

2.6 Student Performance and Learning Outcomes

2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the institution are stated and displayed in website of the institution (to provide the weblink)

Programme Outcomes:-

1. The ability to apply the knowledge of mathematics, science, engineering fundamentals to chemical engineering.
2. The ability to design and conduct experiments, and to analyze and interpret experimental results.
3. The ability to design systems, components, or processes to meet specified objectives within realistic constraints such as economic, environmental, social, ethical, health and safety, manufacturing, and sustainability in chemical engineering.
4. The ability to use the research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to solve complex problems in chemical engineering with provision of valid conclusions.
5. The ability to use the techniques, skills and modern engineering tools necessary for chemical engineering practice.
6. Ability to apply reasoning to assess the economic, environmental, societal, health, safety, legal and cultural issues to professional engineering practice.
7. Able to understand the impact of the chemical engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. An understanding of professional and ethical responsibility.
9. Ability to function effectively as an individual or as a member or as a leader of multidisciplinary team, and have an understanding of team leadership.
10. The ability to communicate effectively in written, oral, and graphical forms with the engineering community and with society at large.
11. Ability to Demonstrate knowledge and understanding of chemical 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.
12. Ability to Recognize the need for and have the ability to engage in lifelong learning.

Program Specific Outcomes :-

At the end of the program, graduates should have:

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| PSO 1:- | Knowledge of mathematics, unit operati Mass and Heat Transfer, Thermodynamics, Chemical reaction engineering, Material and Energy balance, Environmental engineering, Project and Process engineering applied to chemical industries for the betterment of society. |
| PSO 2:- | An ability to design or develop the chemical processes or solution which have the impact on environmental, social, economic, safety, health and sustainability. |
| PSO3 | :-Knowledge of equipment design, instrumentation, process dynamics and control, modeling and simulation and other different computational techniques applied in chemical industries which include health, safety and environmental aspects |
| PSO 4:- | Apply the chemical engineering principals, communication and other skills in industry as well as professional career. |

Course Outcomes:-

At the end of the course the student will be able to:-

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| Subject:- Applied Mathematics III | |
| Course Outcomes | |
| 1. The student will be able to apply Laplace Transform techniques for solving initial value problems. | 2. Understanding and apply the concept of Probability distribution and Sampling theory to engineering problems. |

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| Subject:- Engineering Chemistry– I | |
| Course Outcomes | |
| 1. Students will understand different theories of chemical bonding, organo metallic chemistry, mechanism and | 2. Students will also be capable of defining Stability of Coordination compounds, Kinetics and energy |

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| application of Photochemical processes. | profile diagrams of reactions. |
| 3. Students will have knowledge of metal carbonyls and their properties. | 4. Students will be able to express role of metallo proteins in biological processes. |
| 5. Students will be able to carry out organic estimations, gravimetric analysis and handle different instruments in the laboratory. | 6. After studying this subject, students would be able to measure pressure drop, flow rates etc. |
| 7. Students will be able to understand basic concepts and pressure measurement. | 8. Students will be able to understand kinetics and rheological behavior of fluid flow. |
| 9. Students will be able to understand flow equations for compressible and incompressible flow. | 10. Students will be able to select pumps and valves and would be able to calculate power requirement for pumping as well as agitation operations. |

Subject:- Chemical Engineering Thermodynamics I

Course Outcomes:-

1. The students will be able to apply thermodynamic laws and equations to various Chemical Engineering processes

Subject:- Process Calculations

Course Outcomes:-

1. Students will learn to calculate mass and energy flow rates into and out of various process equipments

2. Students will learn to calculate conversion, selectivity etc for various reactions with and without recycle.

3. Students will learn to carry out degrees of freedom analysis for various units.

Subject:- Chemical Technology**Course Outcomes:-**

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| 1. Describe various manufacturing processes used in the chemical process industries. | 2. Explain industrial processing and overall performance of any chemical process including the major engineering problems encountered in the process. |
| 3. Determine the overall process aspects including yield, formation of by-products and generation of waste, etc. | 4. Draw and illustrate the process flow diagram for a given process |

Sem:- IV**Subject :- Applied Mathematics- IV****Course Outcomes:-**

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| 1. Demonstrate the ability of using Fourier Series and Fourier Transform in solving PDE. | 2. Enable the students to solve boundary value Problem using Finite Differences Approximations. |
| 3. Identify the applicability of theorems and evaluate the Contour Integral. | 4. The students will be ready for any further course on Optimization |

Subject:- Engineering Chemistry– II**Course Outcomes:-**

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| 1. They should be able to understand the role of different conductivity cells and different titrimetric methods and solvent extractions. | 2. Students will be able to detect the organic and inorganic biological compound by the use of spectrophotometer. |
| 3. Students will know the colloidal phenomenon applied in food industry and pesticides. | 4. Students will be able to identify the significance of rearrangement reactions, active methylene group. |
| 5. Students will be able to predict and synthesize different products by learning reaction mechanism. | 6. Students will have deep knowledge of Qualitative (Analysis) and Quantitative (estimations) methods |

Subject:- Chemical Engineering Thermodynamics II**Course Outcomes:-**

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| 1. Students learn the application of First law and second law to the problem of phase equilibrium and reaction equilibrium | 2. Students learn to calculate the compressor sizes and loads for refrigeration.. |
| 3. Students learn to calculate the refrigerant flow rate for a given duty of refrigeration. | 4. The calculation of phase equilibrium and the understanding of it is a fundamental concept to design of mass transfer |

Subject:- Solid Fluid Mechanical Operations :-**Course Outcomes:-**

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| 1. The students would understand the concept of particle size analysis and size reduction. | 2. The students would understand the concept of flow through packed bed, fluidization and filtration |
| 3. The students would understand the concept of sedimentation and gas- solid separation. | 4. The students would understand the concept of solid mixing, solid storage & conveying, size enlargement. |

Subject:- Mechanical Equipment Design (MED)**Course Outcomes:-**

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| 1. Students will demonstrate ability to design various components of process equipment as heads, shell, flanges and supports and complete design of chemical equipment | 2. Students will demonstrate understanding of design of storage vessel |
| 3. Students will demonstrate general understanding of fabrication techniques and equipment testing as a designer | |

Subject:- Chemical Engineering Economics**Course Outcomes:-**

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| 1. Students should will be expose to market And demand driven economics in chemical industry. | 2. Get an idea on the growth and development of futuristic planning. |
| 3. Students will be able to calculate the profitability, rate of return on investments and cost estimation. | 4. After acquiring the knowledge in this subject, students become familiar with various aspects related to economics and can apply them for economic evaluation of chemical process and decide its economical feasibility. |
| 5. The knowledge in this subject will make the students well aware about economic evaluation of dissertation work that they will undertake in final year of their curriculum. | 6. Students will learn to prepare realistic cost estimation to prepare plan and offer |
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Sem:- V**Subject:- Computer Programming & Numerical Methods****Course Outcomes:-**

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| 1. The students will be able to solve linear algebraic equations. | 2. The students will be able to solve non-linear algebraic equations. |
| 3. The students will be able to solve differential equations. | 4. The students will be able to solve partial differential equations |

Subject:- Mass Transfer Operation I**Course Outcomes:-**

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|--|---|
| 1. Demonstrate the knowledge of mass transfer by applying principles of diffusion, mass transfer coefficients, and interphase mass transfer. | 2. Understand the concept and operation of various types of gas-liquid contacts equipments. |
| 3. Determine NTU, HTU, HETP and | 4. Find time required for drying and |

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| height of packed bed used for Absorption and Humidification operations. | design of drying equipments |
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Subject:-Heat Transfer Operations

Course Outcomes:-

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| 1. Analyze Steady and Unsteady State Conduction systems. | 2. Analyze Convective Heat transfer Systems. |
| 3. Analyze Radiative Heat Transfer Systems. | 4. Analyze Extended Surfaces, Evaporators and Agitated Vessels. |
| 5. Basic design of DPHE and STHE | |

Subject:- Chemical Reaction Engineering-I

Course Outcomes:-

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|---|---|
| 1. Students will be able to identify and analyze different types of homogeneous reactions. | 2. Students will be able to apply the knowledge they have gained to develop kinetic models for different types of Homogeneous reactions |
| 3. Students will be able to find the model equation and use this model to design the reactors used for Homogeneous reactions. | 4. Students will be able to understand the effect of temperature on reactor performance for adiabatic and non adiabatic operation and develop kinetic model to design the reactors for adiabatic and non-isothermal operations. |

Subject:- Business Communication and Ethics**Course Outcomes:-**

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|---|---|
| 1. Communicate effectively in both oral and written form and equip to demonstrate knowledge of professional and ethical responsibilities. | 2. participate and succeed in campus placements and competitive examinations like GATE, TOFEL |
| 3. Possess entrepreneurial approach and ability for life-long learning | 4. Have education necessary for understanding the impact of Engineering solutions on Society, and demonstrate awareness of contemporary issues Detailed Syllabus. |
| 5. Design a technical document using precise language, suitable vocabulary and apt style. | 6. Develop the life skills/ interpersonal skills to progress professionally by building stronger relationships. |
| 7. Demonstrate awareness of contemporary issues knowledge of professional and ethical responsibilities. | 8. Apply the traits of a suitable candidate for a job/higher education, upon being trained in the techniques of holding a group discussion, facing interviews and writing resume/SOP. |
| 9. Deliver formal presentations effectively implementing the verbal and non-verbal skills. | |

Subject:- Department Elective I- Advanced Material Science**Course Outcomes:-**

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|--|--|
| 1. Identify various types of advanced materials such as polymers, ceramics and composites. | 2. Understand the properties of various advanced polymeric, ceramic and metallic materials and their applications in various fields. |
| 3. Have knowledge of different types of composite materials and their properties and applications. | 4. Understand the fabrication of various composite materials. |
| 5. Have knowledge of types of nano tubes and | 6. Understand the different thin film coating |

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| nanosensors and their applications. | methods and their applications in various fields. |
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Subject:- Department Elective I- Instrumentation

Course Outcomes:-

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| 1. The student will be able to calculate the output of various measuring schemes | 2. The student will be able to select a DAQ card for any given application |
| 3. The student will be able to select the appropriate type of instrument for any application | 4. The student will be able to prepare a basic control scheme for process units |
| 5. The student will be able to write programs for a PLC | |

Sem:- VI

Subject:- Environmental Engineering :-

Course Outcomes:-

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| 1. To understand Importance of environmental pollution, such as air, water, solid, noise. Various pollutants sources, adverse effects, Environmental Legislation | 2. To understand meteorological aspects air pollutant dispersion. Sampling and measurement, Control Methods and Equipment: |
| 3. To understand Sampling, measurement of various water pollutants. | 4. To understand and design various Waste Water Treatments |

