CIVIL ENGINEERING

Program Education Objectives (PEOs)

On successful completion of under graduation in Civil Engineering, the graduates are expected to attain the following program educational objectives.

PEO1. Employ as a practicing civil engineer in construction, design, testing and allied fields.

PEO2. Engage in self-directed learning research or to undertake higher studies in the rapidly changing civil engineering environment.

PEO3. Create new methods / processes to meet the needs of the society with their civil engineering knowledge.

PEO4. Create themselves as ethical and responsible professionals with good communication skills and demonstrate leadership skills.

PEOs

Several people including Head of the department, Assistant head of the department, Program Coordinator, Dean R&D, Professors and senior staff members having industry and academic Experience, Alumni representatives and Industry representatives are involved extensively in the process of establishing PEOs. This group considers the vision and mission of both the institution and the department, details of the department such as student admission quality, teaching & learning process, faculty and their research activities etc. Interest of the stakeholders, potential of identified industries, research organizations and higher educational institutions are also considered. Finally, the graduates' expected career accomplishments and societal activities are considered. Consistency of the PEOs with the mission statement of the department is also ensured. The Department Advisory Committee (DAC) then finalizes the PEO statements which are then approved by the Academic Council.

Course Outcomes

STRENGTH OF MATERIALS-I

Course Learning Objectives:

1. To give preliminary concepts of Strength of Material and Principles of Elasticity and Plasticity Stress strain behavior of materials and their governing laws. Introduce student the module of Elasticity and their relations.

2. To impart concepts of Bending Moment and Shear force for beams with different boundary and loading conditions and to draw the diagrams of variation across the length.

3. To give concepts of stresses developed in the cross section and bending equations calculation of section modulus of sections with different cross sections.

4. The concepts above will be utilized in measuring deflections in beams under various loading and support conditions.

5. To classify cylinders based on their thickness and to derive equations for measurement of stresses across the cross section when subjected to external pressure.

Course Outcomes:

1. The student will be able to understand the basic materials behavior under the influence of different external loading conditions and the support conditions.

2. The student will be able to draw the diagrams indicating the variation of the key performance features like bending moment and shear forces.

3. The student will have knowledge of bending concepts and calculation of section modulus and for determination of stressed developed in the beans due to various loading conditions.

4. The student will be able to assess stresses across section of the thin and thick cylinders to arrive at optimum sections to withstand the internal pressure.

SURVEYING

Course Learning Objectives:

To introduce the students to basic principles of surveying, various methods of linear and angles measuring instruments and enable the students to use surveying equipments.

Course Outcomes:

Upon successful completion of the course, the student will be able:

1. To demonstrate the basic surveying skills
2. To use various surveying instruments.
3. To perform different methods of surveying
4. To compute various data required for various methods of surveying.
5. To integrate the knowledge and produce topographical map.

STRENGTH OF MATERIALS - II

Course Learning Objectives:

1. To give preliminary concepts of Principal stresses and strains developed in cross section of the beams analytically as well as graphically due to stresses acting on the cross section and stresses on any inclined plane.

2. To impart concepts of failures in the material considering different theories.

3. To give concepts of torsion and governing torsion equation, and there by calculate the power transmitted by shafts and springs and design the cross section when subjected to loading using different theories of failures.

4. To classify columns and calculation of load carrying capacity using different empirical formulas and to assess stresses due to axial and lateral loads for different edge conditions and to calculate combined effect of direct and bending stresses with different engineering structures.

5. Introduce the concept of unsymmetrical bending in beams Location of neutral axis Deflection of beams under unsymmetrical bending.

6. Impart concepts for determination of Forces in members of plane, pin-jointed, perfect trusses by different methods.

Course Outcomes:

Upon successful completion of this course

1. The student will be able to understand the basic concepts of Principal stresses developed when subjected to stresses along different axes and design the sections.

2. The student can asses stresses in different engineering applications like shafts, springs, columns and struts subjected to different loading conditions.

3. The student will be able to assess forces in different types of trusses used in construction.

CONCRETE TECHNOLOGY

Course Learning Objectives:
1. To learn the concepts of Concrete production and its behaviour in various environments.
2. To learn the test procedures for the determination of properties of concrete.
3. To understand durability properties of concrete in various environments.

Course Outcomes:
Upon successful completion of this course, student will be able to

1. Understand the basic concepts of concrete.

2. Realise the importance of quality of concrete.

3. Familiarise the basic ingredients of concrete and their role in the production of concrete and its behaviour in the field.

4. Test the fresh concrete properties and the hardened concrete properties. Evaluate the ingredients of concrete through lab test results. Design the concrete mix by BIS method.

5. Familiarise the basic concepts of special concrete and their production and applications.

6. Understand the behaviour of concrete in various environments.

STRUCTURAL ANALYSIS – I

Course Learning Objectives:
1. To give preliminary concepts of assessment of bending moment and shear force in Propped cantilevers, fixed beams and continuous beams due to various loading conditions.

2. To impart concepts of Bending Moment and Shear force for beams with different boundary and loading conditions and to draw the diagrams of variation across the length.

3. The procedure for development of slope deflection equations and to solve application to continuous beams with and without settlement of supports.

4. The concepts of moving loads and influence lines are imparted for assessment of maximum SF and BM at a given section when loads of varying spans are passing over beams of different spans of Prattand Warren trusses.

Course Outcomes:
Upon successful completion of this course,

1. The student will be able to estimate the bending moment and shear forces in beams of different fixity conditions.

2. The student can analyze the continuous beams using tan important method of slope deflection which impart basic concepts for other methods of analysis to be discussed in next level analysis course.

3. The student will be able to analyze the loads in Pratt and Warren trusses when loads of different types and spans ware passing over the truss. These concepts will be used in to understand the performance and to design of bridge structures in next level courses.

CONCRETE TECHNOLOGY LAB

Course Learning Objectives:

To test the basic properties ingredients of concrete, fresh and hardened concrete properties.

Course Outcomes:
Upon successful completion of this course, student will be able to
Determine the consistency and fineness of cement.
Determine the setting times of cement.
Determine the specific gravity and soundness of cement.
Determine the compressive strength of cement.
Determine the workability of cement concrete by compaction factor, slump and Vee – Bee tests
Determine the specific gravity of coarse aggregate and fine aggregate by Sieve analysis.
Determine the flakiness and elongation index of aggregates.
Determine the bulking of sand.
Understand the non-destructive testing procedures on concrete.

ENGINEERING GEOLOGY

Course Learning Objectives:
The objective of this course is:

1. To introduce the Engineering Geology as a subject in Civil Engineering.
2. To enable the student to use subject in civil engineering applications.

Course Outcomes:
Upon the successful completion of this course, the students will be able to:
a. Identify and classify the geological minerals.
b. Measure the rock strengths of various rocks.
c. Classify and measure the earthquake prone areas to practice the hazard zonation.
d. Classify, monitor and measure the Landslides and subsidence.
e. Prepares, analyses and interpret the Engineering Geologic maps
f. Analyses the ground conditions through geophysical surveys.

g. Test the geological material and ground to check the suitability of civil engineering project construction.
h. Investigate the project site for mega/mini civil engineering projects. Site selection for mega engineering projects like Dams, Tunnels, disposal sites etc…

STRUCTURAL ANALYSIS – II

Course Learning Objectives:
The objective of this course is:
1. Familiarize Students with Different types of Structures
2. Equip student with concepts of Arches
3. Understand Concepts of lateral Load analysis
4. Familiarize Cables and Suspension Bridges
5. Understand Analysis methods Moment Distribution, Kanis Method and Matrix methods.

Course Outcomes:
At the end of this course; the student will be able to
a. Differentiate Determinate and Indeterminate Structures
b. Carryout lateral Load analysis of structures
c. Analyze Cable and Suspension Bridge structures
d. Analyze structures using Moment Distribution, Kani's Method and Matrix methods.

DESIGN AND DRAWING OF REINFORCED CONCRETE STRUCTURES

Course Learning Objectives:
The objective of this course is:
1. Familiarize Students with different types of design philosophies
2. Equip student with concepts of design of flexural members
3. Understand Concepts of shear, bond and torsion
4. Familiarize students with different types of compressions members and Design
5. Understand different types of footings and their design

Course Outcomes:
At the end of this course the student will be able to
a. Work on different types of design philosophies
b. Carryout analysis and design of flexural members and detailing
c. Design structures subjected to shear, bond and torsion
d. Design different type of compression members and footings

GEOTECHNICAL ENGINEERING – I

Course Learning Objectives:
The objective of this course is:
1. To enable the student to determine the index properties of the soil and classify it.
2. To impart the concept of seepage of water through soils and determine the discharge of water through soils.
3. To impart the principles of compaction and consolidation of soils and determine the magnitude and the rate of consolidation settlement.
4. To enable the student to understand the concept of shear strength of soils, determine the shear parameters of sands and clays and the areas of their application.

Course Outcomes:

Upon the successful completion of this course
a. The student must know the definition of the various quantities related to soil mechanics and establish their inter-relationships.
b. The student should be able to know the methods of determination of the various index properties of the soils and classify the soils.
c. The student should be able to know the importance of the different engineering properties of the soil such as compaction, permeability, consolidation and shear strength and determine them in the laboratory.
d. The student should be able to apply the above concepts in day-to-day civil engineering practice.

TRANSPORTATION ENGINEERING – I

Course Learning Objectives:
The objective of this course is:
1. To impart different concepts in the field of Highway Engineering.
2. To acquire design principles of Highway Geometrics and Pavements
3. To learn various highway construction and maintenance procedures.

Course Outcomes:
Upon the successful completion of this course, the students will be able to:
a. Plan highway network for a given area.
b. Determine Highway alignment and design highway geometrics.
c. Design Intersections and prepare traffic management plans.
d. Judge suitability of pavement materials and design flexible and rigid pavements.
e. Construct and maintain highways

GEOTECHNICAL ENGINEERING LAB

Course Learning Objectives:
The objective of this course is:
1. To impart knowledge of determination of index properties required for classification of soils.
2. To teach how to determine compaction characteristics and consolidation behavior from relevant lab tests; to determine permeability of soils.
3. To teach how to determine shear parameters of soil through different laboratory tests.

Course Outcomes:
Upon successful completion of this course, student will be able to
a. Determine index properties of soil and classify them.
b. Determine permeability of soils.
c. Determine Compaction, Consolidation and shear strength characteristics.

ENGINEERING GEOLOGY LAB

Course Learning Objectives:
The objective of this course is:
1. To identify the mega-scopic types of Ore minerals & Rock forming minerals.
2. To identify the mega-scopic types of Igneous, Sedimentary,Metamorphic rocks.
3. To identify the topography of the site & material selection

Course Outcomes:
Upon the successful completion of this course, the students will be able to:

a. Identify Mega-scopic minerals & their properties.
b. Identify Mega-scopic rocks & their properties.
c. Identify the site parameters such as contour, slope & aspect fortopography.
d. Know the occurrence of materials using the strike & dip problems.

DESIGN AND DRAWING OF STEEL STRUCTURES

Course Learning Objectives:
The objective of this course is to:
1. Familiarize Students with different types of Connections and relevant IS codes
2. Equip student with concepts of design of flexural members
3. Understand Design Concepts of tension and compression members intrusses
4. Familiarize students with different types of Columns and column bases and their Design
5. Familiarize students with Plate girder and Gantry Girder and their Design

Course Outcomes:
At the end of this course the student will be able to
a. Work with relevant IS codes.
b. Carryout analysis and design of flexural members and detailing.
c. Design compression members of different types with connection detailing.
d. Design Plate Girder and Gantry Girder with connection detailing
e. Produce the drawings pertaining to different components of steel structures.

GEOTECHNICAL ENGINEERING – II

Course Learning Objectives:
The objective of this course is:
1. To impart to the student knowledge of types of shallow foundations and theories required for the determination of their bearing capacity.
2. To enable the student to compute immediate and consolidation settlements of shallow foundations.
3. To impart the principles of important field tests such as SPT and Plate bearing test.
4. To enable the student to imbibe the concepts of pile foundations and determine their load carrying capacity.

