

Bachelor of Technology In Mechanical Engineering



Course Objectives & Outcomes



Department of Mechanical Engineering

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution-UGC, Govt. of India)
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I Year B.Tech I-Sem



I YEAR I SEM		ENGLISH
S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To enable students to enhance their lexical, grammatical and communicative competence.	Write formal or informal letters and applications for different purposes.
2	To equip the students to study the academic subjects with better perspective through theoretical and practical components of the designed syllabus.	Select and extract relevant information through skimming and scanning.
3	To familiarize students with the principles of writing to ensure error-free writing.	Utilize the strategy of brainstorming in preparing analytical, argumentative and expository essays.
4	To know to use sentence structure effectively and to understand how to convert ideas logically within a sentence.	Draft concise emails following professional email etiquette.
5	To expose students to various techniques of reading skills which hone their comprehensive skills.	Enhance their grammatical competency by spotting errors.

I YEAR I SEM		MATHEMATICS -I
S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	The concept of rank of a matrix which is used to know the consistency of system of linear equations and to find the eigen vectors of a given matrix.	Analyze the solution of the system of linear equations and to find the Eigen values and Eigen vectors of a matrix.
2	Finding maxima and minima of functions of several variables.	Find the extreme values of functions of two variables with / without constraints.
3	Applications of first order ordinary differential equations. (Newton's law of cooling, Natural growth and decay)	Solve first and higher order differential equations.
4	How to solve first order linear, nonlinear partial differential equations and also method of separation of variables technique to solve typical second order partial differential equations.	Solve first order linear and non-linear partial differential equations.
5	Solving differential equations using Laplace Transforms.	Solve differential equations with initial conditions using Laplace Transform.

I YEAR I SEM**ENGINEERING CHEMISTRY**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To apply the electrochemical principles in batteries, understand the fundamentals of corrosion and development of different techniques in corrosion control.	Understand the operating principles of various types of electrochemical cells, including fuel cells and batteries. Analyze and develop a technically sound, economic and sustainable solution to corrosion problems related to engineering service.
2	To analyze microscopic chemistry in terms of atomic and molecular orbitals.	Achieve basic concepts of atomic, molecular and electronic changes related to conductivity and magnetism.
3	To analyze water for its various parameters and its significance in industrial and domestic applications.	Familiarize the student with the fundamentals of the treatment technologies and the considerations for its design and implementation in water treatment plants.
4	To impart the knowledge of organic reaction mechanisms which are useful for understanding the synthesis of organic compounds.	Gain knowledge on synthesis of organic compounds by using different reaction mechanisms.
5	To analyze different types of fuels and their applications in various engineering fields.	Comprehend the types of fuels, characteristics and combustion systems with emphasis on engineering applications.

I YEAR I SEM**BASIC ELECTRICAL AND ELECTRONICS ENGINEERING**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To introduce the concept of electrical circuits and its components.	To analyze and solve electrical circuits using network laws and theorems.
2	To introduce the concepts of diodes & transistors, and	To identify and characterize diodes and various types of transistors.
3	To impart the knowledge of various configurations, characteristics and applications.	Design and analyze the DC bias circuitry of BJT.
4	To learn the Constructional details & operations of DC Machines & Transformers.	Fundamentals Of Constructional Details And Principle Of Operation Of DC Machines And Transformers.
5	To learn the solving differential equations by Laplace transform.	Solve differential equations with initial conditions using Laplace Transform.

I YEAR I SEM**PROGRAMMING FOR PROBLEM SOLVING**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To understand the various steps in Program development.	Demonstrate the basic knowledge of computer hardware and software.
2	To understand the basic concepts in C Programming Language.	To formulate simple algorithms for arithmetic and logical problems.
3	To learn how to write modular and readable C Programs.	To translate the algorithms to programs (in C language).
4	To learn to write programs (using structured programming approach) in C to solve problems.	To test and execute the programs and correct syntax and logical errors.
5	To Learn the solving and logical skills to programming in C language and also in other languages.	Ability to apply solving and logical skills to programming in C language and also in other languages.