Subject:- Mass Transfer Operations II**Course Outcomes:-**

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|---|---|
| 1. Understand equilibrium in all separation process | 2. Design the mass transfer equipments for extraction, leaching and crystallization processes |
| 3. Design distillation column | 4. Choose the separation operation which will be economical for the process |
| 5. Optimize the process parameters | 6. Understand membrane separation processes principle and working |

Subject:-Transport Phenomena**Course Outcomes:-**

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|---|---|
| 1. Student will learn to establish and simplify appropriate conservation statements for momentum, energy and mass transfer processes. | 2. Ability to do momentum, energy and mass transfer analysis. |
| 3. To apply conservation principles, along with appropriate boundary conditions for any chemical engineering problem | 4. Understanding of transport processes. |

Subject:- Chemical Reaction Engineering II**Course Outcomes:-**

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|---|--|
| 1. Students will be able to understand the concept of Residence Time Distribution (RTD) in various reactors and obtain the actual design parameters to design Real Reactor. | 2. Students will be able to find the model equation and use this model to design the reactors used for heterogeneous non catalytic reactions. |
| 3. Students will be able to apply the knowledge they have gained to develop kinetic model and Design strategy for heterogeneous catalytic reactions. | 4. Students will be able to apply the knowledge they have gained to develop kinetic model and use this model to design the reactors used for Fluid-Fluid reactions |

Subject:- Plant Engineering and Industrial Safety**Course Outcomes:-**

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|---|--|
| 1. Students should be able to understand and evaluate situations causing industrial fire and evaluate risk. . | 2. Students should learn and understand type of boilers and be able to calculate its efficiency. |
| 3. Students should be able to identify the causative and initiating factors of accidents. They should be able to make quantitative assessment of vapour release and noise impact. | 4. Students should be able to calculate work requirements for compressors and draw schematic of instrument air, plant air and venting system |

Subject:- Department Elective II -Computational Fluid Dynamics**Course Outcomes:-**

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| 1. The student will be able to use appropriate software for solving realistic problems | 2. The student will be able to obtain flow profiles for some simple applications using Scilab. |
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Sem:- VII**Subject:- Process Equipment Design****Course Outcomes:-**

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| 1. Design heat exchanger and evaporator. | 2. Design distillation and absorption columns. |
| 3. Design high pressure vessels. | 4. Explain different flow sheet presentation and equipment inspection methods |

Subject:- Process Engineering**Course Outcomes:-**

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|---|---|
| 1. The graduates are expected to have ability to apply knowledge of mathematics, science and engineering. | 2. The graduates are expected to have ability to design a system, a component, or a process to meet the desired needs within realistic constraints such as economic, environmental, social, ethical, health and safety, manufacturability and sustainability. |
| 3. The graduates are expected to possess ability to function on multi disciplinary teams. | 4. The graduates are expected to possess ability to identify, formulate and solve engineering problems. |
| 5. The graduates are expected to have an understanding of professional and ethical responsibility. | 6. The graduates are expected to engage themselves in lifelong learning. |
| 7. The graduates are expected to possess ability to use the techniques, skills, and modern engineering tools necessary for engineering practice | |

Subject:- Process Dynamics and Control**Course Outcomes:-**

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|--|---|
| 1. Will be able to study their responses in Time, Laplace and Frequency domains. | 2. The student will be able to design stable controllers, for important chemical processes. |
| 3. The student will be able to model dynamical systems | |

Subject:- Department Elective III- Petroleum Refining Technology**Course Outcomes:-**

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|--|--|
| 1. Characterize crude petroleum and petroleum refinery | 2. Fractionate crude petroleum into useful fractions |
| 3. Measure important physical properties of petroleum products | 4. Apply refinery processes to maximize desired petro products |
| 5. Use treatment techniques to purify petro products | 6. Manufacture widely used petrochemicals |

Subject:- Institute Level Optional Subject I- Energy Audit and Management**Course Outcomes:-**

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| 1. To identify and describe present state of energy security and its importance | 2. To identify and describe the basic principles and methodologies adopted in energy audit of an utility. |
| 3. To describe the energy performance evaluation of some common electrical installations and identify the energy saving opportunities. | 4. To describe the energy performance evaluation of some common thermal installations and identify the energy saving opportunities |

Sem:- VIII**Subject:- Modelling Simulation and Optimization****Course Outcomes:-**

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|--|---|
| 1. The students will be able to write and solve models of chemical engineering system. | 2. The students will be able to carry out sequential and equation oriented simulation of complete flowsheets. |
| 3. The student will be able to optimize typical chemical processes. | 4. |

Subject:- Project Engineering and Entrepreneurship Management

Course Outcomes:-

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|--|---|
| 1. Concepts and knowledge of project management to manage projects in process industries | 2. Students should be able to prepare feasibility reports. |
| 3. Students should be able to understand various clearances required to start industry | 4. Students should be able to prepare project organization charts and contracts |
| 5. Students should be able to prepare contracts | 6. Students should be able to use tools of PM to solve problems and will be motivated to become entrepreneurs |

Subject:- Energy System Design

Course Outcomes:-

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|---|---|
| 1. The graduates should able to design an energy system to meet the desired needs within realistic constraints such as economic, environmental, social, ethical, health and safety, manufacturability and sustainability. | 2. The graduates should able to function on multidisciplinary teams, identify, formulate and solve engineering problems. |
| 3. The graduates are expected to have knowledge of professional and ethical responsibility. | 4. The graduates should able to use the techniques, skills, and modern engineering tools necessary for engineering practice |

Subject:- Department Elective IV: Advanced Separation Technology

Course Outcomes:-

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|---|---|
| 1. The graduates are expected to have ability to apply knowledge of mathematics, science and engineering. | 2. The graduates are expected to have ability to design a system, a component, or a process to meet the desired needs within realistic constraints such as economic, environmental, social, ethical, health and safety, manufacturability and sustainability. |
| 3. The graduates are expected to possess ability to identify, formulate and solve engineering problems. | 4. The graduates are expected to possess ability to use the techniques, skills, and modern engineering tools necessary for engineering practice |

Subject:- Institute Level Optional Subject II- Environmental Management

Course Outcomes:-

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| 1. Understand the concept of environmental management | 2. Understand ecosystem and interdependence, food chain etc. |
| 3. Understand and interpret environment related legislations | |

(ELECTRONICS AND TELECOMMUNICATION)

PROGRAM OUTCOMES (POs)

Engineering Graduates will be able to:

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

Program Specific Objectives (PSOs):

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| PSO 1:- | 1. Apply knowledge of signal processing, communication theory, Microprocessor and Microcontroller to solve the problems in the field of electronics and telecommunication engineering and automation. |
| PSO 2:- | 2. Design low power electronics circuits. |
| PSO 3:- | 3. Analyze the system behaviour and obtain the results using modelling, simulation, and experiments. |

ACADEMIC YEAR 2018-19**4TH YEAR - 7TH SEMESTER (REV-2012)****Subject:- Image and Video Processing****Course Outcomes:-**

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| 1. Understand theory and models in Image and Video Processing | 2. Interpret and analyze 2D signals in frequency domain through image transforms |
| 3. Apply quantitative models of image and video processing for various engineering applications | 4. Develop innovative design for practical applications in various fields |

Subject:- Mobile Communication**Course Outcomes:-**

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|--|--|
| 1. Understand GSM, CDMA concepts and architecture, frame structure, system capacity, services provided. | 2. Study of evolution of mobile communication generations 2G, 2.5G, 3G with their characteristics and limitations. |
| 3. Understand emerging technologies required for fourth generation mobile systems such as SDR, MIMO etc. | 4. Understand different indoor and outdoor propagation models related to losses and different types of fading |

Subject:- Optical Communication and Networks**Course Outcomes:-**

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|---|---|
| 1. Apply the knowledge of optical communication and networking to identify and describe the function of various optical components. | 2. Apply the fundamental principle of optics and light wave to conduct experiments to meet desired specifications Able to design simple optical communication system, evaluate system performance |
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Subject:- Microwave and Radar Engineering**Course Outcomes:-**

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| 1. Get knowledge of microwave components, waveguides, and semiconductor microwave devices. | 2. Design tuning and matching networks. |
| 3. Understand the process of generation and amplification of microwaves | 4. Understand the basics and types of RADAR. |
| 5. Become familiar with Microwave Applications. | |

Subject:- Data Compression and Encryption**Course Outcomes:-**

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| 1. Implement text, audio and video compression techniques. | 2. Understand symmetric and asymmetric key cryptography schemes. |
| 3. Understand network security and ethical hacking | 4. |

Subject:- Project (Stage I)**Course Outcomes:-**

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|---|---|
| 1. Identify complex engineering problems & apply the knowledge of fundamental science & engineering to solve the problem. | 2. Use research-based knowledge & methods to design a system using ethics & modern tools. |
| 3. Assess & solve the problems of society considering the environment & sustainability. | 4. Able to work in a team & communicate effectively. |
| 5. Manage the project on the basis of engineering knowledge & finance. | 6. Arouse the interest in the lifelong learning of technical & allied fields. |

4TH YEAR 8TH SEMESTER (REV 2012)**Subject:- Wireless Networks****Course Outcomes:-**

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| 1. Describe the phases of planning and design of mobile wireless networks | 2. List and compare personal area network (PAN) technologies such as Zigbee, Bluetooth etc |
| 3. Students will details of sensor network architecture, traffic related protocols , transmission technology etc | 4. Understand middleware protocol and network management issues of sensor networks |

Subject:- Satellite communication and Networks**Course Outcomes:-**

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| 1. Explain the basics of satellite communication | 2. Explain and analyzes link budget of satellite signal for proper communication |
| 3. Use the system for the benefit of society | 4. Use the different application of satellite communication |

Subject:- Internet and Voice Communication**Course Outcomes:-**

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| 1. Install, configure, and troubleshoot server and client operating systems. | 2. Disassemble, troubleshoot/debug, upgrade, replace basic components, and reassemble servers and client systems. |
| 3. Implement local area networks using both static and dynamic addressing techniques including sub netting | 4. Explain the concept of encapsulation and its relationship to layering in the network models |
| 5. Describe how DNS works on the global Internet including caching and root servers | 6. Explain how TCP's byte-stream sliding window is related to a traditional packet-based sliding window algorithm. |
| 7. Explain the operation of the components of a router including, DHCP, NAT/PAT, a Routing function, Switching function. | |

Subject:- Telecom Network Management**Course Outcomes:-**

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| 1. Demonstrate broad knowledge of fundamental principles and technical standards underlying | 2. Understand basic of telecommunication, networking and information technologies. |
| 3. Architect and implement networked informative systems. | 4. Continuously improve their technology knowledge and communication skills. |
| 5. Anticipate the way technological change and emerging technologies might alter the assumptions | 6. Underlying architectures and systems. |