Course Outcomes:
Upon the successful completion of this course:
a. The student must be able to understand the various types of shallow foundations and decide on their location based on soil characteristics.
b. The student must be able to compute the magnitude of foundation settlement and decide on the size of the foundation accordingly.
c. The student must be able to use the field test data and arrive at the bearing capacity.
d. The student must be able to apply the principles of bearing capacity of piles and design them accordingly.

TRANSPORTATION ENGINEERING – II

Course Learning Objectives:
The objective of this course is:
1. To know various components and their functions in a railway track
2. To acquire design principles of geometrics in a railway track.
3. To know various techniques for the effective movement of trains.
4. To acquire design principles of airport geometrics and pavements.
5. To know the planning, construction and maintenance of Docks and Harbours.

Course Outcomes:
At the end of course, Student can
a. Design geometrics in a railway track.
b. Provide good transportation network
c. Design airport geometrics and airfield pavements.
d. Plan, construct and maintain Docks and Harbours.

ENVIRONMENTAL ENGINEERING – I

Course Learning Objectives:
The course will address the following:
1. Outline planning and the design of water supply systems for acommunity/town/city.
2. Provide knowledge of water quality requirement for domestic usage
3. Impart understanding of importance of protection of water sourcequality and enlightens the efforts involved in converting raw waterinto clean potable water.
4. Selection of valves and fixture in water distribution systems.
5. Impart knowledge on design of water distribution network.

Course Outcomes:
Upon the successful completion of this course, the students will be able to:
a. Plan and design the water and distribution networks and seweragesystems.
b. Identify the water source and select proper intake structure.
c. Characterisation of water.
d. Select the appropriate appurtenances in the water supply.
e. Selection of suitable treatment flow for raw water treatments.

WATER RESOURCES ENGINEERING–I

Course Learning Objectives:
The course is designed to
1. Introduce hydrologic cycle and its relevance to Civil engineering.
2. Make the students understand physical processes in hydrology and components of the hydrologic cycle.
3. Appreciate concepts and theory of physical processes and interactions.
4. Learn measurement and estimation of the components hydrologic cycle.
5. Provide an overview and understanding of Unit Hydrograph theory and its analysis.
6. Understand flood frequency analysis, design flood, flood routing.
7. Appreciate the concepts of groundwater movement and well hydraulics.

Course Outcomes
At the end of the course the students are expected to
a. Have a thorough understanding of the theories and principles governing the hydrologic processes.
b. Be able to quantify major hydrologic components and apply key concepts to several practical areas of engineering hydrology and related design aspects.
c. Develop Intensity-Duration-Frequency and Depth-Area Duration curves to design hydraulic structures.
d. Be able to develop design storms and carry out frequency analysis.
e. Be able to determine storage capacity and life of reservoirs.
f. Develop unit hydrograph and synthetic hydrograph.
g. Be able to estimate flood magnitude and carry out flood routing.
h. Be able to determine aquifer parameters and yield of wells.

i. Be able to model hydrologic processes.

ENVIRONMENTAL POLLUTION AND CONTROL

Course Learning Objectives:
The objective of this course is:
1. Impart knowledge on fundamental aspects of air pollution & control, noise pollution, and solid waste management.
2. Provide basic knowledge on sustainable development.
3. Introduces some basics of sanitation methods essential for protection of community health.
4. Differentiate the solid and hazardous waste based on characterization.

Course Learning Outcomes:
By the end of successful completion of this course, the students will be ableto:
a. Identify the air pollutant control devices
b. Have knowledge on the NAAQ standards and air emission standards
c. Differentiate the treatment techniques used for sewage and industrial waste water treatment methods.
d. Understand the fundamentals of solid waste management, practices adopted in his town/village and its importance in keeping the health of the city.
e. Appreciate the methods of environmental sanitation and the management of community facilities without spread of epidemics.
f. Appreciate the importance of sustainable development while planning a project or executing an activity.

COMPUTER AIDED ENGINEERING DRAWING

Course Objectives:
The objective of this course is:
. To enhance the students knowledge and skills in engineering drawing
3. To introduce computer aided drafting packages and commands for modeling and sketching.
4. To learn surface modeling techniques required designing and machining to draw the geometric entities and create 2D and 3D wire frame models.
5. To learn various modelling techniques such as edit, zoom, cross-hatching, pattern filling, rotation, etc.
Course outcomes:
Upon completion of the course, the student shall be able to:
1) Understand the paper –space environment thoroughly
2) Develop the components using 2D and 3D wire frame models through various editing commands.
3) Generate assembly of various components of compound solids.

TRANSPORTATION ENGINEERING LAB

Course Learning Objectives:
The objective of this course is:
1. To test crushing value, impact resistance, specific gravity and water absorption, percentage attrition, percentage abrasion, flakiness index and elongation index for the given road aggregates.
2. To know penetration value, ductility value, softening point, flash and fire point, viscosity and stripping for the given bitumen grade.
3. To test the stability for the given bitumen mix.
4. To carry out surveys for traffic volume, speed and parking.

Course outcomes:
a. Ability to test aggregates and judge the suitability of materials for the road construction
b. Ability to test the given bitumen samples and judge their suitability for the road construction
c. Ability to obtain the optimum bitumen content for the mix design
d. Ability to determine the traffic volume, speed and parking characteristics.

ENVIRONMENTAL ENGINEERING – II

Course Learning Objectives:
The objective of this course is:
1. Outline planning and the design of wastewater collection, conveyance and treatment systems for a community/town/city.
2. Provide knowledge of characterisation of wastewater generated in a community.
3. Impart understanding of treatment of sewage and the need for its treatment.
4. Summarize the appurtenance in sewerage systems and their necessity.
5. Teach planning, and design of septic tank and imhoff tank and the disposal of the effluent from these low cost treatment systems.
6. Effluent disposal method and realise the importance of regulations
in the disposal of effluents in rivers.

Course Outcomes:
By the end of successful completion of this course, the students will be able to:
a. Plan and design the sewerage systems
b. Characterisation of Sewage
c. Select the appropriate appurtenances in the sewerage systems
d. Selection of suitable treatment flow for sewage treatment
e. Identify the critical point of pollution in a river for a specific amount of pollutant disposal into the river

WATER RESOURCES ENGINEERING–II

Course Learning Objectives:
The course is designed to
1. Introduce the types of irrigation systems
2. Introduce the concepts of planning and design of irrigation systems
3. Discuss the relationships between soil, water and plant and their significance in planning an irrigation system.
4. Understand design methods of erodible and non-erodible canals
5. Know the principles of design of hydraulic structures on permeable foundations.
6. Know the concepts for analysis and design principles of storage and diversion head works.
7. Learn design principles of canal structures.

Course Outcomes
At the end of the course the student will be able to
a. estimate irrigation water requirements
b. design irrigation canals and canal network
c. plan an irrigation system
d. design irrigation canal structures
e. plan and design diversion head works
f. analyse stability of gravity and earth dams
g. design ogee spillways and energy dissipation works

CONSTRUCTION TECHNOLOGY AND MANAGEMENT

Course Learning Objectives:
The objective of this course is:
1. To introduce to the student the concept of project management including network drawing and monitoring.
2. To introduce the various equipment related to construction like earth moving equipment, trucks and handling equipment, aggregate production and construction equipment and machinery.
3. To introduce the importance of safety in construction projects.

Course Outcomes:
Upon the successful completion of this course, the students will be able to:
1. Appreciate the importance of construction planning.
2. Understand the functioning of various types of earth-moving equipment.
3. Know the methods of production of aggregate products and concreting.
4. Apply the gained knowledge to project management and construction techniques.

PRE-STRESSED CONCRETE

Course Learning Objectives:
The objective of this course is:
1. Familiarize Students with concepts of pre-stressing.
2. Equip student with different systems and devices used in pre-stressing.
3. Understand the different losses of pre-stress including short and long-term losses.
4. Familiarize students with the analysis and design of pre-stressed concrete members under flexure, shear and torsion.

Course Outcomes:
At the end of this course the student will be able to
a. Understand the different methods of pre-stressing.
b. Estimate the effective pre-stress including the short and long term losses.
c. Analyze and design pre-stressed concrete beams under flexure and shear.
d. Understand the relevant IS Codal provisions for pre-stressed concrete

REMOTE SENSING AND GIS APPLICATIONS

Course Learning Objectives:
The course is designed to
1. Introduce the basic principles of Remote Sensing and GIS techniques.
2. Learn various types of sensors and platforms
3. Learn concepts of visual and digital image analyses
4. Understand the principles of spatial analysis
5. Appreciate application of RS and GIS to Civil engineering

Course outcomes
At the end of the course the student will be able to
a. Be familiar with ground, air and satellite based sensor platforms.
b. Interpret the aerial photographs and satellite imageries
c. Create and input spatial data for GIS application
d. Apply RS and GIS concepts in water resources engineering

GROUND IMPROVEMENT TECHNIQUES

Course Learning Objectives:

The objective of this course is:
1. To make the student appreciate the need for different ground improvement methods adopted for improving the properties of remoulded and in-situ soils by adopting different techniques such as in situ densification and dewatering methods.
2. To make the student understand how the reinforced earth technology and soil nailing can obviate the problems posed by the conventional retaining walls.
3. To enable the students to know how geo textiles and geo synthetics can be used to improve the engineering performance of soils.
4. To make the student learn the concepts, purpose and effects of grouting.

Course Outcomes:
a. By the end of the course, the student should be able to possess the knowledge of various methods of ground improvement and their suitability to different field situations.
b. The student should be in a position to design a reinforced earth embankment and check its stability.
c. The student should know the various functions of Geosynthetics and their applications in Civil Engineering practice.
d. The student should be able to understand the concepts and applications of grouting.

ENVIRONMENTAL ENGINEERING LAB

Course Learning Objectives:
The course will address the following:
1. Estimation some important characteristics of water and waste water in the laboratory.
2. It also gives the significance of the characteristics of the water and wastewater.

Course Outcomes:
Upon the successful completion of this course, the students will be able to:
a. Estimation some important characteristics of water and waste water in the laboratory.
b. Draw some conclusion and decide whether the water is potable or not.
c. Decide whether the water body is polluted or not with reference to the state parameters in the list of experiments.
d. Estimation of the strength of the sewage in terms of BOD and COD.

GIS & CAD LAB

Course Learning Objectives:
The course is designed to
1. To introduce image processing and GIS software
2. To familiarize with structural analysis software
3. To understand the process of digitization, creation of thematic map from topo sheets and maps.
4.To learn to apply GIS software to simple problems in water resources and transportation engineering.
5.To learn to analyse 2 D and 3D frame steel tubular truss using structural analysis software.
6.To learn to analyse and design retaining wall and simple towers.

Course outcomes
At the end of the course the student will be able to
a. To work comfortably on GIS software
b. To digitize and create thematic map and extract important features
c. To develop digital elevation model
d. To use structural analysis software to analyse and design 2D and 3Dframes.
e. To design and analyse retaining wall and simple towers using CADD software.

ESTIMATING, SPECIFICATIONS & CONTRACTS

Course Learning Objectives:
The objective of this course is to enable the students to:
1. Understand the quantity calculations of different components of the buildings.
2. Understand the rate analysis of different quantities of the buildings components.
3. Learn various specifications and components of the buildings.

Course Outcomes:
Upon the successful completion of this course:
a. The student should be able to determine the quantities of different components of buildings.
b. The student should be in a position to find the cost of various building components.
c. The student should be capable of finalizing the value of structures.

ENVIRONMENTAL IMPACT ASSESSMENT AND MANAGEMENT

Course Learning Objectives:
The objective of this course is:
1. To impart knowledge on different concepts of Environmental Impact Assessment.
2. To know procedures of risk assessment
3. To learn the EIA methodologies and the criterion for selection of EIA methods.
4. To pre-requisites for ISO 14001 certification
5. To know the procedures for environmental clearances and audit
6. To appreciate the importance of stakeholder participation in EIA

Course Learning Outcomes
Upon successful completion of this course, the students will be able to:
a. Prepare EMP, EIS, and EIA report
b. Identify the risks and impacts of a project
c. Selection of an appropriate EIA methodology
d. Evaluation the EIA report
e. Estimate the cost benefit ratio of a project
f. Know the role of stakeholder and public hearing in the preparation of EIA

SOLID WASTE MANAGEMENT

Course Learning Objectives:
The objective of this course is:
1. To impart the knowledge the methods of collection and optimization of collection routing of municipal solid waste.
2. To acquire the principles of treatment of municipal solid waste
3. To know the impact of solid waste on the health of the living beings
4. To learn the criterion for selection of landfill and its design
5. To plan the methods of processing such as composting the municipal organic waste.