I YEAR I SEM**ENGINEERING WORKSHOP/IT WORKSHOP LAB**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	Able to know the knowledge for computer assembling and software installation that meets the specified needs of office considerations.	Apply knowledge for computer assembling and software installation that meets the specified needs of office considerations.
2	Student able know how to solve the trouble shooting problems in designing IT tools or any other component related to software.	Ability to solve the trouble shooting problems in designing IT tools or any other component related to software.
3	Student able to understand preparation of PPT, Documentation and budget sheet etc. so that the students cope with any kind of complex activities in their engineering work set.	Apply the tools for preparation of PPT, Documentation and budget sheet etc. so that the students cope with any kind of complex activities in their engineering work set up.
4	Student able to learn about different tools used in the lab.	Students can understand different machine shop operations.
5	Student able to learn about foundry, welding, plumbing, house wiring and Tin smithy operations.	Students can understand Foundry, welding, plumbing, house wiring and Tin smithy operation and learned about metal cutting processes.

I YEAR I SEM**PROGRAMMING FOR PROBLEM SOLVING LAB ENGLISH**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	Understand the basic concept of C Programming, and its different modules that include conditional and looping expressions, Arrays, Strings, Functions, Pointers, and Structures.	Acquire knowledge about the basic concept of writing a program.
2	Acquire knowledge about the basic concept of writing a program.	Understand the Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language.
3	Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language.	Learn how to use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.
4	Use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.	Understand the Role of Functions involving the idea of modularity.
5	Role of Functions involving the idea of modularity.	Understand the Concept of Array and pointers dealing with memory management.

I YEAR I SEM**BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LAB**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To Design Electrical Systems.	Be able to explain about electrical systems.
2	To Analyze A Given Network By Applying Various Network Theorems.	Explain the concept of circuit laws and network theorems and apply them to laboratory measurements.
3	To Expose The Students To The Operation Of DC Generator.	Be able to systematically obtain the equations that characterize the performance of an electric circuit as well as solving both single phase and DC Machines.
4	To Expose The Students To The Operation Of DC Motor and Transformer.	Acknowledge the principles of operation and the main features of electric machines and their applications.
5	To get the knowledge using electrical measuring devices.	Acquire skills in using electrical measuring devices.

I YEAR I SEM**HUMAN VALUES AND SOCIETAL PERSPECTIVES**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.	The students will be able to obtain happiness and prosperity in their life.
2	To facilitate the development of a holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of Existence.	They will develop harmony at all levels.
3	To highlight plausible implications of such a holistic understanding in terms of ethical human conduct,.	They can have satisfying human behaviour throughout their life.
4	To learn trustful and mutually satisfying human behaviour and mutually enriching interaction with Nature	They will learn trustful and mutually satisfying human behaviour.
5	To facilitate Such a holistic perspective forms the basis of value based living in a natural way.	Students will be able to know holistic perspective forms the basis of value based living in a natural way.



I Year B.Tech II-Sem



I YEAR II SEM**PROFESSIONAL ENGLISH**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To enrich students to express themselves appropriately and fluently in professional contexts.	Draft coherent and unified paragraphs with adequate supporting details.
2	To enhance their employability through regular participation in group discussions and interview skills.	Demonstrate problem solving skills, decision-making skills, analytical skills.
3	To lay foundation with writing strategies for the future workplace needs.	Comprehend and apply the pre-interview preparation techniques for successful interview.
4	To acquaint students with different components of professional presentation skills.	Achieve expertise in writing resume and cover letter formats.
5	To equip students with necessary training in listening to comprehend dialects of English language.	Understand the steps of writing 'Reports and Abstract'.

IYEAR II SEM**MATHEMATICS-II**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	The aim of numerical methods is to provide systematic methods for solving problems in a numerical form using the given initial data and also used to find the roots of an equation.	Find the roots of algebraic, non-algebraic equations and predict the value of the data at an intermediate point from a given discrete data.
2	To learn the concepts curve fitting, numerical integration and numerical solutions of first order ordinary differential equations.	Find the most appropriate formula for a guesses relation of the data variables using curve fitting and this method of analysis data helps engineers to understand the system for better interpretation and decision making.
3	Evaluation of improper integrals using Beta and Gamma functions.	Find a numerical solution for a given differential equation.
4	Evaluation of multiple integrals.	Evaluate multiple integrals and to have a basic understanding of Beta and Gamma functions.
5	In many engineering fields the physical quantities involved are vector valued functions.	Evaluate the line, surface, volume integrals and converting them from one to another using vector integral theorems.