Subject:- Project(Stage II)**Course Outcomes:-**

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|---|---|
| 1. Identify complex engineering problems & apply the knowledge of fundamental science & engineering to solve the problem. | 2. Use research-based knowledge & methods to design a system using ethics & modern tools. |
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| 3. Assess & solve the problems of society considering the environment & sustainability. | 4. Able to work in a team & communicate effectively. |
| 5. Manage the project on the basis of engineering knowledge & finance. | 6. Arouse the interest in the lifelong learning of technical & allied fields |

ACADEMIC YEAR 2018-19
3rd YEAR - 5TH SEMESTER (Rev. 2016)

Subject:- Microprocessor & Peripherals Interfacing

Course Outcomes:-

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| 1. Understand the basic concepts of microcomputer systems. | 2. Understand the architecture and software aspects of microprocessor 8086. |
| 3. Write Assembly language program in 8086. | 4. Know the Co-processor configurations. |
| 5. Interface peripherals for 8086. | 6. Design elementary aspect of microprocessor based system. |

Subject:- Digital Communication

Course Outcomes:-

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| 1. Understand random variables and random processes of signal, | 2. Apply the concepts of Information Theory in source coding, |
| 3. Evaluate different methods to eliminate Inter-symbol interference, | 4. Compare different band-pass modulation techniques, |
| 5. Evaluate performance of different error control codes. | 6. |

Subject:- Electromagnetic Engineering

Course Outcomes:-

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| 1. Fields and energies in simple planar, cylindrical, and spherical geometries, Fields within conducting and anisotropic media | 2. Electric and magnetic forces on charges, wires, and media Sinusoids and transients on TEM lines with mismatched impedances and tuning |
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| Subject:- Discrete Time Signal Processing | | |
| Course Outcomes:- | | |
| 1. Understand the concepts of discrete-time Fourier transform and fast Fourier transform. | 2. Apply the knowledge of design of IIR digital filters to meet arbitrary specifications. | |
| 3. Apply the knowledge of design of FIR digital filters to meet arbitrary specifications. | 4. Analyze the effect of hardware limitations on performance of digital filters. | |
| 5. Apply the knowledge of DSP processors for various applications | | |
| Subject:- TV & Video Engineering | | |
| Course Outcomes:- | | |
| 1. Understand overview of TV system. | 2. Understand details of compression technique. | |
| 3. Know about different dvb standards. | 4. Understand advanced digital systems | |
| Subject:- Data Compression and Encryption | | |
| Course Outcomes:- | | |
| 1. Implement text, audio and video compression techniques | 2. Understand Symmetric and Asymmetric Key Cryptography schemes. | |
| 3. Understand network security | | |
| Subject:- Business Communication & Ethics Lab | | |
| Course Outcomes:- | | |
| 1. Design a technical document using precise language, suitable vocabulary and apt style. | 2. Develop the life skills/ interpersonal skills to progress professionally by building stronger relationships. | |
| 3. Demonstrate awareness of contemporary issues knowledge of professional and | 4. Apply the traits of a suitable candidate for a job/higher education, upon being trained | |

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| ethical responsibilities. | in the techniques of holding a group discussion, facing interviews and writing resume/SOP. |
| 5. Deliver formal presentations effectively implementing the verbal and non-verbal skills. | |

Subject:- Open Source Technology for Communication Lab

Course Outcomes:-

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| 1. Learn open source programming tools for communication technology. | 2. Simulate and analyze the performance of communication system. |
| 3. Implement the communication system/subsystem | 4. |

3RD YEAR 6TH SEMESTER

Subject:- Microcontrollers & Applications

Course Outcomes:-

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| 1. Students should be able to describe the architecture and organization of a 8-bit (8051) and ARM-7 | 2. Student should able to program a 8-bit and 32-bit microcontroller to perform various task s |
| 3. Students should be able to design interface circuit of a microcontroller with various devices | 4. Students should be able to communicate Microcontroller effectively both verbally and in writing. |
| 5. Course has stimulated student's interest in the field of embedded system. | |

Subject:- Computer Communication Networks

Course Outcomes:-

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| 1. Design a small or medium sized computer network including media types, end devices, and interconnecting devices that meets a customer's specific needs. | 2. Perform basic configurations on routers and Ethernet switches. |
| 3. Demonstrate knowledge of programming for network communications. | 4. Learn to simulate computer networks and analyse the simulation results. |

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| 5. Troubleshoot connectivity problems in a host occurring at multiple layers of the OSI model. | 6. Develop knowledge and skills necessary to gain employment as computer network engineer and network administrator |
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Subject:- Antenna & Radio Wave Propagation

Course Outcomes:-

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| 1. Define Basic antenna parameters like radiation pattern, directivity and gain. | 2. Derive the field equations for the basic radiating elements like linear wire antenna and loop antenna. |
| 3. Design of uniform linear and planar antenna arrays using isotropic and directional Sources. | 4. Implement special types of Antennas like micro strip antennas and reflectors. |

Subject:- Image Processing and Machine Vision

Course Outcomes:-

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|---|---|
| 1. Understand theory and models in image processing. | 2. Interpret and analyze 2D signals in Spatial and frequency domain through image transforms. |
| 3. Apply quantitative models of image processing for segmentation and restoration for various applications. | 4. Find shape using various representation techniques and classify the object using different classification methods. |

Subject:- Radar Engineering

Course Outcomes:-

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| 1. Explain generalized concept of RADAR. | 2. Solve problems using radar equations. |
| 3. Describe different types of radar for specific application. | 4. Explain concept of tracking radar. |
| 5. Evaluate the design constraints for transmitter. | 6. Evaluate the design constraints for receiver. |

Subject:- Digital VLSI Design**Course Outcomes:-**

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| 1. Understand the semiconductor technology, scaling and performance. | 2. Realize logic circuits with different design styles. |
| 3. To understand operation of memory, storage circuits and data path elements. | 4. Simulate and synthesize digital circuits using HDL language. |
| 5. Demonstrate an understanding of system level design issues such as protection, clocking, and routing. | 6. Learn the RTL design techniques and methodologies |

ACADEMIC YEAR 2018-19**2ND YEAR - 3RD SEMESTER (Rev. 2016)****Subject:- Applied Mathematics III****Course Outcomes:-**

| | |
|--|--|
| 1. 1. Students will demonstrate basic knowledge of Laplace Transform. Fourier series, Bessel | 2. Functions, Vector Algebra and Complex Variable. |
| 3. 2. Students will demonstrate an ability to identify and Model the problems of the field of | 4. Electronics and Telecommunication and solve it. |
| 5. 3. Students will be able to apply the application of Mathematics in Telecommunication Engineering | |

Subject:- Electronic Devices and Circuits I**Course Outcomes:-**

| | |
|--|---|
| 1. 1. Understand the current voltage characteristics of semiconductor devices, | 2. 2. Analyze dc circuits and relate ac models of semiconductor devices with their physical |
| 3. Operation, | 4. 3. Design and analyze of electronic circuits, |
| 5. 4. Evaluate frequency response to understand behaviour of Electronics | |

| | |
|-----------|--|
| circuits. | |
|-----------|--|

Subject:- Digital System Design

Course Outcomes:-

| | |
|--|---|
| 1. Develop a digital logic and apply it to solve real life problems. | 2. Analyze, design and implement combinational logic circuits. |
| 3. Classify different semiconductor memories. | 4. Analyze, design and implement sequential logic circuits. |
| 5. Analyze digital system design using PLD. | 6. Simulate and implement combinational and sequential circuits using VHDL systems. |

Subject:- Circuit Theory and Networks

Course Outcomes:-

| | |
|---|---|
| 1. Apply their knowledge in analysing Circuits by using network theorems. | 2. Apply the time and frequency method of analysis. |
| 3. Find the various parameters of two port network. | 4. Apply network topology for analyzing the circuit |
| 5. Synthesize the network using passive elements. | |

Subject:- Electronic Instrumentation and Control

Course Outcomes:-

| | |
|--|--|
| 1. Students will be able to explain principle of operation for various sensors. | 2. Students will be able to describe functional blocks of data acquisition system. |
| 3. Students will be able to find transfer functions for given system. | 4. Students will be able to calculate time domain and frequency domain parameter for given system. |
| 5. Students will be able to predict stability of given system using appropriate criteria | . |

Subject:- OOP using JAVA Laboratory

Course Outcomes:-

1. Students will be able to code a program using JAVA constructs.

2. Students will be able to understand fundamental features of an object oriented language: object classes and interfaces, exceptions and libraries of object collections.

3. Students will be able to develop a program that efficiently implements the algorithm for given tasks.

4. Students will be able to utilize the knowledge acquired in this course to develop higher level algorithms.

2ND YEAR - 4TH SEMESTER

Subject:- Applied Mathematics IV

Course Outcomes:-

| | |
|--|--|
| 1. Demonstrate basic knowledge of Calculus of variation, Vector Spaces, Matrix Theory, Random Variables, Probability Distributions, Correlation and Complex Integration. | 2. Demonstrate an ability to identify and Model the problems in the field of Electronics and Telecommunication and solve it. |
| | 3. Apply the application of Mathematics in Telecommunication Engineering. |

Subject:- Electronic Devices and Circuits II

Course Outcomes:-

| | |
|---|--|
| 1. Design and analyse the basic operations of MOSFET. | 2. Know about the multistage amplifier using BJT and FET in various configuration to determine frequency response and concept of voltage gain. |
| 3. Know about different power amplifier circuits, their design and use in electronics and communication circuits. | 4. Know the concept of feedback amplifier and their characteristics. |
| 5. Design the different oscillator circuits for various frequencies | |

Subject:- Linear Integrated Circuits

Course Outcomes:-

| | |
|--|--|
| 1. Understand the fundamentals and areas of applications for the integrated circuits. | 2. Analyze important types of integrated circuits. |
| 3. Demonstrate the ability to design practical circuits that perform the desired operations. | 4. Understand the differences between theoretical, practical & simulated results in integrated circuits. |
| 5. Select the appropriate integrated circuit modules to build a given application. | |

Subject:- Signals & Systems**Course Outcomes:-**

| | |
|--|--|
| 1. Understand about various types of signals and systems, classify them, analyze them, and | perform various operations on them, |
| 2. Understand use of transforms in analysis of signals and system in continuous and discrete time domain. | 3. Observe the effect of various properties and operations of signals and systems. |
| 4. Evaluate the time and frequency response of Continuous and Discrete time systems which are useful to understand the behaviour of electronic circuits and communication systems. | |

Subject:- Principles of Communication Engineering**Course Outcomes:-**

| | |
|--|--|
| 1. Use different modulation and demodulation techniques used in analog communication | 2. Identify and solve basic communication problems |
| 3. Analyze transmitter and receiver circuits | 4. Compare and contrast design issues, advantages, disadvantages and limitations of analog communication systems |

(COMPUTER)

PROGRAM OUTCOMES (POs)

Engineering Graduates will be able to:

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

Program Specific Objectives (PSOs):

| | |
|--------------|--|
| PSO1: | Design and develop systems using concepts of Mathematics, Computer Engineering and other related disciplines to meet customers' business objectives. |
| PSO2: | Test and analyse the hardware/software systems for continuous quality Improvement |
| | |

ACADEMIC YEAR 2018-19**4TH YEAR - 7TH SEMESTER (REV-2012)****Subject:- Digital Signal & Image Processing****Course Outcomes:-**

| | |
|--|--|
| 1. Classify and analyze discrete time signals and systems | 2. Implement Digital Signal Transform techniques DFT and FFT |
| 3. Use the enhancement techniques for digital Image Processing | 4. Differentiate between the advantages and disadvantages of different edge detection techniques |
| 5. Develop small projects of 1-D and 2-D Digital Signal Processing | 6. |

Subject:- Mobile Communication & Computing**Course Outcomes:-**

| | |
|--|---|
| 1. To identify basic concepts and principles in mobile communication & computing, cellular architecture. | 2. To describe the components and functioning of mobile networking |
| 3. To classify variety of security techniques in mobile network. | 4. To apply the concepts of WLAN for local as well as remote applications |
| 5. To describe and apply the concepts of mobility management | 6. To describe Long Term Evolution (LTE) architecture and its interfaces. |

Subject:- Artificial Intelligence & Soft Computing**Course Outcomes:-**

| | |
|--|---|
| 1. Identify the various characteristics of Artificial Intelligence and Soft Computing techniques. | 2. Choose an appropriate problem solving method for an agent to find a sequence of actions to reach the goal state. |
| 3. Analyse the strength and weakness of AI approaches to knowledge representation, reasoning and planning. | 4. Construct supervised and unsupervised ANN for real world applications. |
| 5. Design fuzzy controller system. | 6. Apply Hybrid approach for expert system design. |

Subject:- Department Level Optional Course -III : Big Data & Analytics**Course Outcomes:-**

| | |
|--|--|
| 1. Understand & describes the key issues in big data management and its associated applications for business decisions and strategy. | 2. Develop problem solving and critical thinking skills in fundamental enabling techniques like Hadoop, Mapreduce and NoSQL in big data analytics. |
| 3. Collect, manage, store, query and analyze various forms of Big Data. | 4. Interpret business models and scientific computing paradigms, and apply software tools for big data analytics. |

Subject:- Institute Level Optional Course-I : Cyber Security and Laws**Course Outcomes:-**

| | |
|---|---|
| 1. Understand the concept of cybercrime and its effect on outside world | 2. Interpret and apply IT law in various legal issues |
| 3. Distinguish different aspects of cyber law | 4. Apply Information Security Standards compliance during software design and development |

Subject:- Project (Stage I)**Course Outcomes:-**

| | |
|---|--|
| 1. Able to make comprehensive use of the technical knowledge gained from previous courses. | 2. Able to understand technologies viz., platform, database, etc. concerned with the project. |
| 3. Able to apply project management skills (scheduling work, procuring parts and documenting expenditures and working within the confines of a deadline). | 4. Able to analyze, develop and demonstrate Computer Science & Engineering and Information Technology. |
| 5. Able to communicate technical information by means of written and oral reports. | |

4TH YEAR 8TH SEMESTER (REV 2012)

Subject:- Data Warehousing & Mining

Course Outcomes:-

| | |
|---|--|
| 1. Understand Data Warehouse fundamentals, Data Mining Principles | 2. Design data warehouse with dimensional modelling and apply OLAP operations. |
| 3. Identify appropriate data mining algorithms to solve real world problems | 4. Compare and evaluate different data mining techniques like classification, prediction, clustering and association rule mining |
| 5. Describe complex data types with respect to spatial and web mining. | |

Subject:- Human Machine Interaction

Course Outcomes:-

| | |
|--|--|
| Identify User Interface (UI) design principles. | Analysis of effective user friendly interfaces |
| Apply Interactive Design process in real world applications. | Evaluate UI design and justify. |
| Create application for social and technical task. | |

Subject:- Department Level Optional Course -III : Big Data & Analytics

Course Outcomes:-

| | |
|--|--|
| 1. Understand & describes the key issues in big data management and its associated applications for business decisions and strategy. | 2. Develop problem solving and critical thinking skills in fundamental enabling techniques like Hadoop, Mapreduce and NoSQL in big data analytics. |
| 3. Collect, manage, store, query and analyze various forms of Big Data. | 4. Interpret business models and scientific computing paradigms, and apply software tools for big data analytics. |

Subject:-Parallel and distributed Systems

Course Outcomes:-

| | |
|---|--|
| 1. Demonstrate knowledge of the basic elements and concepts related to distributed system technologies; | 2. Illustrate the middleware technologies that support distributed applications such as RPC, RMI and Object based middleware. |
| 3. Analyze the various techniques used for clock synchronization and mutual exclusion | 4. Demonstrate the concepts of Resource and Process management and synchronization algorithms |
| 5. Demonstrate the concepts of Consistency and Replication Management | 6. Apply the knowledge of Distributed File System to analyze various file systems like NFS, AFS and the experience in building large-scale distributed applications. |

Subject:- Project –II**Course Outcomes:-**

| | |
|---|--|
| 1. Able to make comprehensive use of the technical knowledge gained from previous courses | 2. Able to understand technologies viz., platform, database, etc. concerned with the project |
| 3. Able to apply project management skills (scheduling work, procuring parts and documenting expenditures and working within the confines of a deadline). | 4. Able to analyze, develop and demonstrate Computer Science & Engineering and Information Technology. |
| 5. Able to communicate technical information by means of written and oral reports. | |

ACADEMIC YEAR 2018-19**3rd YEAR - 5TH SEMESTER (Rev. 2016)****Subject:- Microprocessor****Course Outcomes:-**

| | |
|--|--|
| 1. Students should be able to DESCRIBE the architecture and organization of a Microprocessor. | 2. Students should be able to WRITE assembly language program for Microprocessor to perform various tasks. |
| 3. Students should be able to DESIGN interface a Microprocessor to various devices. | 4. Course has stimulated student's interest in the field of Microprocessor. |
| 5. Students should be able to COMMUNICATE Microprocessor effectively both verbally and in writing. | |

Subject:- Database Management System**Course Outcomes:-**

| | |
|---|---|
| 1. Understand the fundamentals of a database systems | 2. Design and draw ER and EER diagram for the real life problem. |
| 3. Convert conceptual model to relational model and formulate relational algebra queries. | 4. Design and querying database using SQL. |
| 5. Analyze and apply concepts of normalization to relational database design. | 6. Understand the concept of transaction, concurrency and recovery. |

Subject:- Computer Network**Course Outcomes:-**

| | |
|---|---|
| 1. Demonstrate the concepts of data communication at physical layer and compare ISO - OSI model with TCP/IP model | 2. Demonstrate the knowledge of networking protocols at data link layer |
| 3. Design the network using IP addressing and sub netting / super netting schemes. | 4. Analyze various routing algorithms and protocols at network layer |
| 5. Analyze transport layer protocols and congestion control algorithms. | 6. Explore protocols at application layer . |

**Subject:- Department Level Optional Course –I
(Multimedia System)****Course Outcomes:-**

| | |
|---|---|
| 1. To understand & identify basics of multimedia, multimedia system architecture and different multimedia components. | 2. To explain file formats for different multimedia components. |
| 3. To analyze the different compression algorithms | 4. To describe various multimedia communication techniques. |
| 5. To apply different security techniques in multimedia environment. | |

**Subject:- Department Level Optional Course –I
(Advanced Operating System)****Course Outcomes:-**

| | |
|---|---|
| 1. Demonstrate understanding of design issues of Advanced operating systems and compare different types of operating systems. | 2. Analyse design aspects and data structures used for file subsystem, memory subsystem and process subsystem of Unix OS. |
| 3. Demonstrate understanding of different Operating Systems (RTOS, Multiprocessor) architectures, scheduling and analyse the design and data structures used in Multiprocessor operating systems. | 4. Explore architectures and design issues of Mobile OS, Virtual OS, Cloud OS. |

Subject:- Business Communication & Ethics Lab**Course Outcomes:-**

| | |
|---|---|
| 1. Design a technical document using precise language, suitable vocabulary and apt style. | 2. Develop the life skills/ interpersonal skills to progress professionally by building stronger relationships. |
| 3. Demonstrate awareness of contemporary issues knowledge of professional and ethical responsibilities. | 4. Apply the traits of a suitable candidate for a job/higher education, upon being trained in the techniques of holding a group discussion, facing interviews and |

| | |
|---|--------------------|
| | writing resume/SOP |
| 5. Deliver formal presentations effectively implementing the verbal and non-verbal skills | |

3RD YEAR - 6TH SEMESTER

| | |
|---|--|
| Subject:- Software Engineering | |
| Course Outcomes:- | |
| 1. Understand and demonstrate basic knowledge in software engineering | 2. Identify requirements, analyze and prepare models |
| 3. Plan, schedule and track the progress of the projects | 4. Design & develop the software projects |
| 5. Identify risks, manage the change to assure quality in software projects | |

| | |
|--|---|
| Subject:- System Programming & Compiler Construction | |
| Course Outcomes:- | |
| 1. Students should be able to describe basic concepts and designing of system software's | 2. Students should be able to implement the compiler phases, Assembler, Macro processor |
| 3. Students should be able to demonstrate the working of parsers, Assembler, Macro processor | 4. Course has stimulated student's interest in the field of System Programming & Compiler Construction. |

| | |
|---|--|
| Subject:- Data Warehousing & Mining | |
| Course Outcomes:- | |
| 1. Understand Data Warehouse fundamentals, Data Mining Principles | 2. Design data warehouse with dimensional modelling and apply OLAP operations. |
| 3. Identify appropriate data mining algorithms to solve real world problems | 4. Compare and evaluate different data mining techniques like classification, prediction, clustering and association rule mining |
| 5. Describe complex data types with respect to spatial and web mining. | |

| | |
|--|--|
| Subject:- Cryptography & System Security. | |
| Course Outcomes:- | |
| 1. Understand system security goals and concepts, compare and apply different encryption and decryption techniques, digital signature to solve problems related to confidentiality and authentication respectively | 2. Evaluate performance of different message digest algorithm to keep integrity messages and digital signature to solve problem elated |
| 3. Understand and compare security | 4. Analyze different attacks on networks |

Subject:- Electronic Circuits and Communication Fundamentals**Course Outcomes:-**

| | |
|---|---|
| 1. Ability to understand and use semiconductor devices in circuits. | 2. Ability to understand concept of feedback and oscillations |
| 3. Ability to apply knowledge of electronic devices and circuits to communication applications. | 4. Ability to describe Class A and Class C power amplifier |
| | |
| protocols like SSL, IPSec, PGP etc. | and apply various system security concepts to recognize malicious action. |