Course Learning Outcomes
Upon successful completion of this course, the students will be able to:
a. Design the collection systems of solid waste of a town
b. Design treatment of municipal solid waste and landfill
c. To know the criteria for selection of landfill
d. To characterise the solid waste and design a composting facility

REPAIR AND REHABILITATION OF STRUCTURES

Course Learning Objectives:
The objective of this course is:
1. Familiarize Students with deterioration of concrete in structures
2. Equip student with concepts of NDT and evaluation
3. Understand failures and causes for failures in structures
4. Familiarize different materials and techniques for repairs
5. Understand procedure to carryout Physical evaluation of buildings and prepare report.

Course Outcomes:
At the end of this course the student will be able to
a. Explain deterioration of concrete in structures
b. Carryout analysis using NDT and evaluate structures
c. Assess failures and causes of failures in structures
d. Carryout Physical evaluation and submit report on condition of the structure.

PROJECT WORK

The main objective of the Project work is
a. To enable the student apply engineering knowledge that has been taught all through the programme for solving practical engineering problem.
b. To enable the student capable for problem solving / problem shooting.
c. To instill and inculcate team spirit/ team work in to the minds of the students.
d. To enable/ train the students report making/ documentation.
e. To provide students an opportunity to use any civil engineering software for their project work.

Outcomes of the Project work.
Up on completion of the Project work, the student will be able to
1. Apply all levels of engineering knowledge in solving the problems.
2. Work together with team spirit.
3. Use Civil Engineering software at least one.
4. Document the projects

MECHANICAL DEPARTMENT 1st YEAR

COURSE OBJECTIVES - ENGINEERING DRAWING

SUB: ENGINEERING DRAWING **SEM-1-1I**

1	The objective is to introduce the use and the application of drawing instruments and to make the students construct the polygons, curves and various types of scales. The student will be

	able to understand the needto enlarge or reduce the size of objects in representing them.
2	The objective is to introduce orthographic projections and to project the points and lines parallel to one plane and inclined to other.
3	The objective is to make the students draw the projections of the lines inclined to both the planes.
4	The objective is to make the students draw the projections of the plane inclined to both the planes.
5	The objective is to make the students draw the projections of the various types of solids in different positions inclined to one of the planes.
6	The objective is to represent the object in 3D view through isometric views. The student will be able to represent and convert the isometric view to orthographic view and vice versa.

COURSE OUTCOMES:

SNO	DESCRIPTION
1	The student will learn how to visualize 2D & 3D objects.

COURSE OBJECTIVES - ENGINEERING MECHANICS

SUB: ENGINEERING MECHANICS **SEM-1-1**

1	The students are to be exposed to the concepts of force and friction , direction and its application.
2	The students are to be exposed to application of free body diagrams. Solution to problems using graphical methods and law of triangle of forces.
3	The students are to be exposed to concepts of centre of gravity.
4	The students are to be exposed to concepts of moment of inertia and polar moment of inertia including transfer methods and their applications.
5	The students are to be exposed to motion in straight line and in curvilinear paths, its velocity and acceleration computation and methods of representing plane motion.
6	The students are to be exposed to concepts of work, energy and particle motion

COURSE OUTCOMES:

SNO	DESCRIPTION
1	The student should be able to draw free body diagrams for FBDs for particles and rigid bodies in plane and space and problems to solve the unknown forces, orientations and geometric parameters.
2	He should be able to determine centroid for lines, areas and center of gravity for volumes and their composites.
3	He should be able to determine area and mass movement of inertia for composite sections
4	He should be able to analyze motion of particles and rigid bodies and apply the principles of motion, work energy and impulse – momentum.

COURSE OBJECTIVES

SUB: MACHINE DRAWING **SEM-2-1**

1	To provide basic understanding and drawing practice of various joint, simple mechanical parts Selection of Views, additional views for the following machine elements and parts with every drawing proportions.
2	The student will be able to draw the assembly from the individual part drawing.

COURSE OUTCOMES:

SNO	DESCRIPTION
1	The student will acquire a knowledge of fastening arrangements such as welding, riveting the different styles of attachment for shaft.
2	The student also is enabled to prepare the assembly of various machine or engine components and miscellaneous machine components.

SUB: MMS **SEM:2-1**

COURSE OBJECTIVES:

1	To know the basic concepts of bonds in metals and alloys. To understand the basic requirements for the formation of solid solutions and other compounds.
2	To understand the regions of stability of the phases that can occur in an alloy system in order to solve the problems in practical metallurgy.
3	To study the basic differences between cast irons and steels, their properties and practical applications.
4	To study the affect of various alloying elements on iron-iron carbide system. To understand the various heat treatment and strengthening processes used in practical applications.
5	To study the properties and applications of widely used non-ferrous metals and alloys ceramic, composite and other advanced materials so as to use the suitable material for practical applications.

COURSE OUTCOMES:

SNO	DESCRIPTION
1	To explain basic concepts of bonds in metals and alloys, and To know the basic requirements for the formation of solid solutions and other compounds.
2	Analyze the regions of stability of the phases that can occur in an alloy system
3	Explain the differences between cast irons and steels, their properties and practical applications.
4	Describe the concept of heat treatment of steels & strengthening mechanisms
5	To know the properties and applications of widely used non-ferrous metals and their alloys
6	To explain the properties and applications of ceramic, composite materials and other materials, and describe the various methods of component manufacture of composite.

COURSE OBJECTIVES

SUB: MECHANICS OF SOLIDS **SEM-2-1**

1	After studying this unit student will know the basic terms like stress, strain poissons ratio…etc and stresses in bars of varying cross sections, composite bars, thermal stress in members, stresses on inclined planes with analytical approach and graphical approach, strain energy under different loadings and also problem solving techniques.
2	After studying this unit student will know the construction of shear force diagrams and bending moment diagrams to the different loads for the different support arrangements and also problem solving techniques.
3	After studying this unit student will know the bending and shear stress induced in the beams which are made with different cross sections like rectangular, circular, triangular, I, T angle sections and also problem solving techniques.
4	After studying this unit student will know how to finding slope and deflection for different support arrangements by Double integration method, Macaulay's method and Moment-Area and also problem solving techniques.
5	After studying this unit student will know how a cylinder fails, what kind of stresses induced in cylinders subjected to internal, external pressures and also problem solving techniques.
6	After studying this unit student will know shear stresses induced in circular shafts, discussing columns in stability point of view and columns with different end conditions.

COURSE OUTCOMES:

SNO	DESCRIPTION
1	Model & Analyze the behavior of basic structural members subjected to various loading and support conditions based on principles of equilibrium.
2	Understand the apply the concept of stress and strain to analyze and design structural members and machine parts under axial, shear and bending loads, moment and torsional moment.
3	Students will learn all the methods to analyze beams, columns, frames for normal, shear, and torsion stresses and to solve deflection problems in preparation for the design of such structural components. Students are able to analyse beams and draw correct and complete shear and bending moment diagrams for beams.
4	Students attain a deeper understanding of the loads, stresses, and strains acting on a structure and their relations in the elastic behavior
5	Design and analysis of Industrial components like pressure vessels

COURSE OBJECTIVES

SUB:THERMODYNAMICS **SEM-2-1**

1	To study the concepts of thermodynamic systems, work and heat
2	To study the concepts of first law of thermodynamics and applications.
3	To study the second law of thermodynamics, carnot engine, entropy principle.
4	To study the properties of pure substances, steam formation.
5	To understand the use of psychrometric chart and understand psychrometric properties of air
6	To study the concept of air standard cycles.

COURSE OUTCOMES:

SNO	DESCRIPTION
1	Students are able to understand thermodynamic systems and apply knowledge to solve problems related to heat & work.
2	Students are able to apply first law of thermodynamics for different thermodynamic systems and for different processes
3	Students are able to apply second law of thermodynamics for engines and can solve performance parameters of heat engines.
4	Students are able to understand the concept of steam formation and able to calculate the quality of steam after its expansion in turbines with the help of steam tables.
5	Students are able to use psychrometric chart for finding properties of air
6	Students are able to calculate efficiency & performance parameters of IC Engines using the concept of power cycles

COURSE OBJECTIVES

SUB: FLUID MECHANICS **SEM-2-2**

1	To learn about the concept of fluid and its properties, manometry, hydrostatic forces acting on different surfaces and also problem solving techniques.
2	To study the basic laws of fluids, flow patterns, viscous flow through ducts and their corresponding problems
3	To learn about the concepts related to boundary layer theory, flow separation, basic concepts of velocity profiles, dimensionless numbers and dimensional analysis.
4	To learn about hydrodynamic forces acting on vanes and their performance evaluation.
5	To study the use of aware of the importance, function and performance of hydro machinery.
6	To evaluate the performance characteristics of hydraulic turbines. Also a little knowledge on hydraulic systems and fluidics is imparted to the student.

COURSE OUTCOMES

SNO	DESCRIPTION
1.	Students are able to learn about the concept of fluid and its properties, manometry, hydrostatic forces acting on different surfaces and also problem solving techniques.
2.	Students are able to study the basic laws of fluids, flow patterns, viscous flow through ducts and their corresponding problems
3.	Students are able to learn about the concepts related to boundary layer theory, flow separation, basic concepts of velocity profiles, dimensionless numbers and dimensional analysis.
4.	Students are able to study the use of aware of the importance, function and performance of hydro machinery.
5.	Students are able to evaluate the performance characteristics of hydraulic turbines. Also a little knowledge on hydraulic systems and fluidics is imparted to the student.

COURSE OBJECTIVES

SUB: KINEMATICS OF MACHINERY **SEM-2-2**

1	The objective of this unit is to make student understand the purpose of kinematics, Kinematic joint and mechanism and to study the relative motion of parts in a machine without taking into consideration the forces involved.
2	The objective of this unit is to make student understand various mechanisms for straight line motion and their applications including steering mechanism.
3	The objective of this unit is to make student understand the velocity and acceleration concepts and the methodology using graphical methods and principles and application of four bar chain. To understand the application of slider crank mechanism etc. and study of plane motion of the body.
4	The objective of this unit is to make student understand the theories involved in cams. Further the students are exposed to the applications of cams and their working principles.
5	The objective of this unit is to make student understand gears, power transmission through different types of gears including gear profiles and its efficiency.
6	The objective of this unit is to make student understand various power transmission mechanisms and methodologies and working principles. Students are exposed to merits and demerits of each drive.

COURSE OUTCOMES:

SNO	DESCRIPTION
1	Contrive a mechanism for a given plane motion with single degree of freedom.
2	Suggest and analyze a mechanism for a given straight line motion and automobile steering motion.
3	Analyze the motion (velocity and acceleration) of a plane mechanism.
4	Suggest and analyze mechanisms for a prescribed intermittent motion like opening and closing of IC engine valves etc.
5	Select a power transmission system for a given application and analyze motion of different transmission systems

COURSE OBJECTIVES

SUB: PRODUCTION TECHNOLOGY **SEM-2-2**

1	To design the patterns and the gating system for different metal casting processes.
2	To understand the concept of special casting processes and to study about different types of furnaces.
3	To learn about the different types of joining processes and principles of fusion welding.
4	To learn about the different types of welding processes used for special fabrication.
5	To study the use of forging, extrusion and rolling processes and its applications and to understand the concept of powder metallurgy.
6	To impart basic knowledge and understanding about the sheet metal forming and To introduce processing methods of plastics.

COURSE OUTCOMES

SNO	DESCRIPTION
1.	Students are able to design the patterns and the gating system for different metal casting processes.
2.	Students are able to understand the concept of special casting processes and to study about different types of furnaces.
3.	Students are able to learn about the classification of welding and apply knowledge to understand the applications of fusion welding.
4.	Students are able to understand the concept of forging, extrusion and rolling processes and able to calculate the forces and power requirements in rolling.
5.	Students are able to understand about the sheet metal forming processing methods of plastics.

