concept of influence lines for deciding the critical forces and sections while designing.

Design of Steel Structures-I

CO 1. Understand and appreciate various aspects of steel construction like different types of steel sections, their specifications, advantages of steel construction etc.
CO 2. Analyze and design various types of steel connections using rivets, bolts and weld.
CO 3. Design basic elements of a steel building like beam, column, and column bases etc. for given conditions and loading.
CO 4. Estimate 'design loads' for a roof truss and then be able to design its various components like top chord members, bottom chord members, web members, purlins etc

Geotechnical Engineering

CO 1. To understand the origin of soil and to identify different types of soil.
CO 2. To understand the various physical and engineering characteristics of different types of soil.

CO 3. To understand the concept of slope stability.
CO 4. To appreciate the use of modern technology in the field of geotechnical engineering.

Structural Analysis-II

CO 1. Distinguish statically determinate and redundant structural systems.
CO 2. Choose a suitable method for the analysis of structural system (pin-jointed as well as rigid jointed) while designing.
CO 3. Visualize the effect of loads and/or reactions, support displacements and temperature on the structural response.
CO 4. Utilize the concept of influence lines for deciding the critical forces and sections while designing.

Transport Engineering-I

CO 1. Understand the importance & characteristics of road transport for geometric design of various roads with proper alignment based on planning principles, survey data, economics & finance data.
CO 2. Recognize the knowledge of highway materials & construction of various types of roads and identify the problems associated with roads & remedies for same.
CO 3. The traffic characteristics, interpretation of traffic data & its uses, traffic safety & various control measures and traffic environment interaction for safe & healthy environment.

Environmental Engineering – I

CO 1. Identify various water demands and select suitable source of water.
CO 2. Demonstrate a firm understanding of various water quality parameters.
CO 3. Generalize relevant design criteria, procedures and methods for various water treatment processes.
CO 4. Describe structure of drinking water supply system, water transport and its distribution.

Design of Concrete Structures-II

CO 1. Design various sub-structure components like isolated footing, combined footing, retaining walls, along with relevant IS code requirements.
CO 2. Design various super-structure components like stairs, columns, continuous beams, along with relevant IS code requirements.
CO 3. Apply the concepts of structure design to special structural elements like curved beams, domes, water retaining structures, along with relevant IS code requirements.

Design of Steel Structures-II

CO 1. Consider various primary loads, load combinations for obtaining a worst design load.

CO 2. Plan the structural framing of industrial buildings and bridges from the given data/design constraints.
CO 3. Apply the concepts of structural design to obtain suitable member sizes/sections.
CO 4. Prepare and deliver rough sketches to the draftsman.

Disaster Management

CO 1. Identify various types of disasters, its causes, effect & mitigation of each and describe the various important phases of disaster management cycle having concern of vulnerability & risk for mankind and need of emergency management system to tackle the problems.
CO 2. Understand the role of media, various agencies, and technology for the capacity building for effective disaster management & preparedness for future through various case studies.
CO 3. Understand the importance of integration of public policy and how planning& design of infrastructure, community based approach and various ecological & sustainable models can be used for effective disaster management.

Irrigation Engineering-II

CO 1. Analyze the structures for seepage and uplift pressure.
CO 2. Understand the functioning of Diversion Headwork and use of energy dissipation devices.
CO 3. Envisage the selection of type of fall and outlet and choice of different cross drainage works according to situation.
CO 4. Utilize the concept of hydraulic design in the devising the water distribution system, regulators, falls, outlets and weirs of irrigation network.

Transportation Engineering – II

CO 1. Functions of components of railway track
CO 2. Apply existing technology to the design, construction, and maintenance of railway physical facilities.
CO 3. Aware of the current international technology relative to Railway Engineering.
CO 4. Develop an awareness of major issues and problems of current interest to the Airport Engineering.