ACADEMIC YEAR 2018-19**2ND YEAR - 3RD SEMESTER (Rev. 2016)****Subject:- Applied Mathematics-III****Course Outcomes:-**

| | |
|---|--|
| 1. Students will demonstrate basic knowledge of Laplace Fourier series, Bessel function Vector algebra and complex variable | 2. Students will demonstrate an ability to identify and Model the problems of the field of Electronic and Telecommunication and solve it |
| 3. Students will be able to apply the application of Mathematics in Telecommunication Engineering | |

Subject:- Digital Logic Design & Analysis**Course Outcomes:-**

| | |
|---|---|
| 1. Develop a digital logic and apply it to solve real life problems | 2. Analyze, design and implement combinational logic circuit. |
| 3. Classify different Memories | 4. Analyze, design and implement sequential logic circuit |
| 5. Analyze digital system design using PLD | 6. Simulate and implement combinational and sequential circuit using VHDL system. |
| | |

Subject:- Data Structures**Course Outcomes:-**

- | | |
|--|---|
| 1. Describe various techniques for representation of the data in the real world. | 2. Choose & apply appropriate data structure as applied to specified problem definition |
| 3. Implement various linear and nonlinear data structures | 4. Implement various sorting and searching techniques. |

Subject:- OOPM(Java) Lab**Course Outcomes:-**

- | | |
|--|---|
| 1. To apply fundamental programming constructs. | 2. To illustrate & elaborate the concept of packages, classes, objects, strings and arrays. |
| 3. To implement the concept of inheritance, interfaces, exception handling and multithreading. | 4. To develop GUI based application. |

2ND YEAR 4TH SEMESTER**Subject:- Applied Mathematics-IV****Course Outcomes:-**

- | | |
|---|--|
| 1. Demonstrate basic knowledge of Calculus of variation, Vector Spaces, Matrix Theory, Random Variables, Probability Distributions, Correlation and Complex Integration | 2. Demonstrate an ability to identify and Model the problems in the field of Electronics and telecommunication and solve it. |
| 3. Apply the application of Mathematics in Telecommunication Engineering. | |

Subject:- Open Source Tech Lab**Course Outcomes:-**

- | | |
|--|---|
| 1. Understand & describe basic concepts in python and perl. | 2. explore contents of files, directories and text processing with python |
| 3. Develop program for data structure using built in functions in python. | 4. Implement file handling and database handling using Python |
| 5. Explore basics of two way communication between client and server using python. | 6. Course has stimulated student's interest in the field of Computer Programming. |

Subject:- Computer Graphics**Course Outcomes:-**

| | |
|--|--|
| 1. Understand the basic concepts of Computer Graphics. | 2. Demonstrate various algorithms for scan conversion and filling of basic objects and their comparative analysis. |
| 3. Apply geometric transformations, viewing and clipping on graphical objects. | 4. Explore solid model representation techniques and projections. |
| 5. Understand visible surface detection techniques and illumination models | 6. |

Subject:- Operating System**Course Outcomes:-**

| | |
|--|---|
| 1. Understand role of Operating System in terms of process, memory, file and I/O management. | 2. Apply and analyse the concept of a process, thread, mutual exclusion and deadlock. |
| 3. Evaluate performance of process scheduling algorithms and IPC. | 4. Evaluate the performance of memory allocation and replacement techniques. |
| 5. Apply and analyse the concepts of memory management techniques, different techniques of file and I/O management | |

Subject:- Analysis of Algorithms**Course Outcomes:-**

| | |
|--|---|
| 1. Analyze the running time and space complexity of algorithms | 2. Describe, apply and analyze the complexity of divide and conquer strategy |
| 3. Describe, apply and analyze the complexity of greedy strategy. | 4. Describe, apply and analyze the complexity of dynamic programming strategy. |
| 5. Explain and apply backtracking, branch and bound and string matching techniques to deal with some hard problems | 6. Describe the classes P, NP, and NP-Complete and be able to prove that a certain problem is NP-Complete |

Subject:- Computer Organization and Architecture

Course Outcomes:-

| | |
|---|---|
| 1. To describe basic structure of the computer system. | 2. To demonstrate the arithmetic algorithms for solving ALU operations |
| 3. To describe instruction level parallelism and hazards in typical processor pipelines | 4. To describe superscalar architectures, multi-core architecture and their advantages |
| 5. To demonstrate the memory mapping techniques. | 6. To Identify various types of buses, interrupts and I/O operations in a computer system |

Applied Sciences & Humanities

First Year Engineering, Semester 1

Subject:- Applied Mathematics-1

Course Outcomes:-

| | |
|--|---|
| 1. Apply and demonstrate the concepts of Complex Number, Successive Differentiation, Partial Differentiation, Applications of Partial Differentiation, Expansion of Functions, Numerical Methods to the problems arising in engineering formulation. | 2. Analyze and interpret the problems arising in engineering formulation using Complex Number, Matrices, Partial Differentiation, Expansion of Functions |
| 3. Apply the techniques of Science Lab Programming to solve Linear, Non linear, transcendental equations and Extremis the functions of two variables | 4. Express graphically, Mathematically and through writing the concept of Complex Number, Successive Differentiation, Partial Differentiation, Applications of Partial Differentiation, Expansion of Functions, Numerical Methods in Engineering and Technology |

Subject:-Applied Chemistry-1

Course Outcomes:-

| | |
|---|--|
| 1. Describe the chemistry of polymers and their applications, methods of purification of water, mechanism of lubrication and its properties, thermodynamics of chemical processes and manufacture of cement and engineering materials and phase rule. | 2. Select and apply appropriate formula and calculate the percentage of impurities in water, various reagent to soften water, acid and saponification value of lubricants. |
| 3. Express verbally, graphically through writing the concept of Water, Polymers, Lubricants, Phase rule & Important Engineering Material. | 4. Perform experimentations using the safety techniques and skills necessary for engineering practices. |

Subject:- Applied Physics-1

Course Outcomes:-

| | |
|---|---|
| 1. Apply the concepts of crystal lography and to use XRD techniques for analysis of crystal structure . | 2.)Apply the knowledge of Quantum mechanics to uncertainty principle and motion of free particle b) Apply the knowledge of superconductivity to SQUID and c) Apply the knowledge of Magnetic levitation and Piezoelectric/ Magnetostriction effect for production of ultrasonic waves and its application in various fields. |
|---|---|

| | |
|--|---|
| 3. To comprehend the basic concepts of semiconductor physics and apply the same to electronic devices. | 4. Identify Acoustical defects and apply this knowledge for designing of Hall/Auditorium. |
| 5. Express verbally, graphically and through writing the concept of Crystallography, Quantum Mechanics, Semiconductors, Acoustic and Ultrasonic's in Engineering and Technology. | |

Subject:- Engineering Mechanics

Course Outcomes:-

| | |
|--|--|
| 1. Illustrate the concept of force, moment and apply the same along with the same along with the concept of equilibrium in two and three dimensional system with the help of FBD | 2. Demonstrate the understanding of centroid and its significance and locate the same. |
| 3. Correlate real life application to specific type of friction and estimate required force to overcome friction | 4. Establish relation between velocity and acceleration of a particle and analyze the motion by plotting the relation. |
| 5. Illustrate different types of motion and establish kinematic relation for a rigid body. | 6. Analyze body in motion using force and acceleration , work energy, impulse-momentum principle |

First Year Engineering, Semester 1

Subject:- Basic Electrical Engineering

Course Outcomes:-

| | |
|---|--|
| 1. Demonstrate the fundamental knowledge of DC and AC Circuits | 2. Formulate and analyze DC and AC circuits. |
| 3. Communicate DC and AC circuit graphically in writing and verbally. | 4. Perform experiment with all precautions. |

Subject:- Environmental Studies

Course Outcomes:-

| | |
|---|---|
| 1. Illustrate depleting nature of environmental resources and Global environmental crises and its impact. | 2. Explain concept of ecosystem and ecological succession. |
| 3. Demonstrate the technique of disaster management and green building | 4. Describe the need of sustainable development and importance of renewable energy resources. |
| 5. Explain the salient features of the incident and suggest preventive measures. | 6. |

Subject:- Basic Wrokshop-1**Course Outcomes:-**

| | |
|---|---|
| 1. Understand the basic knowledge such as interpretation of job drawing, application of processes and operations to produce components from raw materials along with safety precautions to be taken during working. | 2. Demonstrate the lathe machine and lathe operations such as facing, plain turning, step turning, taper turning, etc |
| 3. Use various fitting tools and perform fitting operations such as cutting, filing, marking, center punching, drilling, tapping and prepare one male female joint. | 4. Know about the House wiring, staircase wiring, wiring diagram for fluorescent tube light, Go down wiring and three phase wiring for electrical motors. |

First Year Engineering, Semester 2**Subject:- Applied Mathematics-2****Course Outcomes:-**

| | |
|--|--|
| 1. Demonstrate and apply the concept of first and higher order Differential Equations, Beta and Gamma Functions, Rectification, Double and Triple Integrals of different co-ordinate system to the problems arising in engineering formulation | 2. Identify the various types of Differential Equations and Integrals arising in engineering formulation and select the appropriate method to solve. |
| 3. Apply the techniques of Science Lab programming in Curve Tracing, Differential Equations and Numerical Integrations. | 4. Express graphically mathematically through writing the concept of differential equations Beta and Gamma |

Subject:- Applied Physics-2**Course Outcomes:-**

| | |
|---|--|
| Comprehend principles of interference, diffraction, electrodynamics, nanotechnology and their usages in different applications. | Illustrate the principle, construction, working of various LASERs along with its applications and state various applications of optical fibre. |
| Enumerate the concepts of electromagnetism in focusing systems and CRO. | Interpret surface morphology of optical instruments using appropriate techniques of interference and diffraction |
| Express verbally, graphically and through writing the concept of Interference, Diffraction, Fibre optics, Lasers, Electron optics | |

Subject:- Applied Chemistry-2**Course Outcomes:-**

| | |
|---|---|
| 1. Demonstrate the chemistry of Corrosion and their methods of purifications for protection, need of Alloy and composite materials, importance of green concepts and Fuels and its characteristics. | 2. Select and apply appropriate formula and calculate the air and oxygen for combustion, atom economy for chemical reactions. |
| 3. Express verbally, graphically through writing the concept of Corrosion, Alloys, Fuels, Composite materials and Green Chemistry. | 4. Use safety tools & safety precautions while performing experiments. |

Subject:- Engineering Drawing**Course Outcomes:-**

| | |
|--|---|
| 1. Acquire the knowledge of projection of 2D & 3D drawing. | 2. Apply the basic principles of projections in converting 3D views in 2D drawings & vice versa |
| 3. Read & Visualize a given drawing & hidden views | 4. Use computer aided drafting to draw 2D & 3D object. |