Sub: TE-1 **SEM-2-2**

COURSE OBJECTIVES:

1	To make the student learn and understand the reasons and affects of various losses that occurs in the actual engine operation.
2	To familiarize the student with the various engine systems along with their function and necessity.
3	To learn about normal combustion phenomenon and knocking in S.I. and C.I. Engines and to find the several engine operating parameters that affect the smooth engine operation.
4	To make the student learn to perform testing on S.I and C.I Engines for the calculations of performance and emission parameters.
5	To make students learn about different types of compressors and to calculate power and efficiency of reciprocating compressors.
6	To make students learn mechanical details, and to calculate power and efficiency of rotary compressors

COURSE OUTCOMES:

SNO	DESCRIPTION
1	The reasons and affects of various losses that occur in the actual engine operation can be analysed and solved .
2	The various engine systems along with their function and necessity can be familiarized.
3	Normal combustion phenomenon and knocking in S.I. and C.I. Engines can be explained and can find the several engine operating parameters that affect the smooth engine operation.
4	Testing on S.I and C.I Engines for the calculations of performance and emission parameters can be performed.
5	Different types of compressors can be classified and also can calculate power and efficiency of reciprocating compressors.
6	Mechanical details, power and efficiency of rotary compressors can be studied.

SUB: DMM-1 **SEM-3-1**

COURSE OBJECTIVES:

1	To get the knowledge about basic design procedure to engineering problems, including the consideration of technical and manufacturing constraints and also selection of suitable materials and significance of tolerances and fits in critical design applications
2	Utilize design data hand book and design the elements for strength, stiffness and fatigue and also Identify the loads, the machine members subjected and calculate static and dynamic stresses to ensure safe design
3	Learning and understanding of the different types of failure modes and criteria of riveted , bolted and welded joints and also the design calculations of boiler shells and ship hulls etc.
4	Can apply the Procedure for designing different machine elements such as shafts, cotter joints, keys and axial loaded joints and also understand the failures if these elements in real life application.
5	Explain the Procedure for design different types of shaft couplings also understand the failures if these elements in real life application.
6	Analyse the Procedure for designing different types of mechanical springs and also to understand the failures if these elements in real life application.

COURSE OUTCOMES:

SNO	DESCRIPTION
1	Understanding the design procedure to engineering problems, including the consideration of technical and manufacturing constraints and also Select suitable materials and significance of tolerances and fits in critical design applications
2	By Utilizing the design data hand book and can design the elements for strength, stiffness and fatigue and also Identifying the loads, the machine members subjected and calculate static and dynamic stresses to ensure safe design.
3	Learning and understanding of the different types of failure modes and criteria of riveted , bolted and welded joints and also can design the boiler shells and ship hulls etc.
4	Imparting the procedure for designing different machine elements such as shafts, cotter joints, keys and axial loaded joints and understand the failures if these elements in real life application.
5	Can explain the Procedure for designing different types shaft couplings also should able to understand the failures if these elements in real life application.
6	Analyze the Procedure for designing different types Mechanical springs also to understand the failures if these elements in real life application.

SUB: DMM-II **SEM-3-2**

COURSE OBJECTIVES:

1	It gives the knowledge of different bearings and their life prediction.
2	To learn the design procedure of I.C Engine parts like Cylinder, Piston, Crankshaft and Connecting rod.
3	To study the design procedure of curved beams having different cross sections like rectangular, circular, trapezoidal , T-section of crane hooks and C-clamps
4	Design the power transmission elements like belts, ropes, chains and power screws.
5	Design the power transmission elements like gears.
6	Design the power transmission elements like ropes and levers.

COURSE OUTCOMES:

S.NO	DESCRIPTION
1	Impart the selection of suitable bearing depending upon the application and can calculate life of the bearing.
2	Analyze the design procedure of different I.C Engine parts Cylinder, Piston, Crankshaft and Connecting rod.
3	To analyze the design procedure of curved beams having different cross sections like rectangular, circular, trapezoidal , T-section of crane hooks and C-clamps
4	Design the power transmission elements like belts, ropes, chains and power screws.
5	Design the power transmission elements like gears.
6	Design different power transmission elements &Alignment on machine tool elements

COURSE OBJECTIVES

SUB: DYNAMICS OF MACHINERY **SEM-3-2**

1	To equip the student with fundamental knowledge of dynamics of machines so that student can appreciate problems of dynamic force balance, transmissibility of forces, isolation of systems, vibrations.
2	Develop knowledge of analytical and graphical methods for calculating balancing of rotary and reciprocating masses.
3	Develop understanding of vibrations and its significance on engineering design.
4	Develop understanding of dynamic balancing, flywheel analysis, gyroscopic forces and moments.

COURSE OUTCOMES

SNO	DESCRIPTION
1.	Analyze stabilization of sea vehicles, aircrafts and automobile vehicles.
2.	Compute frictional losses, torque transmission of mechanical systems.
3.	Analyze dynamic force analysis of slider crank mechanism and design of flywheel.
4.	Understand how to determine the natural frequencies of continuous systems starting from the general equation of displacement.
5.	Understand balancing of reciprocating and rotary masses.

SUB:HT **SEM-3-2**

COURSE OBJECTIVES:

1	To make students familiar with fundamental heat transfer concepts: mechanisms of heat transfer (conduction, radiation, and convection)
2	To study analytical, empirical and numerical techniques for the solution of heat transfer problems.
3	To study the concept of boundary layer formation and apply these principles to real thermo-fluid systems
4	To study about the phase change process in boilers and condensers.
5	To study, analyze and design heat exchangers
6	To study about radiation heat exchange process

COURSE OUTCOMES:

SNO	DESCRIPTION
1	Students are able to apply principles of heat transfer to basic engineering systems and can solve problems on conduction ,convection and radiation
2	Students are able to apply the non dimensional numbers for solving heat transfer problems
3	Students are able to develop the concept of boundary layer formation over heated surfaces during forced and free convection, formulation of momentum and energy equations of the laminar boundary layers and their solution by approximate method
4	Students are able to understand film wise and drop wise condensation in condensers, Pool, forced, sub-cooled and saturated boiling in boilers and evaporators, bubble formation and critical heat flux. Model laminar film condensation and its application in the design of condensers. Evaluation of Reynolds and Nusselt numbers for boiling and condensation
5	Students are able to calculate fluid temperatures, mass flow rates, pressure drops, heat exchange and effectiveness during parallel, counter and cross flow in simple and baffled–shell and tube type heat exchangers, condensers, evaporators, etc.
6	Students are able to develop concept of monochromatic and total radiations, intensity of radiation, shape factor, radiation shields, solar radiation and estimation of radiative heat exchange between two or more surfaces of different geometries.

SUB:ICS **SEM:3-1**

COURSE OBJECTIVES:

1	To provide knowledge on the fundamentals of measurement science and measuring instruments, To educate students on different measurement systems and on common types of errors
2	To introduce different types of sensors for pressure and temperature measurement, To give knowledge about thermocouples, thermometers used for temperature measurements
3	To give knowledge level, flow and speed meters used for level, flow and speed measurements
4	To introduce measuring equipments used for, strain and strain measurements
5	To introduce measuring equipments used for, humidity, force, torque and power measurements
6	To provide a knowledge to students on the basics of control system theory

COURSE OUTCOMES:

SNO	DESCRIPTION
1	Students will be conversant with measurement techniques and the use of measuring instruments,
2	Students will be able to design a measuring equipments for the measurement of temperature and pressure
3	Students will be able to design a sensors and transducers used for stress and strain measurement
4	Students will be able to design a measuring equipments for the measurement of temperature and flow
5	Students Will have working knowledge for dealing with problems involving control system fundamentals
6	student can able to control the mechanical measurement devices through mechanical and electrical controllers

SUB:IEM **SEM-3-2**

COURSE OBJECTIVES:

1	To impart fundamental knowledge and skill sets required in the Industrial Management and Engineering profession and the domain knowledge of Industrial Management and Engineering
2	To create fundamental knowledge and skill to know quantitative techniques for optimal design of layouts, plant maintenance, preventive and breakdown maintenance
3	To produce graduates with the ability to adopt a system approach to design, develop, implement and innovate integrated systems that include people, materials, information, equipment and energy.
4	To improve knowledge in Quality control, to know importance in manufacturing activities
5	To develop information to understand the fundamental of human resource management, personnel management and industrial relations
6	To Understand value engineering, implementation procedure, enterprise resource planning and supply chain management

COURSE OUTCOMES:

SNO	DESCRIPTION
1	Develop a fundamental knowledge and skill sets required in the Industrial Management and Engineering profession
2	Design a system, component, or process, and synthesize solutions to achieve desired needs.
3	Use the techniques, skills, and modern engineering tools necessary for engineering practice with appropriate considerations for public health and safety, cultural, societal and environmental constraints.
4	Function effectively within multi-disciplinary teams and understand the fundamental precepts of effective project management.
5	Understand their role as engineers and their impact to society at the national and global context.HR
6	Understand value engineering, implementation procedure, enterprise resource planning and supply chain management

METAL CUTTING AND MCHINE TOOLS

COURSE OBJECTIVES:

1	The course provides students with fundamental knowledge and principles in material removal processes.
2	In this course, the students apply the fundamentals and principles of metal cutting to practical applications through multiple labs using lathes, milling machines, grinding machines, and drill presses, Computer Numerical Control etc
3	To demonstrate the fundamentals of machining processes and machine tools.
4	To develop knowledge and importance of metal cutting parameters.
5	To develop fundamental knowledge on tool materials, cutting fluids and tool wear mechanisms.
6	To apply knowledge of basic mathematics to calculate the machining parameters for different machining processes.

COURSE OUTCOMES:

SNO	DESCRIPTION
1	Apply cutting mechanics to metal machining based on cutting force and power consumption.
2	Operate lathe, milling machines, drill press, grinding machines, etc.
3	Select cutting tool materials and tool geometries for different metals.
4	Select appropriate machining processes and conditions for different metals.
5	Learn machining economics.
6	Design jigs and Fixtures for simple parts.
7	Learn principles of CNC Machines

COURSE OBJECTIVES

SUB: METROLOGY **SEM-3-2**

1	To learn about the Inspection of engineering parts with various precision instruments.
2	To study the Design of part, tolerances and fits.
3	To learn about the Principles of measuring instruments and gauges and their uses.
4	To learn about evaluation and inspection of surface roughness.
5	To study the use of Inspection of spur gear and thread elements.
6	To impart basic knowledge and understanding about the machine tool testing to evaluate machine tool quality

COURSE OUTCOMES

SNO	DESCRIPTION
1.	Students are able to learn about the Inspection of engineering parts with various precision instruments.
2.	Students are able to study the Design of part, tolerances and fits
3.	Students are able to learn about the Principles of measuring instruments and gauges and their uses.
4.	Students are able to study the use of Inspection of spur gear and thread elements.
5.	Students are able to impart basic knowledge and understanding about the machine tool testing to evaluate machine tool quality

SUB:R&AC **SEM:3-2**

COURSE OBJECTIVES:

1	The course is aimed to understand the basic cycles of various refrigerating systems, their performance evaluation along with details of system components and refrigerant properties.
2	The course is aimed to learn about vapour compression refrigeration system, super heating and sub cooling methods in that system.
3	The course is aimed to learn about the effects of CFC, HCFC refrigerants on environment and importance of HFC refrigerants and various components of VCR system.
4	The course is aimed to learn about vapour absorption refrigeration system and steam jet refrigeration system.
5	The course is aimed to learn requirement of air conditioner in real life and how we can calculate the cooling loads and estimation while purchasing an Air conditioner and impart knowledge of psychometric properties, processes which are used in air-conditioning systems for comfort and industrial applications.
6	The course is aimed to learn about various components of refrigerating and air conditioning systems.

COURSE OUTCOMES:

SNO	DESCRIPTION
1	Analyze various refrigerating cycles and evaluate their performance.
2	Knowledge on vapour compression refrigeration system and can analyze the performance of the system.
3	Can understand the difference between CFC, HCFC and HFC refrigerants and their effect on environment.
4	Having knowledge on vapour absorption and steam jet refrigeration system and can analyze the performance of the system.
5	Can perform cooling load calculations and select the appropriate process and equipment for the required comfort and industrial Air-conditioning. Student is having knowledge on the difference between refrigeration and air conditioning systems & sensible and latent heat.
6	Describe about various components of the air conditioning system and their working.

SUB: ROBOTICS **SEM:3-2**

COURSE OBJECTIVES:

1	To get the knowledge on practice in applying their knowledge of mathematics, science, and Engineering and to expand this knowledge into the vast area of robotics.
2	To understand the types of components used in robot
3	To understand the concepts of robot kinematics, Dynamics, Trajectory planning.
4	To get the knowledge on robot end effectors and their design. Mathematical approach to explain how the robotic arm motion can be described
5	To analyze the Robot Programming methods & Languages of robot.
6	To impart various Sensors and their applications in robots.The students will understand the functioning of sensors and actuators

COURSE OUTCOMES:

SNO	DESCRIPTION
1	Understood equipped with the automation and brief history of robot and applications.
2	Understood familiarized with the kinematic motions of robot.
3	Describe good knowledge about robot end effectors and their design concepts.
4	Analyze the equipped with the Programming methods & various Languages of robots
5	Analyze equipped with the principles of various Sensors and their applications in robots
6	Analyze increase the performance and accuracy of robot functioning using various sensor and control systems

SUB:TE-11 **SEM-3-1**

COURSE OBJECTIVES:

1	The course objective is to provide basic knowledge for students on rankine cycle and to understand methods to improve performance of turbines.
2	To understand classification of boilers and their working principles along with condition for maximum efficiency in a chimney.
3	To study the function of different types of nozzles and to understand the concept for condition for maximum discharge.
4	To understand various classifications of steam turbines and to learn various methods to draw the velocity diagrams as well and also to find efficiency and power output of a steam power plant.
5	To study how a gas turbine works and also to understand the methods used to improve the efficiency of gas turbine.
6	To study the classifications and working principle of jet propulsions and rockets and its applications.

COURSE OUTCOMES:

SNO	DESCRIPTION
1	By learning the basic concepts of vapour cycles a student can attain good knowledge useful in steam power plants and apply the knowledge to improve the efficiency of plant
2	By understanding the working principle and classification of boilers a student will be able to solve various problems related to efficiency and power output.
3	By understanding working principle of nozzle ,a student can able to understand the conversion of heat energy of steam into kinetic energy.
4	By studying classification of types of turbines a student will be able to draw the velocity diagram and can find turbine work output.
5	By understanding gas turbines properly a student can easily enumerate the methods of improving performance of a power plant.
6	By understanding the concept of jet propulsion and rockets a student can draw various schematic diagrams and also can find thrust power and propulsion efficiency.

MECHANICAL DEPARTMENT 4th YEAR

SUN:AE **SEM:4-1**

COURSE OBJECTIVES:

1	The course imparts the principles of automobile system and provides the list and details of important parts in an assembly.
2	To study various transmission systems those are currently in use along with their sub classifications.
3	To understand steering geometry and to classify various steering gear mechanisms along with their corresponding diagrams.
4	To understand in detail about suspension system, braking system and electrical system in an automobile.
5	To study layout of various engines and their specifications and also to understand safety standards or norms that are applicable in an automobile.
6	To understand the concept of controlling emissions from an automobile and various techniques to be carried out to control the emissions and pollutants in order to follow or abide the environmental standards.

COURSE OUTCOMES:

SNO	DESCRIPTION
1	From this topic basic introduction to automobiles can be easily analyzed, so as for better understanding of concepts further.
2	Design of various types of transmission systems can be classified along with their working principle, advantages and disadvantages.
3	The topic describes basic terminology of how a steering system works and also explains various types of steering gear mechanisms that are in use.
4	Design of major necessities in an automobile such as electrical system, braking system and suspension system can be easily understood from this unit , along with their limitations.
5	Analyzes the importance of safety system in an automobile and also it evaluates the latest updates in the field of automobile industry. Classifies various types of automobile engines that are in use along with their detailed specifications.
6	Explains how the emissions/pollutants from automobiles are harmful for humans and also for environment. what are all the necessary steps to be taken to overcome them. national and international pollution standards.

COURSE OBJECTIVES

SUB: AUTOMATION IN MANUFACTURING SEM-4-2

1	To study the types and strategies and various components in Automated Systems.
2	To understand the automated flow lines, line balancing, material storage and retrieval and inspection.

COURSE OUTCOMES

SNO	DESCRIPTION
1.	Upon successful completion of this course student should be able to : Solve the line balancing problems in the various flow line systems with and without use buffer storage.
2.	Understand the different automated material handling, storage and retrieval systems and automated inspection systems.
3.	Use of Adaptive Control principles and implement the same online inspection and control.

SUB:CAD/CAM **SEM:4-1**

COURSE OBJECTIVES:

1	To understand the basic fundamentals of computer aided design and manufacturing.
2	To learn 2D & 3D transformations of the basic entities like line, circle, ellipse etc. and to understand the different geometric modeling techniques like solid modeling, surface modeling, feature based modeling etc.
3	To learn automated machines like NC, CNC, DNC and learning the procedure of manuscript writing for manual part programming. Learning basics of APT language for writing part programming.
4	To impart learning the importance of group technology in the industries and learn different techniques that is used for classifying of part families.
5	To learn the activities of process planning and computer assisted process planning. And learns different techniques are used in computer aided quality control.
6	To get the knowledge overall configuration and elements of computer integrated manufacturing systems.

COURSE OUTCOMES:

SNO	DESCRIPTION
1	Improves the basic idea on the history of CAD/CAM hardware, and importance of CAD/CAM in industries.
	Learn the mathematical techniques for representation of geometric entities including points, lines, and parametric curves, surfaces and solid, and the technique of transformation of geometric entities using transformation matrix.
3	To get the knowledge on procedure to write manuscript for a part to be manufactured. Having basic idea on APT language in computer aided part programming for the product development.
4	Classification of different parts into part families, which are manufacturing in any industry with the knowledge on group technology and learning different techniques which are widely applying in industries.
5	Having basic knowledge in Process Planning help in understanding the importance in manufacturing industries. And the learning of computer aided quality control enhances their knowledge in applying or using these techniques in the industries.
6	Can identify various elements and their activities in the Computer Integrated Manufacturing Systems.

COURSE OBJECTIVES

SUB: FINITE ELEMENT METHODS **SEM-4-1**

1	To learn basic principles of finite element analysis procedure
2	To learn the theory and characteristics of finite elements that represent engineering structures
3	To learn and apply finite element solutions to structural, thermal, dynamic problem to develop the knowledge and skills needed to effectively evaluate finite element analyses performed by others
4	Learn to model complex geometry problems and solution techniques.

COURSE OUTCOMES

SNO	DESCRIPTION
1.	Understand the concepts behind variational methods and weighted residual methods in FEM
2.	Identify the application and characteristics of FEA elements such as bars, beams, plane and isoparametric elements, and 3-D element.
3.	Develop element characteristic equation procedure and generation of global stiffness equation will be applied.
4.	Able to apply Suitable boundary conditions to a global structural equation, and reduce it to a solvable form.
5.	Able to identify how the finite element method expands beyond the structural domain, for problems involving dynamics, heat transfer, and fluid flow.

SUB:GES **SEM-4-2**

COURSE OBJECTIVES:

S.NO	DESCRIPTION
1	Analyze solar radiation data on earth's surface.
2	Design solar thermal collection
3	Design solar photo voltaic cell
4	Design maximum power point tracking in wind and solar power system
5	Explain wind energy conversion system and Betz coefficient and tip-speed ration
6	Explain basic principle and working of hydal , wave , tidal , fuel cell and geothermal

COURSE OUTCOMES:

SNO	DESCRIPTION
1	To study the solar radiation data, extraterrestrial radiation, radiation on earth's surface.
2	To study solar thermal collections.
3	To study solar photo voltaic systems.
4	To study maximum power point techniques in solar pv and wind.
5	To study wind energy conversion systems, Betz coefficient, tip speed ratio.
6	To study basic principle and working of hydro, tidal, biomass, fuel cell and geothermal systems.

MECHATRONICS

COURSE OBJECTIVES:

1	To learn the fundamentals of Mechatronics systems, various elements of Mechatronics and various microprocessors base application.
2	To Learn the Fundamentals of solid state electronic devices and working mechanism of different diodes with their application.
3	To learn the working mechanism of various hydraulic and pneumatic control system and correlation between actuator and servo mechanism.
4	To learn the fundamental concept of Digital and Analog electronic system. To describe different PLCs with their application.
5	To understand the basic concept of Data Acquisition system with various conversion phenomenon between analog and Digital signals.
6	To learn the concept of system analogies, design and future trends of Mechatronics system.

COURSE OUTCOMES:

SNO	DESCRIPTION
R1641031.1	Able to explain about Mechatronic system, different microprocessor based controller and their applications.
R1641031.2	Able to explain various diodes, their types with construction and working mechanism.
R1641031.3	Analyze various actuation system and can able to draw circuit diagram for various pneumatic and hydraulic actuators.
R1641031.4	Able to explain digital electronic system and various application of PLCs.
R1641031.5	Analyze Data Acquisition system and able to explain data flow in DSPs.
R1641031.6	Able to explain various process controllers and future trends of Mechatronics system.

POs & PSO REFERENCE

PO1	Engineering Knowledge	PO7	Environment & Sustainability	PSO1	Capable of design, develop and implement sustainable mechanical and environmental systems.
PO2	Problem Analysis	PO8	Ethics	PSO2	Qualify in national and international competitive examinations for successful higher studies and employment.
PO3	Design & Development	PO9	Individual & Team Work		
PO4	Investigations	PO10	Communication Skills		
PO5	Modern Tools	PO11	Project Mgt. & Finance		
PO6	Engineer & Society	PO12	Life Long Learning		

SUB: MEMS **SUB:4-1**

COURSE OBJECTIVES:

1	To learn basics of Micro Electro Mechanical Systems (MEMS), lithography principles and about various mechanical sensors and actuators.
2	To learn about various principles and working of thermal sensors and actuators we are using in present scenario.
3	To learn about the properties of light and about principles and working of various devices of MOEMS.
4	To learn about magnetic sensors and actuators working principle and various effects of magnetization.
5	To learn about various methods of micro fluid pumping system and handling system and working of communication media.
6	To learn about principles and working of chemical and bio medical system.

COURSE OUTCOMES:

SNO	DESCRIPTION
1	Understanding about difference in behavior of elements when size is reduced to micro scale level and about various fabrication techniques of micro elements. Students are able to understand about mechanical sensors and actuators.
2	Knowledge about thermal sensors and actuators, devices working under seebeck and peltier effects.
3	Knowledge about various properties of light and also knows principles of MOEMS technology.
4	Understanding about magnetic sensors and actuators and also about various effects of magnetization at micro scale level.
5	Knowledge about micro scale pumping system and handling of micro fluids by considering the physical, chemical, thermal properties of the fluids and also about the working of communication media.
6	Knowledge about chemical and bio medical sensors and actuators.

COURSE OBJECTIVES

SUB: PRODUCTION PLANNING AND CONTROL **SEM-4-2**

1	An understanding of the concepts of production and service systems;
2	The ability to apply principles and techniques in the design, planning and control of these systems to optimise/make best use of resources in achieving their objectives.
3	Identify different strategies employed in manufacturing and service industries to plan production and control inventory.
4	Measure the effectiveness, identify likely areas for improvement, develop and implement improved planning and control methods for production systems.

COURSE OUTCOMES

SNO	DESCRIPTION
1.	Recognize the objectives, functions, applications of PPC and forecasting techniques
2.	Explain different Inventory control techniques.
3.	Solve routing and scheduling problems.
4.	Summarize various aggregate production planning techniques.
5.	Describe way of integrating different departments to execute PPC functions.

SUB: PPE **SEM-4-1**

COURSE OBJECTIVES:

1	To study the sources of energy and types of power plants
2	To Analyze different types of steam cycles and estimate efficiencies in a steam power plant
3	To study basic working principles of gas turbine and diesel engine power plants.
4	To study the working principle of hydro electric power plant and defines the performance characteristics and components of such power plants.
5	To study the principal components and types of nuclear reactors
6	Calculate present worth depreciation and cost of different types of power plants and estimates the cost of producing power per kW.