Subject:-Structured Programming Approach**Course Outcomes:-**

| | |
|---|--|
| 1. Illustrate the basic terminologies used in computer programming like data types, operators in C. | 2. Design and Implement control statements and looping constructs in C. |
| 3. Apply function concept on problem statements. | 4. Demonstrate the use of arrays, strings, structures and files handling in C. |
| 5. Demonstrate the use of pointers to construct various data structures. | |

First Year Engineering, Semester 2**Subject:-Communication Skills****Course Outcomes:-**

| | |
|---|---|
| 1. Demonstrate the knowledge of Communication theory, basic official correspondence, grammar and lexis, summarization, comprehension, technical writing and Information communication Technology. | 2. Apply the communication theory knowledge to compare it with results obtained by performing practical's individually and in groups and use soft skills techniques necessary for engineering practice. |
| 3. Express verbally in effective business letters by applying rules of style, principles, structure, blocks in business organization and hard skills like technical writing. | 4. Apply the knowledge of creating official content digitally for further communication in the corporate environment. |

Subject:- Basic Workshop-2

Course Outcomes:-

| | |
|---|---|
| 1. Understand the basic knowledge such as interpretation of job drawing, application of processes and operations to produce components from raw materials along with safety precautions to be taken during working. | 2. Use and perform the setting of hand tools like hacksaws, jack planes, chisels and gauges for construction of various joints, wood turning and modern wood turning methods. |
| 3. Carry out edge preparation for welding jobs and perform arc welding operations. | 4. Use different plumbing tools like spanners, wrenches, threading dies and demonstrate the preparation of a domestic pipe line. |
| | |

MECHANICAL

PO1:- Able to apply the knowledge of mathematics, science, engineering fundamentals, and mechanical engineering to the solution of complex engineering problems.

PO2:- Able to identify, formulate, conduct literature survey, and analyze mechanical engineering problems and draw conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3:- Able to design components, systems and processes to specified needs with due considerations of safety, health, environment and society.

PO4:- Able to experiment and conduct investigation, analysis, synthesis to arrive at conclusions.

PO5:- Able to select and use appropriate modern tools to solve the engineering problems.

PO6:- Able to apply professional reasoning to assess safety, health, environment, legal, economical issues.

PO7:- Able to understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8:- Able to apply ethical principles and commit to professional ethics and Responsibilities and norms of the engineering practice.

PO9:- Able to function effectively as an individual member, team member, leader in diverse and multidisciplinary teams.

PO10:- Able to write effective report, design documents, make oral presentation, and debate before engineering community and society at large.

PO11:- Able to apply the principles of engineering and management to own work and manage projects and group activities.

PO12:- Able to engage in life-long learning to recognize the need in the context of the technological changes.

PSO:- Able to demonstrate design skills and manufacturing ability in both thermal and mechanical engineering systems.

Sem III

Subject:- Applied Mathematics III

Course Outcomes

| | |
|---|--|
| 1. Demonstrate the ability of using Laplace Transform and Fourier Series in solving the Ordinary Differential Equations and Partial Differential Equations | 2. Identify the analytic function, harmonic function, orthogonal trajectories and to apply bilinear transformations and conformal mappings. |
| 3. Identify the applicability of theorems and evaluate the contour integrals. | 4. |

Subject:- Thermodynamics

Course Outcomes

| | |
|---|--|
| 1. Demonstrate understanding of basic concepts of thermodynamics. | 2. Differentiate between quality and quantity of energy, heat and work, enthalpy and entropy, etc. |
| 3. Analyze basic power cycles. | 4. Apply the laws of thermodynamics to various real life systems. |

Subject:- Strength of Materials

Course Outcomes:-

| | |
|---|---|
| 1. Demonstrate fundamental knowledge about various types of loading and stresses induced. | 2. Draw SFD and BMD for different types of loads and support conditions |
| 3. Compute and analyze stresses induced in basic mechanical components. | 4. Analyze buckling and bending phenomenon in columns and beams respectively. |

Subject:-Production Process-I**Course Outcomes:-**

- | | |
|---|---|
| 1. Demonstrate understanding of non-chip forming processes such as casting, forging, metal joining etc. | 2. Understand basic of powder metallurgy. |
| 3. Identify the role of Non Destructive techniques in Production Processes | |

Subject:- Computer Aided M/c Drawing**Course Outcomes:-**

- | | |
|--|---|
| 1. Visualize and prepare detail drawing of a given object. | 2. Draw details and assembly of mechanical system. |
| 3. Read and interpret a given drawing | 4. Create 2-D and 3-D models using any standard CAD software with manufacturing considerations. |

Subject:- Data Base & Information Retrieval System**Course Outcomes:-**

- | | |
|---|---|
| 1. To describe data models and schemas in DBMS. | 2. To understand the features of database management systems and Relational database. |
| 3. To use SQL- the standard language of relational databases. | 4. To understand the functional dependencies and design of the database. |
| 5. To understand the graphical user Interface design. | |

Subject:- Machine Shop Practice- I

Course Outcomes:-

| | |
|---|--|
| 1. Operate various machines like lathe, shaper etc. | 2. Perform plain turning, taper turning, and screw cutting etc. on lathe machine |
| 3. Perform machining operations on shaper. | 4. Demonstrate metal joining process like compressive welding. |

Sem IV

Subject:- Applied Mathematics IV

Course Outcomes:-

| | |
|---|--|
| 1. Use matrix algebra with its specific rules to solve the system of linear equations. | 2. Understand and apply the concept of probability distribution and sampling theory to engineering problems. |
| 3. Apply principles of vector differential and integral calculus to the analysis of engineering problems. | 4. Identify, formulate and solve engineering problems. |

Subject:-Fluid Mechanics

Course Outcomes:-

| | |
|---|--|
| 1. To know the viscosity and Newton's law of viscosity. | 2. To know the Pascal's law and pressure measurement. |
| 3. To able to calculate the shear stress, velocity and pressure of fluid | 4. To know hydrostatic force and centre of pressure, and able to calculate the total pressure and center of pressure of the submerged plate. |
| 5. Can differentiate various types of fluid and flow. | 6. To know importance of meta- centric height and its calculations. |
| 7. To able to the differentiate fluid static, fluid kinematic and fluid dynamics. | 8. To able to calculate the discharge through the pipes in different |

| | |
|--|----------------|
| | configuration. |
| 9. To able to calculate the boundary layer, momentum, displacement and energy thicknesses. | |

Subject:-Theory of Machines- I

Course Outcomes:-

| | |
|--|---|
| 1. To develop clear concept of machine, mechanisms and inversion. | 2. To use the graphical method for finding the velocity and acceleration of any link of a mechanism. |
| 3. To able to find length of belt, length of chain & velocity ratio. | 4. To able to differentiate flat belt, V-belt, Rope drive and Chain drive. |
| 5. To able to know the D Alembert's principle, principle of Work and Energy. | 6. To able to do the Static and dynamic force analysis of slider crank mechanisms. |
| 7. To know the terminologies of gears & its related calculations | 8. Define various components of mechanisms. |
| 9. Construct/Compose mechanisms to provide specific motion. | 10. Draw velocity and acceleration diagrams of various mechanisms. Construct CAM profile for the specific follower motion. |
| 11. Select appropriate power transmission mechanism. | |

Subject:- Production Process- II

Course Outcomes:-

| | |
|---|--|
| 1. Understand chip forming processes such as turning, milling, drilling, etc. | 2. Understand the design aspects of cutting Tools and Economics of machining. |
| 3. Distinguish between the conventional and modern machine tools. | 4. To use concepts of speed, feed, depth of cut, machining time for practical problems |

| | |
|---|---|
| 5. To use economics concept to problems of machining. | 6. To measure tool life & the forces in metal cutting. |
| 7. To design die-set for sheet metal working. | 8. To design jigs and fixtures on basic mechanical components. |
| 9. To design rolling parameters, and know elements of like processes. | 10. To design single point cutting tool, form tool, broach tool, milling cutter |

Subject:- Material Technology

Course Outcomes:-

| | |
|---|---|
| 1. To able to identify the defects of the crystalline materials. | 2. To know the effect of dislocation climb, FRS and dislocation Piled- up. |
| 3. To able to calculate the stress required to propagate the crack and relative percentage of phases & micro-constituents in materials. | 4. To know the slip system for various crystal structure of materials. |
| 5. To know the effect of cyclic stresses & high temperature. | 6. Can differentiate various phases in microstructure of steels. |
| 7. To know the different property variations due to heat treatment process. | 8. To know which alloying element is to be added to get the desired properties in the steels. |
| 9. Can know different mechanism to improve the strength of materials. | |

Subject:- Material Technology

Course Outcomes:-

| | |
|---|--|
| 1. To able to identify the defects of the crystalline materials. | 2. To know the effect of dislocation climb, FRS and dislocation Piled- up. |
| 3. To able to calculate the stress required to propagate the crack and relative percentage of phases & micro-constituents in materials. | 4. To know the slip system for various crystal structure of materials. |
| 5. To know the effect of cyclic stresses & high temperature. | 6. Can differentiate various phases in microstructure of steels. |

| | |
|---|---|
| 7. To know the different property variations due to heat treatment process. | 8. To know which alloying element is to be added to get the desired properties in the steels. |
| 9. Can know different mechanism to improve the strength of materials. | |

Subject:- Industrial Electronics

Course Outcomes:-

| | |
|---|--|
| 1. Understand the applications of power electronic converters. | 2. Understand concept of OPAMP. |
| 3. Demonstrate the knowledge of basic functioning of digital circuits and microcontrollers. | 4. Understand speed-torque characteristics of electrical machines for implementation of speed control methods using electrical drives. |

Subject:- Machine Shop Practice- II

Course Outcomes:-

| | |
|--|---|
| 1. Operate various machines like lathe, shaper, grinding machine, milling machine etc. | 2. Perform precision turning, boring etc. |
|--|---|

Sem V

Subject:- Mechanical Measurement & Metrology

Course Outcomes:-

| | |
|---|--|
| 1. Students will understand various measurement methods. | 2. Students will be able to understand quantity sensors and transducers with their working principles. |
| 3. Students will be able to understand different measurement instruments. | 4. Students will be able to understand difference between comparison techniques. |
| 5. Students will be able to understand measurement standards | |

Subject:- Theory Of Machines-II

Course Outcomes:-

| | |
|--|--|
| 1. Demonstrate the construction and working of different mechanical systems. | 2. Understand basics of different governors and gear trains in Mechanical Engineering. |
|--|--|

| | |
|--|--|
| 3. Identify the role of Braking systems in Automobile Engineering. | |
|--|--|

Subject:- Heat And Mass Transfer

Course Outcomes:-

| | |
|---|---|
| 2. To know the viscosity and Newton's law of viscosity. | 3. To know the Pascal's law and pressure measurement. |
|---|---|