COURSE OUTCOMES:

SNO	DESCRIPTION
1	The student will able to know various energy resources and energy conversion methods available for the production of electric power in India.
2	The student will able to determine the efficiency and output of a modern Rankine cycle steam power plant from given data, including superheat, reheat &regeneration
3	The student will able to calculate the performance of gas turbines with reheat and regeneration, and discuss the performance of combined cycle power plants
4	The student will able to understand major types of hydro-power and wind-power turbines and estimate power generation potential
5	The student will able to know the basic principles of thermal-fission and fast-breeder nuclear power plants, such as pressurized-water, boiling-water, and heavy-water reactors.
6	Perform the preliminary design of the major components or systems of a conventional or alternate power plant

SUB:PPE **SEM-4-2**

COURSE OBJECTIVES:

1	To study the sources of energy and types of power plants
2	To Analyze different types of steam cycles and estimate efficiencies in a steam power plant
3	To study basic working principles of gas turbine and diesel engine power plants.
4	To study the working principle of hydro electric power plant and defines the performance characteristics and components of such power plants.
5	To study the principal components and types of nuclear reactors
6	Calculate present worth depreciation and cost of different types of power plants and estimates the cost of producing power per kW.

COURSE OUTCOMES:

SNO	DESCRIPTION
1	The student will able to know various energy resources and energy conversion methods available for the production of electric power in India.
2	The student will able to determine the efficiency and output of a modern Rankine cycle steam power plant from given data, including superheat, reheat &regeneration
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5	The student will able to know the basic principles of thermal-fission and fast-breeder nuclear power plants, such as pressurized-water, boiling-water, and heavy-water reactors.
6	Perform the preliminary design of the major components or systems of a conventional or alternate power plant

COURSE OBJECTIVES

SUB: UN CONVENTIONAL MACHINING PROCESSES **SEM-4-2**

1	The course aims in identifying the classification of unconventional machining processes.
2	To understand the principle, mechanism of metal removal of various unconventional machining processes.
3	To study the various process parameters and their effect on the component machined on various unconventional machining processes.
4	To understand the applications of different processes.

COURSE OUTCOMES

SNO	DESCRIPTION
1.	After completion of course, the student shall understand the principle of working, mechanism of metal removal in the various unconventional machining process. The student is able to identify the process parameters, their effect and applications of different processes.

MECHANICAL DEPARTMENT

PROGRAM OUTCOMES (PO_S)

PO-1 Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO-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.

PO-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

PO-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.

PO-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.

PO-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.

PO-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.

PO-8 Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO-9 Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO-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.

PO-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.

PO-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 EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Graduates expertise their technical knowledge, creativity and problem solving skillstowards employment, higher Education and in research organization

PEO2: Graduates shall perceive latest tools and techniques to analyze, design and develop innovative systems and products for real life problems.

PEO3: Graduates will function and communicate effectively both as individuals and in multi-disciplinary teams to solve technical problems

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1: To enable the students to apply practical skills, knowledge in major streams such as Thermal, design, manufacturing and industrial engineering.

PSO2: To Empower the students to take-up career in industries or to pursue higher studies in mechanical and interdisciplinary programs

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EEE DEPARTMENT

COURSE OUTCOMES

II-I

1. ELECTRICAL CIRCUIT ANALYSIS-II

Learning Outcomes:

• Students are able to solve three- phase circuits under balanced and unbalanced condition
• Students are able find the transient response of electrical networks for different types of excitations.
• Students are able to find parameters for different types of network.
• Students are able to realize electrical equivalent network for a given network transfer function.
• Students are able to extract different harmonics components from the response of a electrical network.

2. ELECTRICAL MACHINES – I

Learning outcomes:

•Able to assimilate the concepts of electromechanical energy conversion.
• Able to mitigate the ill-effects of armature reaction and improve commutation in dc machines.
• Able to understand the torque production mechanism and control the speed of dc motors.
• Able to analyze the performance of single phase transformers.
• Able to predetermine regulation, losses and efficiency of single phase transformers.
• Able to parallel transformers, control voltages with tap changing methods and achieve three phase to two-phase transformation.

3.BASIC ELECTRONICS AND DEVICES

Learning outcomes:

- Students are able to understand the basic concepts of semiconductor physics, which are usefulto understand the operation of diodes and transistors.
- Students are able to explain the operation and characteristics of PN junction diode and special diodes.
- Ability to understand operation and design aspects of rectifiers and regulators.
- Students are able to understand the characteristics of various transistor configurations. Theybecome familiar with different biasing, stabilization and compensation techniques used in transistor circuits.
- Students are able to understand the operation and characteristics of FET, Thyristors, PowerIGBTs and Power MOSFETs.
- Students are able to understand the merits and demerits of positive and negative feedback andthe role of feedback in oscillators and amplifiers.

4.ELECTROMAGNETIC FIELDS

Learning outcomes:

• To determine electric fields and potentialsusing guass's lawor solving Laplace's orPossion's equations, for various electric charge distributions.
• To Calculate and design capacitance, energy stored in dielectrics.
• To Calculate the magnetic field intensity due to current, the application of Ampere's Law and the Maxwell's second and third equations.
• To determine the magnetic forces and torque produced by currents in magnetic field
• To determine self and mutual inductances and the energy stored in the magnetic field.
• To calculate induced e.m.f., understand the concepts of displacement current andPointingvector.

5. THERMAL AND HYDRO PRIME MOVERS

Learning outcomes:

- To make the student learn about the constructional features, operational details of various types of internal combustion engines through the details of several engine systems and the basic air standard cycles, that govern the engines. Further, thestudent shall be able to calculate the performance of different types of internal combustion engines.
- To train the student in the aspects of steam formation and its utilitiesthrough the standard steam data tables and charts. To make the student correlatebetween the air standard cycles and the actual cycles that govern the steam turbines. Totrain the student to calculate the performance of steam turbines using velocity diagrams
- To impart the knowledge of gas turbine fundamentals, the governing cyclesand the methods to improve the efficiency of gas turbines
- To teach the student about the fundamental of fluid dynamic equations andits applications fluid jets. To impart the knowledge of various types of pumps, their constructional features, working and performance
- To make the student learn about the constructional features, operational details of various types of hydraulic turbines. Further, the student shall be able to calculate the performance of hydraulic turbines
- To train the student in the areas of types of hydroelectric power plants, estimation and calculation of different loads by considering various factors

6.MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Learning outcomes:

- The Learner is equipped with the knowledge of estimating the Demand and demandelasticity for a product and the knowledge of understanding of the Input-Output-Costrelationships and estimation of the least cost combination of inputs.

- One is also ready to understand the nature of different markets and Price Outputdetermination under various market conditions and also to have the knowledge of differentBusiness Units.
- The Learner is able to prepare Financial Statements and the usage of various Accountingtools for Analysis and to evaluate various investment project proposals with the help ofcapital budgeting techniques for decision making.

II-II

1. ELECTRICAL MEASUREMENTS

Learning Outcomes:

• Able tochoose right type of instrument for measurement of voltage and current for acand dc.
• Able to choose right type of instrument for measurement of power and energy – ableto calibrate energy meter by suitable method
• Able to calibrate ammeter and potentiometer.
• Able to select suitable bridge for measurement of electrical parameters
• Able to use the ballistic galvanometer and flux meter for magnetic measuringinstruments
• Able to measure frequency and phase difference between signals using CRO.
- Able to use digital instruments in electrical measurements.

2. ELECTRICAL MACHINES – II

Learning outcomes:

• Able to explain the operation and performance of three phase induction motor.
• Able to analyze the torque-speed relation, performance of induction motor andinduction generator.
• Able to explain design procedure for transformers and three phase induction motors.
• Implement the starting of single phase induction motors.
• To perform winding design and predetermine the regulation of synchronousgenerators.
• Avoid hunting phenomenon, implement methods of staring and correction of powerfactor with synchronous motor.

3 .CONTROL SYSTEMS

Learning Outcome:

• Ability to derive the transfer function of physical systems and determination ofoverall transfer function using block diagram algebra and signal flow graphs.
• Capability to determine time response specifications of second order systems and todetermine error constants.
• Acquires the skill to analyze absolute and relative stability of LTI systems usingRouth'sstability criterion and the root locus method.
•Capable to analyze the stability of LTI systems using frequency response methods.
• Able to design Lag, Lead, Lag-Lead compensators to improve system performancefrom Bode diagrams.

• Ability to represent physical systems as state models and determine the response.Understandingthe concepts of controllability and observability.

4. POWER SYSTEMS-I

Learning Outcomes:
• Students are able to identify the different components of thermal power plants.
• Students are able to identify the different components of nuclear Power plants.
• Students are able to distinguish between AC/DC distribution systems and alsoestimate voltage drops of distribution systems.
• Students are able to identify the different components of air and gas insulatedsubstations.
• Students are able to identifysingle core and multi core cables with differentinsulating materials.
• Students are able to analyzethe different economic factors of power generationand tariffs.

5. MANAGEMENT SCIENCE

Learning Outcomes:
- After completion of the Course the student will acquire the knowledge on managementfunctions, global leadership and organizational behavior.
- Will familiarize with the concepts of functional management project management andstrategic management

III-I

1.POWER SYSTEMS–II

Learning Outcomes:
• Able to understand parameters of various types of transmission lines during differentoperating conditions.
• Able to understand the performance of short and medium transmission lines.
• Student will be able to understand travelling waves on transmission lines.
• Will be able to understand various factors related to charged transmission lines.
• Will be able to understand sag/tension of transmission lines and performance of lineinsulators.

2.RENEWABLE ENERGY SOURCES

Learning Outcomes:
Student should be able to
• Analyze solar radiation data, extraterrestrial radiation, and radiation on earth'ssurface.
• Design solar thermal collectors, solar thermal plants.
• Design solar photo voltaic systems.
• Develop maximum power point techniques in solar PV and wind energy systems.
• Explain wind energy conversion systems, wind generators, power generation.
• Explain basic principle and working of hydro, tidal, biomass, fuel cell and geothermalsystems.

3. SIGNALS & SYSTEMS

At the end of this course the student will able to:
• Characterize the signals and systems and principles of vector spaces, Concept oforthgonality.

• Analyze the continuous-time signals and continuous-time systems using Fourierseries, Fourier transform and Laplace transform.
• Apply sampling theorem to convert continuous-time signals to discrete-timesignal and reconstruct back.
• Understand the relationships among the various representations of LTI systems
• Understand the Concepts of convolution, correlation, Energy and Power densityspectrum and their relationships.
Apply z-transform to analyze discrete-time signals and systems.

4. PULSE AND DIGITAL CIRCUITS OBJECTIVES

LEARNINGOUTCOMES:
After going through this course the student will be able toDesign linear and non-linear wave shaping circuits.
• Apply the fundamental concepts of wave shaping for various switching and signal generating circuits.
• Design different multivibrators and time base generators.
• Utilize the non sinusoidal signals in many experimental research areas.

5. POWER ELECTRONICS

Learning Outcomes:
Student should be able to
• Explain the characteristics of various power semiconductor devices and analyze thestatic and dynamic characteristics of SCR's.
• Design firing circuits for SCR.
• Explain the operation of single phase full–wave converters and analyze harmonics inthe input current.
• Explain the operation of three phase full–wave converters.
• Analyze the operation of different types of DC-DC converters.
• Explain the operation of inverters and application of PWM techniques for voltagecontrol and harmonic mitigation.
• Analyze the operation of AC-AC regulators.

6.INTELLECTUAL PROPERTY RIGHTS AND PATENTS

Outcome:
* IPR Laws and patents pave the way for innovative ideas which are instrumental for Inventions to seek Patents.
*Student gets an insight on Copyrights, Patents and Software patents which areinstrumental for further advancements.

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III-II

1. POWER ELECTRONIC CONTROLLERS& DRIVES

Learning Outcomes:

After completion of the course, studentswill be able to:

• Explain the fundamentals of electric drive and different electric braking methods.
• Analyze the operation of three phase converter fed dc motors and four quadrantoperations of dc motors using dual converters.
• Describe the converter control of dc motors in various quadrants of operation
• Know the concept of speed control of induction motor by using AC voltagecontrollers and voltage source inverters.
• Differentiate the stator side control and rotor side control of three phase inductionmotor..
• Explain the speed control mechanism of synchronous motors

2.POWER SYSTEM ANALYSIS

Learning Outcomes:

• Able to draw impedance diagram for a power system network and to understand perunit quantities.
• Able to form aYbusand Zbusfor a power system networks.
• Able to understand the load flow solution of a power system using different methods.
• Able to find the fault currents for all types faults to provide data for the design of protective devices.
• Able to findthe sequence components of currents for unbalanced power systemnetwork.
• Able to analyze the steady state, transient and dynamic stability concepts of a powersystem.

3.MICROPROCESSORS AND MICROCONTROLLERS

Learning Outcomes:

• To be able to understand the microprocessor capability in general and explore theevaluation of microprocessors.
• To be able to understand the addressing modes of microprocessors
• To be able to understand the micro controller capability
• To be able to program mp and mc
• To be able to interface mp and mc with other electronic devices
• To be able to develop cyber physical systems

4. DATA STRUCTURES

OUTCOMES:

• Distinguish between procedures and object oriented programming.
• Apply advanced data structure strategies for exploring complex data structures.

• Compare and contrast various data structures and design techniques in the area ofPerformance.
• Implement data structure algorithms through C++. • Incorporate data structures intothe applications such as binary search trees, AVL and B Trees
• Implement all data structures like stacks, queues, trees, lists and graphs and comparetheir Performance and trade offs

5.UNIX AND SHELL PROGRAMMIN

OUTCOMES:
• Documentation will demonstrate good organization and readability.
• File processing projects will require data organization, problem solving and research.
• Scripts and programs will demonstrate simple effective user interfaces.
• Scripts and programs will demonstrate effective use of structured programming.
• Scripts and programs will be accompanied by printed output demonstrating completion of a test plan.
• Testing will demonstrate both black and glass box testing strategies.
• Project work will involve group participation.

6.PROFESSIONAL ETHICSAND HUMAN VALUES

Outcome:
*It gives a comprehensive understanding of a variety issues that are encountered by every professional in discharging professional duties.
*It provides the student the sensitivity and global outlook in the contemporary world to fulfill the professional obligations effectively.

IV-I

1. UTILIZATION OF ELECTRICAL ENERGY

Learning Outcomes:
• Able to identify a suitable motor for electric drives and industrial applications
• Able to identify most appropriate heating or welding techniques for suitableapplications.
• Able to understand various level of luminosity produced by different illuminatingsources.
• Able to estimate the illumination levels produced by various sources and recommendthe most efficient illuminating sources and should be able to design different lightingsystems by taking inputs and constraints in view.
• Able to determine the speed/time characteristics of different types of traction motors.
• Able to estimate energy consumption levels at various modes of operation.

2.LINEAR IC APPLICATIONS

OUTCOMES
- Design circuits using operational amplifiers for various applications.
- Analyze and design amplifiers and active filters using Op-amp.

- Diagnose and trouble-shoot linear electronic circuits.
- Understand the gain-bandwidth concept and frequency response of the amplifierconfigurations.
- Understand thoroughly the operational amplifiers with linear integrated circuits.

3.POWER SYSTEM OPERATION AND CONTROL

Learning Outcomes:

• Able to compute optimal scheduling of Generators.
• Able to understand hydrothermal scheduling.
• Understand the unit commitment problem.
• Able to understand importance of the frequency.
• Understand importance of PID controllers in single area and two area systems.
• Will understand reactive power control and compensation for transmission line.

4. SWITCHGEAR AND PROTECTION

Learning Outcomes:

• Able to understand the principles of arc interruption for application to high voltagecircuit breakers of air, oil, vacuum, SF6 gas type.
• Ability to understand the working principle and operation of different types ofelectromagnetic protective relays.
• Students acquire knowledge of faults and protective schemes for high powergenerator and transformers.
• Improves the ability to understand various types of protective schemes used forfeeders and bus bar protection.
• Able to understand different types of static relays and their applications.
• Able to understand different types of over voltages and protective schemes required for insulation co–ordination.

5.INSTRUMENTATION

Learning Outcomes:

• Able to represent various types of signal .
• Acquire proper knowledge to use various types of Transducers.
• Able to monitor and measure various parameters such as strain, velocity,temperature, pressure etc.
• Acquire proper knowledge and working principle of various types of digitalvoltmeters.
• Able to measure various parameter like phase and frequency of a signal with thehelp of CRO.
• Acquire proper knowledge and able to handle various types of signal analyzers.

6.SPECIAL ELECTRICAL MACHINES

Learning Outcomes:

The student should be able to

• Distinguish between brush dc motor and brush less dc motor**.**
• Explain the performance and control of stepper motors, and their applications.

• Explain theory of operation and control of switched reluctance motor.
• Explain the theory of travelling magnetic field and applications of linear motors.
• Understand the significance of electrical motors for traction drives.

IV-II

1. DIGITAL CONTROL SYSTEMS

Learning outcomes:

• The students learn the advantages of discrete time control systems and the "knowhow" of various associated accessories.
• The learner understand z–transformations and their role in the mathematical analysis of different systems(like Laplace transforms in analog systems).
• The stability criterion for digital systems and methods adopted for testing the same are explained.
• Finally, the conventional and state space methods of design are also introduced.

2.H.V.D.C. TRANSMISSION

Learning Outcomes:

The Student shall be able to
• Learn different types of HVDC levels and basic concepts
• Know the operation of converters
• Acquire control concept of reactive power control and AC/DC load flow.
• Understand converter faults, protection and harmonic effects
• Design low pass and high pass filters

3.ELECTRICAL DISTRIBUTION SYSTEMS

Learning Outcomes:

• Able to understand various factors of distribution system.
• Able to design the substation and feeders.
• Able to determine the voltage drop and power loss
• Able to understand the protection and its coordination.
• Able to understand the effect of compensation for improvement.
• Able to understand the effect of voltage control.

4. FLEXIBLE ALTERNATING CURRENT TRANSMISSION SYSTEMS

Learning Outcomes:

The student should be able to
• Understandpower flow control in transmission lines using FACTS controllers.
• Explain operation and control of voltage source converter.
• Analyze compensation methods to improve stability and reduce power oscillations inthe transmission lines.
• Explain the method of shunt compensation using static VAR compensators.
• Understand the methods of compensations using series compensators.
• Explain operation of Unified Power Flow Controller (UPFC).

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Graduates shall have good understanding and technological skills in core fields of Electronics and Communication Engineering to turn into globally proficient engineers.

PEO2: Graduates shall have a sound knowledge on latest tools and technologies in the field of Electronics and Communication Engineering to understand, analyze, design and develop innovative systems and products to reach the needs of real life issues.

PEO3: Graduates shall have professional approach, ethical values and effective communication skills to adapt and present the emerging technologies in Electronics and Communication Engineering through life-long learning.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1: Proficient in design, develop and implement the electronics and communication engineering systems and products.

PSO2: Capable of qualifying in multi level public and private sector competitive examinations for successful employment and higher studies.

PROGRAM OUTCOMES (POs)

PO 1: Engineering Knowledge: Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.

PO 2: Problem Analysis: Identify, formulate, research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

PO 3: Design/ Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal and environmental considerations.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

I Year - I Semester

ENGLISH

Objectives:

1. To improve the language proficiency of the students in English with emphasis on LSRW skills.
2. To enable the students to study and comprehend the prescribed lessons and subjects more effectively relating to their theoretical and practicalcomponents.
3. To develop the communication skills of the students in both formal and informalsituations.

LISTENING SKILLS:
Objectives:

1. To enable the students to appreciate the role of listening skill and improve their pronunciation.
2. To enable the students to comprehend the speech of people belonging to different backgrounds andregions.
3. To enable the students to listen for general content, to fill up information and for specific information.

SPEAKING SKILLS:
Objectives:

1. To make the students aware of the importance of speaking for their personal and professionalcommunication.
2. To enable the students to express themselves fluently and accurately in social and professionalsuccess.
3. To help the students describe objects, situations andpeople.
4. To make the students participate in group activities like role-plays, discussions anddebates.
5. To make the students participate in Just a Minutetalks.

READING SKILLS:
Objectives:

1. To enable the students to comprehend a text through silentreading.
2. To enable the students to guess the meanings of words, messages and inferences of texts in givencontexts.
3. To enable the students to skim and scan atext.
4. To enable the students to identify the topicsentence.
5. To enable the students to identify discoursefeatures.
6. To enable the students to make intensive and extensivereading.

WRITING SKILLS:
Objectives:

1. To make the students understand that writing is an exact formalskill.
2. To enable the students to write sentences andparagraphs.
3. To make the students identify and use appropriatevocabulary.
4. To enable the students to narrate anddescribe.
5. To enable the students capable ofnote-making.
6. To enable the students to write coherently andcohesively.
7. To make the students to write formal and informalletters.
8. To enable the students to describe graphs using expressions ofcomparison.
9. To enable the students to write technicalreports.

COURSE OUTCOME:

1. Using English languages, both written and spoken, competently andcorrectly.
2. Improving comprehension and fluency ofspeech.
3. Gaining confidence in using English in verbalsituations.

MATHEMATICS-I

Course Objectives:

1. The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineeringcourse.
2. The skills derived from the course will help the student from a necessary base to develop analytic and design concepts.

Course Outcomes: At the end of the Course, Student will be able to:

1. Solve linear differential equations of first, second and higherorder.
2. Determine Laplace transform and inverse Laplace transform of various functions and use Laplace transforms to determine general solution to linearODE.
3. Calculate total derivative, Jocobian and minima of functions of twovariables.

MATHEMATICS-II

Course Objectives:

1. The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineeringcourse.
2. The skills derived from the course will help the student from a necessary base to develop analytic and designconcepts.

3. Understand the most basic numerical methods to solve simultaneous linearequations.

Course Outcomes: At the end of the Course, Student will be able to:

1. Calculate a root of algebraic and transcendental equations. Explain relation between the finite differenceoperators.
2. Compute interpolating polynomial for the givendata.
3. Solve ordinary differential equations numerically using Euler's and RKmethod.
4. Find Fourier series and Fourier transforms for certainfunctions.
5. Identify/classify and solve the different types of partial differentialequations.

APPLIED PHYSICS

Course Objectives:

The courses are designedto:

- Impart Knowledge of Physical Optics phenomena like Interference, Diffraction and Polarization involving required to design instruments with higherresolution.
- Teach Concepts of coherent sources, its realization and utility opticalinstrumentation.
- Study the concepts regarding the bulk response of materials to the EM fields and their analytically study in the back-drop of basic quantummechanics.
- Understand the physics of Semiconductors and their working mechanism for their utility in sensors.

Course Outcome: Construction and working details of instruments, ie., Interferometer, Diffractometer and Polarimeter are learnt. Study EM-fields and semiconductors under the concepts of Quantum mechanics paves way for their optimal utility.

COMPUTER PROGRAMMING

Course objectives:

Formulating algorithmic solutions to problems and implementing algorithms in C.

- Notion of Operation of a CPU, Notion of an algorithm and computational procedure, editing and executing programs inLinux.
- Understanding branching, iteration and data representation usingarrays.

- Modular programming and recursive solutionformulation.
- Understanding pointers and dynamic memoryallocation.
- Understanding miscellaneous aspects ofC.
- Comprehension of fileoperations.

Course Outcomes:

- Understand the basic terminology used in computerprogramming
- Write, compile and debug programs in Clanguage.
- Use different data types in a computerprogram.
- Design programs involving decision structures, loops andfunctions.
- Explain the difference between call by value and call byreference
- Understand the dynamics of memory by the use ofpointers
- Use different data structures and create/update basic datafiles.

ENGINEERING DRAWING

Course Objective: Engineering drawing being the principle method of communication for engineers, the objective to introduce the students, the techniques of constructing the various types of polygons, curves and scales. The objective is also to visualize and represent the 3D objects in 2D planes with proper dimensioning, scaling etc.

- To introduce the use and the application of drawing instruments and to make the students construct the polygons, curves and various types of scales. The student will be able to understand the need to enlarge or reduce the size of objects in representingthem.
- To introduce orthographic projections and to project the points and lines parallel to one plane and inclined toother.
- To make the students draw the projections of the lines inclined to both theplanes.
- To make the students draw the projections of the various types of solids in different positions inclined to one of theplanes.
- To represent the object in 3D view through isometric views. The student will be able to represent and convert the isometric view to orthographic view and viceversa.