Subject:- Fluid Mechanics

Course Outcomes:-

| | |
|--|--|
| 1. To able to calculate the shear stress, velocity and pressure of fluid. | 2. To know hydrostatic force and centre of pressure, and able to calculate the total pressure and center of pressure of the submerged plate. |
| 3. To know importance of meta- centric height and its calculations. | 4. Can differentiate various types of fluid and flow. |
| 5. To able to the differentiate fluid static, fluid kinematic and fluid dynamics. | 6. To able to calculate the discharge through the pipes in different configuration. |
| 7. To able to calculate the boundary layer, momentum, displacement and energy thicknesses. | |

Subject:- Graphic User Interface And Database Management

Course Outcomes:-

| | |
|---|---|
| 1. To describe data models and schemas in DBMS. | 2. To understand the features of database management systems and Relational database. |
| 3. To use SQL- the standard language of relational databases. | 4. To understand the functional dependencies and design of the database. |
| 5. To understand the graphical user Interface design. | |

Sem VI

Subject:- Hydraulic Machinery

Course Outcomes:-

| | |
|---|---|
| 1. To Develop Good Hydraulic System and Help to increase production of electricity. | 2. To provide optimized Hydraulic system. |
| 3. To design Control systems and optimization of Existing Hydraulic turbines. | 4. To design optimum Control system for Hydraulic pumps |
| 5. To use techniques for Analysis of Hydraulic turbines & pumps. | 6. To use software to control Hydraulic system. |
| 7. To use Hydraulic system for the domestic use. | |

Subject:- Mechanical Vibrations

Course Outcomes:-

| | |
|--|---|
| 1. Making use of different methods for developing Mathematical model such as FBD | 2. Identify the importance of different methods Rayleigh, Dunkerlys and Holzer methods in Mechanical Engineering for determining Natural Frequency. |
|--|---|

Subject:- Machine Design- I

Course Outcomes:-

| | |
|--|--|
| 1. Demonstrate the construction and working of different mechanical systems. | 2. Identify the roles of various drives in Mechanical Engineering. |
| 3. Identify the roles of various joints in Engineering. | |

Subject:- E-Commerce And Industrial Finance

Course Outcomes:-

| | |
|--|---|
| 1. Students learn how E-commerce work on www. Reality and Myth | 2. Students learn the Online Marketing, advantages, working of internet based systems, risks, ESCM. |
| 3. Students familiar with Challenges of transition of E-commerce for Indian market | 4. Students know the ways of Different industrial finance Methods, Types, their profit, Efficiency |

| | |
|---|--|
| 5. Students make a Analysis of different investment appraisal methods | 6. Students aware about DEBT finance, hybrid finance, short term financial markets, risk of this methods |
| 7. Studied cash conversion cycles, overtrading | 8. Studied Exchange rates, factor affecting on exchange rate |

Sem VII

Subject:- Refrigeration And Air Conditioning Machine Design - II

Course Outcomes:-

| | |
|--|--|
| 1. Demonstrate the construction and working of different mechanical Systems. | 2. Identify the roles of Bearings in Automobile Engineering. |
| 3. Identify the roles of Centrifugal Pumps in Engineering. | |

Subject:- Manufacturing Planning And Control

Course Outcomes:-

| | |
|---|--|
| 1. Role and importance of manufacturing cycle in supply chain. | 2. To determine demand and manage demand. |
| 3. To schedule and sequence jobs and optimize elapsed time of production. | 4. To design project network and solve for critical path, & minimum cost. |
| 5. To assign resources and utilize them for minimum cost or maximum profit. | 6. To simulate data of demand, inventory, production requirements. |
| 7. To determine EOQ and Costs with and without discounts. | 8. To determine plant capacity and utilization. To model and solve any production planning problem considering linearity |

Subject:- CAD CAM/CIM

Course Outcomes:-

| | |
|--|---|
| 1. Student understood the basic analytical fundamentals that are used to create and manipulate geometric models in a computer program. | 2. Students understood all of the steps of the computer aided design process in proposing and building models in design projects. |
| 3. Students understood the possible applications of the CAD/CAM systems. | 4. Students understood Model the 3- D geometric information of machine components including assemblies, and automatically generate 2-D production |

| | |
|--|---|
| | drawing. |
| 5. Students understood the concept of Integrate the CAD and the CAM systems for modeling design information and converting the CAD model into a CAM model for manufacturing. | 6. Students understood the various CAD/CAM and CNC processes & understand the working principles of CNC machines. |
| 7. Students understood NC Part programs and CNC Programming for different machining operations. | 8. Students understood Group Technology and Flexible Manufacturing systems. |
| 9. Students understood the benefits and problems associated with CIM technology and study CIM driven practices. | |

Subject:- Supply Chain Management (Elective I)

Course Outcomes:-

| | |
|--|---|
| 1. Analyze the manufacturing operations of firm. | 2. Apply sales and operations planning, MRP and lean manufacturing concept. |
| 3. Apply logistics and purchasing concepts to improve supply chain operations. | 4. Apply quality management tools for process improvement. |

Subject:- Power Plant Engineering (Elective-I)

Course Outcomes:-

| | |
|---|--|
| 1. Students understood concept of power plant. | 2. Student understood the economical concept of power plant. |
| 3. Student understood different types of power plant. | 4. Student understood comparison of power plant |
| 5. Student understood the combined cycle of power generation. | 6. Student understood the environmental impact of power plants |

Sem VII

Subject:- Project Industrial Engineering And Enterprise Resource Planning

Course Outcomes:-

| | |
|---|---|
| 1. Student understood Industrial Engineering concept. | 2. Students got knowledge of work study, ergonomics & value engineering. |
| 3. Students studied computer applications in IE. | 4. Student understood the concept of ERP. (Enterprise Resource Planning). |
| 5. Students got knowledge of several ERP Packages. | |

Subject:- Finite Element Analysis

Course Outcomes:-

| | |
|---|--|
| 1. Identify mathematical model for solution of common engineering Problems. | 2. Formulate simple problems into finite elements. |
| 3. Solve structural, thermal, fluid flow, impact and crash problems. | 4. Solve complicated 3D structural problems for stress analysis under Impact loads. |
| 5. Solve Fluid Structure Interaction problems. | 6. Develop and exercise critical thinking in interpreting results from FEM analysis. This will include the ability to identify bad results by looking at deflected shapes, stress contours, 7. Eigen frequency animations as well as field distributions. |
| a. Develop a complete FEM solution strategy for analysis of Mechanical systems. | 8. Develop the stiffness equation for common FEA elements, and assemble element stiffness equations in to a global equation. |

Subject:- Automobile Engineering

Course Outcomes:-

| | |
|--|--|
| 1. To Develop or design different types of Clutches. | 2. To construct battery storage systems and use of ignition systems. |
| 3. To use different types of brakes. | 4. To design steering system. |

| | |
|--|---|
| 5. To provide optimized suspension systems. | 6. To use techniques for Analysis of body engineering of an automobile. |
| 7. The use of ECM for fuel injectors in automobiles. | a. To decide the types of tires, wheels and Transmission systems. |

Subject:- Business Process Reengineering (Elective II)

Course Outcomes:-

| | |
|--|---|
| 1. Analyze the manufacturing operations of firm. | 2. Apply sales and operations planning, MRP and lean manufacturing concept. |
| 3. Apply logistics and purchasing concepts to improve supply chain operations. | a. Apply quality management tools for process improvement. |

Subject:- Non- Conventional Energy Sources

Course Outcomes:-

| | |
|--|--|
| 1. Understand current energy scenario & depletion of conventional energy sources | 2. Understand types of non-conventional energy sources |
| 3. Understand collection, storage and conversion of solar energy to useful forms | 4. Understand basics of wind energy conversion and wind energy conversion machines |
| 5. Understand basics of geo- thermal energy conversion, potential geo-thermal energy harvesting locations, impact on environment | 6. Understand basics of ocean energy conversion and ocean energy conversion through OTEC plant |
| 7. Understand principles of tidal energy conversion and tidal energy conversion plants | 8. Understand basics of ocean wave energy harnessing and wave energy conversion machines |
| 9. Understand Biomass generation and energy conversion from biomass, Thermal gasification of biomass | a. Understand Principles and development of Fuel cells |

Subject:- Project Engineering Mechanics**Course Outcomes:-**

| | |
|---|--------------------------------|
| 1. Study regarding Force, Friction of static bodies | 2. Students analyze the truss. |
| 3. Study of dynamics of mechanics. | |

Subject:- Engineering Drawing**Course Outcomes:-**

| | |
|---|---|
| 1. Students understand the concept of different curves | 2. Students understand the concept of lines, planes, solids |
| 3. Student analyze, understand the knowledge of orthographic views. | 4. From orthographic views students understand to draw isometric view |

Programme Outcomes:-**PO-1: Engineering Knowledge****PO-2: Problem Analysis****PO-3: Design/ Development of solution****PO-4: Conduction investigation on complex problem****PO-5: Modern tool usage****PO-6: The Engineer & Society****PO-7: Environment & Sustainability****PO-8: Ethics****PO-9: Individual & Teamwork****PO-10: Communication****PO-11: Project Management & Finance****PO-12: Life-Long Learning****PEO-1: Graduates of the program will be able to apply efficiently principles of Civil Engineering****PEO-2: Graduates of the program will be able to lead a successful professional career in the thrust areas of Civil Engineering and Management****PEO-3: Graduates of the program will be able to exercise professionalism, ethics, sustainability, socio-economic aspects of Civil Engineering and need for lifelong learning.****PSO 1: Students will be able to implement various aspects of civil engineering through use of software, advance tools and site visits.****PSO 2: Student will be able to find societal need, develop, design & carryout solution through project based learning.****Subject:- Construction Engineering****Course Outcomes:-**

Identify and describe the purpose, importance, working and all the constructional aspects of various construction equipments and suggest proper construction equipment that suits to a particular situation

Explain and get familiar with various types of construction methodology

Compute various costs related to a construction equipment and make a proper decision in order to use particular type of construction equipment according to the situation after analyzing the economic aspect

Subject:- Limit state method for reinforced concrete structures

Course Outcomes:-

Students will describe the clauses & significance of IS 456-2000 in the RCC design.

Students will be able to design the building components by using Ultimate Load Method and Limit State Method.

Subject:- Construction Management

Course Outcomes:-

Understand and apply the knowledge of management functions to construction projects

Demonstrate their capability for preparing the project networks to work out best possible time for completing the project

Implement the safety as well as quality aspects during the execution of civil engineering project

Apply managerial skills in future during actual execution of projects

Subject:- Design and Drawing of Reinforced Concrete Structures

Course Outcomes:-

Read and understand various IS Codes used for design and their application.

Analyze and design RCC buildings considering safety, serviceability and economy.

Analyze and design water retaining structures like Water tanks, Retaining etc.

Subject:- Industrial Waste Treatment

Course Outcomes:-

Remember the industrial waste sources, effects and its treatment.