Course Outcomes:

- Understand the basic methods used in Engineering drawing.

- Understand orthographic projections and to project the points and lines parallel to one plane and inclined toother.
- Students can able to draw the projections of the plane inclined to both theplanes.

ENGLISH - COMMUNICATION SKILLS LAB – I

OBJECTIVES:
To enable the students to learn through practice the communication skills of listening, speaking, reading and writing.

OUTCOME:
A study of the communicative items in the laboratory will help the students become successful in the competitiveworld.
The course content along with the study material is divided into six units.

APPLIED/ENGINEERING PHYSICSLAB

Objective: Training field oriented Engineering graduates to handle instruments and their design methods to improve the accuracy of measurements.

Outcome: Physics lab curriculum gives fundamental understanding of design of an instrument with targeted accuracy for physical measurements

APPLIED/ENGINEERING PHYSICS - VIRTUAL LABS – ASSIGNMENTS

Objective: Training Engineering students to prepare a technical document and improving their writing skills.

Outcome: Physics Virtual laboratory curriculum in the form of assignment ensures an engineering graduate to prepare a /technical/mini-project/ experimental report with scientific temper.

C PROGRAMMING LAB

OBJECTIVES:

- Understand the basic concept of C Programming, and its different modules that include conditional and looping expressions, Arrays, Strings, Functions, Pointers, Structures and File programming.
- Acquire knowledge about the basic concept of writing aprogram.
- Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language.
- Use of conditional expressions and looping statements to solve problems associated with conditions andrepetitions.
- Role of Functions involving the idea ofmodularity.

OUTCOMES:

- Apply and practice logical ability to solve theproblems.
- Understand C programming development environment, compiling, debugging, and linking and executing a program using the developmentenvironment
- Analyzing the complexity of problems, Modularize the problems into small modules and then convert them intoprograms
- Understand and apply the in-built functions and customized functions for solving theproblems.
- Understand and apply the pointers, memory allocation techniques and use of files for dealing with variety ofproblems.
- Document and present the algorithms, flowcharts and programs in form ofuser-manuals
- Identification of various computer components, Installation ofsoftware

I Year - II Semester

ENGLISH –II

Objectives:

1. To improve the language proficiency of the students in English with emphasis on LSRW skills.
2. To enable the students to study and comprehend the prescribed lessons and subjects more effectively relating to their theoretical and practicalcomponents.
3. To develop the communication skills of the students in both formal and informalsituations.

LISTENING SKILLS:
Objectives:

1. To enable the students to appreciate the role of listening skill and improve their pronunciation.
2. To enable the students to comprehend the speech of people belonging to different backgrounds andregions.
3. To enable the students to listen for general content, to fill up information and

for specific information.

SPEAKING SKILLS:
Objectives:

1. To make the students aware of the importance of speaking for their personal and professionalcommunication.
2. To enable the students to express themselves fluently and accurately in social and professionalsuccess.
3. To help the students describe objects, situations andpeople.
4. To make the students participate in group activities like role-plays, discussions anddebates.
5. To make the students participate in Just a Minutetalks.

READING SKILLS:
Objectives:

1. To enable the students to comprehend a text through silentreading.
2. To enable the students to guess the meanings of words, messages and inferences of texts in givencontexts.
3. To enable the students to skim and scan atext.
4. To enable the students to identify the topicsentence.
5. To enable the students to identify discoursefeatures.
6. To enable the students to make intensive and extensivereading.

WRITING SKILLS:
Objectives:

1. To make the students understand that writing is an exact formalskill.
2. To enable the students to write sentences andparagraphs.
3. To make the students identify and use appropriatevocabulary.
4. To enable the students to narrate anddescribe.
5. To enable the students capable ofnote-making.
6. To enable the students to write coherently andcohesively.
7. To make the students to write formal and informalletters.
8. To enable the students to describe graphs using expressions ofcomparison.
9. To enable the students to write technicalreports.

COURSE OUTCOME:

1. Using English languages, both written and spoken, competently andcorrectly.
2. Improving comprehension and fluency ofspeech.
3. Gaining confidence in using English in verbalsituations.

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MATHEMATICS-III

Course Objectives:

1. The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineeringcourse.
2. The skills derived from the course will help the student from a necessary base to develop analytic and designconcepts.
3. Understand the most basic numerical methods to solve simultaneous linearequations.

Course Outcomes: At the end of the Course, Student will be able to:

1. Determine rank, Eigenvalues and Eigen vectors of a given matrix and solve simultaneous linearequations.
2. Solve simultaneous linear equations numerically using various matrixmethods.
3. Determine double integral over a region and triple integral over avolume.
4. Calculate gradient of a scalar function, divergence and curl of a vector function. Determine line, surface and volume integrals. Apply Green, Stokes and Gauss divergence theorems to calculate line, surface and volumeintegrals.

APPLIED CHEMISTRY

Objectives:

- Plastics are nowadays used in household appliances; also they are used as composites (FRP) in aerospaceindustries.
- Fuels as a source of energy are a basic need of any industry, particularly industries like thermal power stations, steel industry, fertilizer industry etc., and hence they areintroduced.
- The basics for the construction of galvanic cells as well as some of the sensors used in instruments are introduced. Also if corrosion is to be controlled, one has to understand the mechanism of corrosion which itself is explained by electrochemicaltheory.
- With the increase in demand, a wide variety of materials are coming up; some of them have excellent engineering properties and a few of these materials areintroduced.
- Understanding of crystal structures will help to understand the conductivity, semiconductors and superconductors. Magnetic properties are also studied.
- With the increase in demand for power and also with depleting sources of fossil fuels, the demand for alternative sources of fuels is increasing. Some of the prospective fuel sources areintroduced.

Outcomes: The advantages and limitations of plastic materials and their use in design would be understood. Fuels which are used commonly and their economics, advantages and limitations are discussed. Reasons for corrosion and some methods of corrosion control would be understood. The students would be now aware of materials like nano-materials and fullerenes and their uses. Similarly liquid crystals and superconductors are understood. The importance of green synthesis is well understood and how they are different from conventional methods is also explained. Conductance phenomenon is better understood. The students are exposed to some of the alternative fuels and their advantages and limitations.

OBJECT-ORIENTED PROGRAMMING THROUGH C++

OBJECTIVES:

- This course is designed to provide a comprehensive study of the C programming language. It stresses the strengths of C, which provide students with the means of writing efficient, maintainable and portable code. The nature of C language is emphasized in the wide variety of examples and applications. To learn and acquire art of computer programming. To know about some popular programming languages and how tochoose
- Programming language for solving aproblem.

OUTCOMES:

- Understand the basic terminology used in computerprogramming
- Write, compile and debug programs in C language. Use different data types in a computer program.
- Design programs involving decision structures, loops andfunctions.
- Explain the difference between call by value and call byreference

ENVIRONMENTAL STUDIES

Course Learning Objectives:

The objectives of the course is to impart

- Overall understanding of the naturalresources
- Basic understanding of the ecosystem and itsdiversity
- Acquaintance on various environmental challenges induced due to unplanned anthropogenic activities
- An understanding of the environmental impact of developmentalactivities
- Awareness on the social issues, environmental legislation and globaltreaties

Course Outcomes:

The student should have knowledge on

- The natural resources and their importance for the sustenance of the life and recognize the need to conserve the naturalresources
- The concepts of the ecosystem and its function in the environment. The need

for protecting the producers and consumers in various ecosystems and their role in the foodweb

- The biodiversity of India and the threats to biodiversity, and conservation practices to protect thebiodiversity
- Various attributes of the pollution and their impacts and measures to reduce or control the pollution along with waste managementpractices
- Social issues both rural and urban environment and the possible means to combat the challenges
- The environmental legislations of India and the first global initiatives towards sustainable development.
- About environmental assessment and the stages involved in EIA and the environmental audit.
- Self-Sustaining Green Campus with Environment Friendly aspect of – Energy, Water and Wastewater reuse Plantation, Rain water Harvesting, ParkingCurriculum.

ENIGINEERING MECHANICS

Objectives: The students completing this course are expected to understand the concepts of forces and its resolution in different planes, resultant of force system, Forces acting on a body, their free body diagrams using graphical methods. They are required to understand the concepts of Centre of gravity and moments of inertia and their application, Analysis of frames and trusses, different types of motion, friction and application of work - energy method.

Outcomes: after completion of this course, students can able to

1. Understand the concept of forces and its resolution in different planes, resultant of force system, Forces acting on a body, their free body diagrams using graphical methods.
2. Understand the concepts of Centre of gravity and moments of inertia and their application, Analysis of frames and trusses, different types of motion, friction and application of work - energy method.
3.

APPLIED / ENGINEERING CHEMISTRY LABORATORY

Objectives: The students completing this course are expected to understand the concepts of

1. Determination of alkalinity of a sample containing Na_2CO_3 andNaOH.
2. Determination of $KMnO_4$ using standard Oxalic acidsolution.
3. Determination of Ferrous iron using standard $K_2Cr_2O_7$solution.
4. Determination of Copper using standard $K_2Cr_2O_7$solution.
5. Determination of temporary and permanent hardness of water using standardEDTA solution.
6. Determination of Copper using standard EDTAsolution.

7. Determination of Iron by a Colorimetric method using thiocynate asreagent.
8. Determination of pH of the given sample solution using pHmeter.

Outcomes: The students entering into the professional course have practically very little exposure to lab classes. The experiments introduce volumetric analysis; redox titrations with different indicators; EDTA titrations; then they are exposed to a few instrumental methods of chemical analysis. Thus at the end of the lab course, the student is exposed to different methods of chemical analysis and use of some commonly employed instruments. They thus acquire some experimental skills.

ENGLISH - COMMUNICATION SKILLS LAB- II

OBJECTIVES:
To enable the students to learn demonstratively the communication skills of listening, speaking, reading and writing.
OUTCOME:
A study of the communicative items in the laboratory will help the students become successful in the competitiveworld.

OBJECT-ORIENTED PROGRAMMING LAB

OBJECTIVE:

- To strengthen their problem solving ability by applying the characteristics of an object- orientedapproach.
- To introduce object oriented concepts in C++ andJava.

OUTCOMES:
- Explain what constitutes an object-oriented approach to programming and identify potential benefits of object-oriented programming over otherapproaches.
- Apply an object-oriented approach to developing applications of varyingcomplexities

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

PROGRAM OUTCOMES (POs)

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 EDUCATIONAL OBJECTIVES (PEOs)

1. **PEO1**: Graduates expertise their technical knowledge, creativity and problem solving skills towards employment, higher Education and in research organization**.**
2. **PEO2**: Graduates shall perceive latest tools and techniques to analyze, design and develop Innovative systems and products for real life problems.
3. **PEO3**: Graduates will function and communicate effectively both as individuals and in multi-disciplinary teams to solve technical problems

PROGRAM SPECIFIC OUTCOMES (PSOs)

1. **PSO1:** Apply mathematical foundations, algorithmic principles, and theoretical computer science in the modelling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.
2. **PSO2:** Demonstrate understanding of the principles and working of the hardware and software aspects of computer systems.
3. **PSO3:** Use knowledge in various domains to identify research gaps and hence to provide solution to new ideas and innovations.

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MBA DEPARTMENT

POs, PSOs & COs

PROGRAM OBJECTIVES (POs):

Our program will produce graduates who:

- Are competent, creative, and highly valued professionals in industry, academia, or government.
- Are flexible and adaptable in the workplace, possess the capacity to embrace new opportunities of emerging technologies, and embrace leadership and teamwork opportunities, all affording sustainable management careers.
- Continue their professional development by obtaining advanced degrees in Management or other professional fields.
- Act with global, ethical, societal, ecological, and commercial awareness expected of practicing management professionals.

PROGRAM OUTCOMES:

Our program will produce graduates who have attained:

- an ability to apply knowledge of management skills
- an ability to design and conduct data analysis and interpret data
- an ability to function in multi-disciplinary teams
- an ability to identify, formulate, and solve management problems
- an understanding of professional and ethical responsibility
- an ability to communicate effectively
- the broad education necessary to understand the impact of management solutions in a global and societal context
- a recognition of the need for, and an ability to engage in life-long learning
- a knowledge of contemporary issues and

- an ability to use the techniques, skills, and modern tools necessary for management practice.