Understand the nature and characteristics of IW and regulatory requirements regarding IW treatment.

Apply industrial waste minimization techniques

Subject:- Solid Waste Management**Course Outcomes:-**

| | |
|---|---|
| Understand various concepts, the nature and characteristics of solid waste and regulatory requirements regarding the solid waste management | Understand the various methods of disposal of solid waste |
| Understand the various waste collection, storage, transport and waste processing techniques | Study the treatment of special types of waste - such as Industrial, Hazardous, Biomedical, Electronic |

Subject:- Irrigation Engineering**Course Outcomes:-**

| | |
|--|--|
| Calculate the demand of water required for agricultural land | Understand basic requirements of irrigation and how can they be managed |
| Apply their knowledge on ground water, well hydraulics to estimate the safe yield and ground water potential | Perform analysis and design of various Irrigation systems including hydraulic structures |

Subject:- QSEV**Course Outcomes:-**

| | |
|--|---|
| Read, understand and interpret plans, sections, detailed drawings and Specifications for a construction project. | Prepare approximate and detailed estimates based on the quantity survey of the available general and detailed drawings |
| Draft specifications, make bar bending schedules and draw mass haul diagrams. | Have a knowledge about the current market rates for labour and material Required for construction, perform rate analysis and compare with DSR. |
| Draft tender, prepare valid contract documents. | Understand the process of arbitration |
| Understand the role of a valuar and assess the value of a property | |

Subject:- EE II**Course Outcomes:-**

Explain wastewater collection systems in buildings and municipal areas and to determine the quantity of wastewater and storm water production. Also, gain the knowledge of the construction of new sewer line and importance of sewer appurtenances.

Explain and analyse the characteristics of wastewater and design the primary treatment for wastewater

Explain on-site treatment methods and solve Analyse and design wastewater treatment systems (ASP, Aerated lagoon and Oxidation ponds).

Identify and apply proper treatment for reclamation and reuse of wastewater and disposal.

Explain sludge characteristics and processing methods.

To provide knowledge of solid waste collection system, characteristics of solid waste and to identify hazardous waste. Study related to plastic waste management will be studied.

SECOND YEAR CIVIL DEPARTMENT**Subject:- Fluid Mechanics I****Course Outcomes:-**

Define various properties of fluids, state and explain different types of laws and principles of fluid mechanics.

Interpret different forms of pressure measurement and Calculate Hydrostatic Force and its Location for a given geometry and orientation of plane surface.

Compute force of buoyancy on a partially or fully submerged body and analyse the stability of a floating body.

Derive Euler's Equation of motion and Deduce Bernoulli's equation.

Subject:- Surveying II**Course Outcomes:-**

| | |
|--|--|
| Demonstrate setting out of horizontal and vertical curve. | prepares marking of centre line for different civil engineering structures |
| Understand use of modern surveying equipment's and methods | Understand different advanced surveying methods |

Subject:- FM II**Course Outcomes:-**

| | |
|---|---|
| Interpret different pipe fittings and evaluate the fluid velocity considering major and minor losses. | Solve pipe network problems by Hardy cross method. |
| Distinguish the types of compressible flow and understand concept of boundary layer theory. | Evaluate pressure drop in pipe flow using Hagen-Poiseuille's equation for laminar flow in a pipe. |
| Establish Prandtl's mixing theory and solve turbulent flow problems. | |

Subject:- Structural Analysis - 1**Course Outcomes:-**

| | |
|--|---|
| Students will understand the internal forces, displacements / deflections in beams and frames under the action of loads. | Students will be able to analyze the structures such as arches and suspension bridges and study the behavior of eccentrically loaded columns. |
| Students will be able to analyze the section with respect to unsymmetrical bending and shear center. | |

Subject:- Building Material and Construction Techniques

Course Outcomes:-

Able to identify and list various building materials, their properties and symbols

Able to make usage of appropriate material for every activity of construction, after acknowledging the property of each.

Can easily interpret manufacturing process of basic construction materials.

Conduct and conclude various test on materials.

Subject:- Strength of Materials

Course Outcomes:-

Able to understand the engineering properties of various construction material.

Able to understand behavior of beam and concept of shear force, bending moment and axial force.

Able to analyze flexural member under flexural loading.

Interpret the concept of torsion, principal plane, stresses lying on it, strain energy, etc.

Subject:- Engineering geology

Course Outcomes:-

Students will be able to understand the minerals, rocks and their physical as well as engineering properties.

Students will be able to understand physical and structural Geology

Students will be able to understand the geological considerations in different engineering projects like Dam, Tunnels and reservoirs

Subject:- Building Design & Drawing**Course Outcomes:-**

| | |
|--|--|
| To remember & recall the intricate details of building design& drawing. | To gain and understanding of the basic concepts of building design& drawing. |
| To learn how to apply professional ethics & act responsibly pertaining to the norms of building design & drawing practices | To identify, analyse, research literate & solve complex building design& drawing problems. |
| To design new solution for complex building design & drawing problems | To effectively communicate ideas related to building design & drawing. |

Subject:- Surveying I**Course Outcomes:-**

| | |
|---|--|
| Apply principles of surveying and levelling for civil engineering works | Measure vertical and horizontal plane, linear and angular dimensions to arrive at solutions to basic surveying problems. |
| Perform various practical and hence projects using different surveying instruments. | Apply geometric principles for computing data and drawing plans and sections |
| Analyze the obtained spatial data and compute areas and volumes. | Represent 3D data on plane surfaces (2D) as contours |

THIRD YEAR CIVIL DEPARTMENT**Subject:- Design and Drawing of steel structures****Course Outcomes:-**

| | |
|--|---|
| Students will understand the difference between WSM& LSM of steel design. | Students will be able to analyse & design the steel structures using relevant IS codes. |
| Students will be able to apply the knowledge of this course to solve civil engineering problems. | |

Subject:- Advanced Construction Technology**Course Outcomes:-**

| | |
|---|--|
| Know the various materials and properties of concrete | Understand various properties of special concrete |
| Understand Mix Design by different methods. | Get a thorough knowledge of Fibber Reinforced Concrete. |
| Know the different procedures of testing concrete. | Understand the concept of durability and cracking of concrete. |

Subject:- Transportation Engineering II**Course Outcomes:-**

| | |
|---|--|
| Understand the various systems of railway, airport, water transportation and the components of permanent way and its construction, yards, modernization of railway track. | Apply the concept of geometric design of railway track and railway traffic control. |
| Understand airport planning, obstructions and orientation of runway. | Apply the concept of geometric design of runway, taxiway, etc. and the knowledge of various signalling system for air traffic control. |
| Understand the system of water transportation, types of breakwater, harbours and port facilities equipment | Understand the basic idea about the bridge engineering. |

Subject:- Transportation Engineering I**Course Outcomes:-**

To get an insight of the development in all the fields of highway engineering and familiarized with different surveys required to be carried out for the implementation of the highway project;

To understand the phase of engineering which deals with the planning and geometrics design of streets, highways and abutting land in the context of safe and convenient traffic operations thereon.

To know the required properties of the different materials to be used in the construction of highways and other allied structures, and understand characterization of the materials and to evaluate their suitability; along with principle of soil stabilization in the construction of highway and allied structures

To understand the classification of different types of pavements, factors to be considered in the design of pavements, approaches for designing the different types of pavements and can the flexible and rigid pavements be using IRC Specifications.

Subject:- EE II**Course Outcomes:-**

Explain wastewater collection systems in buildings and municipal areas and to determine the quantity of wastewater and storm water production. Also, gain the knowledge of the construction of new sewer line and importance of sewer appurtenances.

Explain and analyse the characteristics of wastewater and design the primary treatment for wastewater

Explain on-site treatment methods and solve Analyse and design wastewater treatment systems (ASP, Aerated lagoon and Oxidation ponds).

Identify and apply proper treatment for reclamation and reuse of wastewater and disposal.

Explain sludge characteristics and processing methods.

To provide knowledge of solid waste collection system, characteristics of solid waste and to identify hazardous waste. Study related to plastic waste management will be studied.

Subject:- Applied Hydraulics**Course Outcomes:-**

| | |
|---|--|
| Apply the concepts of fluid dynamics to solve pipe bend and sprinkler problems. | Analyze dimensional problems and explain model laws. |
| Explain the working and functions of Francis, Kaplan and Pelton wheel turbines | Explain the basic concepts of open channel hydraulics and measure discharge through open channels. |

Subject:- Geotechnical Engineering-II**Course Outcomes:-**

| | |
|---|--|
| Students will be able to evaluate the consolidation parameters for the soil | Students will be able to calculate the shear strength parameters for the soil. |
| Students will be able to explain conduits and calculate the load carried by the struts of a braced cut under various soil conditions. | Students will be able to analyze the stability of slopes. |

Subject:- Water Resource Engineering-I**Course Outcomes:-**

| | |
|---|--|
| Understand and Classify various types of irrigation projects and explain different irrigation methods | Understand & Calculate the crop water requirements and irrigation requirement as well as estimate the capacity of reservoir for different purposes |
| Understand & Derive Hydrographs and calculate runoff of a catchment area | Explain the steady state and unsteady state conditions of any aquifer and design water wells |

Subject:- Structural Analysis II**Course Outcomes:-**

| | |
|--|--|
| Read and understand various IS Codes used for design and their application. | Analyze and design RCC buildings considering safety, serviceability and economy. |
| Analyze and design water retaining structures like Water tanks, Retaining etc. | |

Subject:- Advanced Construction Equipment's

Course Outcomes:-

To illustrate the characteristics & complexities involved in large civil engineering projects

To classify various construction equipments.

To elaborate the various advanced equipment used on, below or above the ground/water.

To discuss about the various non-conventional construction techniques which make use of these advanced equipment.

To discuss the utility of modern formworks systems over conventional system.

To select the appropriate equipment & techniques in construction for large & heavy engineering projects on the basis of suitability, availability, productivity, output, initial & operation cost, saving in time & other resources etc...

Subject:- Environmental Engineering-I

Course Outcomes:-

Understand the water supply system, its components and water demand by various consumers

Understand & analyze the quality of water and will be able to conduct the quality control test on samples

Understand the different processes in the water treatment facility & design the different units of treatment for water treatment plant

Understand the components of building water supply system, storage and rain water harvesting

Understand the problems of air and noise pollution. Besides they will be prepared to contribute practical solutions to environmental problem in our society

Subject:- Geotechnical Engineering I

Course Outcomes:-

Understand the soil types, index and engineering properties and relationship between various unit weights & other parameters

Classify the soil with a view towards assessing the suitability of a given soil for use; either to use it to support a structure (e.g. embankment) or to construct a structure therein (e.g. foundation)

Evaluate the compaction characteristics in laboratory & field and hence interpret the results with compaction specifications.

Interpret soil boring data for foundation design