I YEAR II SEM**ENGINEERING PHYSICS**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To understand the basic concepts of oscillations exhibited by various systems in nature.	Analyze the various oscillations made by different oscillating bodies in nature.
2	To understand the basic concepts of light through interference and diffraction.	Learn to design a device to go to maximum accuracy in measuring the dimensions optically.
3	To understand band structure of the solids and classification of materials.	Get the knowledge of classification of materials which is used for various applications in material technology.
4	To understand dielectric and magnetic properties of the materials and enable them to design and apply in different fields.	Learn dielectric, magnetic properties of the materials and apply them in material technology.
5	To be able to distinguish ordinary light with a laser light and their applications in different fields.	Learn the principles, production of LASER beam and application of LASER in various fields.

I YEAR II SEM**OBJECT ORIENTED PROGRAMMING**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To teach the student the concepts of object oriented and generic programming.	Learn the concepts of object oriented and generic programming.
2	To differentiate between object oriented programming and procedural programming.	Explain differentiate between object oriented programming and procedural programming.
3	To design applications using object oriented features.	Design applications using object oriented features.
4	To teach the student to implement object oriented concepts.	To teach the student to implement object oriented concepts.
5	To able to handling exception handlings.	Explain the handling exception handlings.

I YEAR II SEM**ENGINEERING GRAPHICS**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To enable the students with various concepts like Dimensioning, Conventions & standards related to working drawing fundamental Concepts of curves used in engineering,	Gets knowledge on usage of various drawing instruments and capable to draw various curves like conic curves, cycloidal curves and involutes.
2	Students are capable to understand the Orthographic Projections of Points and Lines and are able to improve their visualization skills so.	Understand the Orthographic Projections of Points and Lines and are able to improve their visualization skills so that they can apply these skills in developing the new products.
3	Understands and becomes efficient in applying the concept of Orthographic Projections of Planes, solids in industrial applications	Understand about orthographic projection and able to draw planes and solids according to orthographic projections.
4	Can employ freehand 3D pictorial sketching to aid in the visualization process and to efficiently communicate ideas graphically.	Can employ freehand 3D pictorial sketching to aid in the visualization process and to efficiently communicate ideas graphically.
5	Analyse a drawing and can efficiently communicate ideas graphically.	To convert and draw the given orthographic view to isometric view and vice versa.

I YEAR II SEM**ENGINEERING PHYSICS / CHEMISTRY LAB**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	The engineering students are exposed in physics lab to understand physical parameters practically.	The students learn the concepts of error, analyse and try to formulate new solutions to the problems related to engineering physics.
2	The list of experiments enables the students to know different branches like mechanics, optics and electronics.	Students basically learning the mechanical behaviour of the wire and practically determining the elastic constant.
3	Provide the students with a solid foundation in chemistry laboratory required to solve engineering problems.	Prepare synthetic drug molecule.
4	Practical implementation of fundamental concepts.	Determine the strength of an acid by conductometric and potentiometric methods.
5	The students are thoroughly trained in learning practical skills by completing all the experiments in chemistry lab.	Find the amount of Fe^{+2} and Cu^{2+} present in unknown substances using titrimetric and instrumental methods.

I YEAR II SEM**OBJECT ORIENTED PROGRAMMING LAB**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To strengthen problem solving ability by using the characteristics of an object-oriented approach.	Learn problem solving ability by using the characteristics of an object-oriented approach.
2	To design applications using object oriented features.	Explain the applications using object oriented features.
3	To handle Exceptions in programs.	Explain the handling exception handlings
4	To teach the student to implement object oriented concepts.	Able to the student to implement object oriented concepts.
5	To strengthen problem solving ability by using the characteristics of an object-oriented approach.	To teach problem solving ability by using the characteristics of an object-oriented approach.

IYEAR II SEM**ENGLISH LANGUAGE COMMUNICATION SKILLS LAB**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To expose students to a variety of self-instructional, learner-friendly modes of language learning.	Understand the importance of learning phonetics.
2	To enable students to learn accurate pronunciation through stress on word accent, intonation and rhythm.	Learn how to pronounce words using phonetic transcription.
3	To enable students to overcome public speaking anxiety and equip them to become employable.	Know the importance of speaking English with rhythm and intonation.
4	To familiarize students with formal telephonic expressions by means of appropriate tone.	Effectively participate in JAM session.
5	To foster sentence-level and holistic understanding of the context through active listening.	Use polite expressions in all formal situations.



II Year B.Tech I-Sem



II YEAR	I SEM	ENGINEERING MECHANICS
S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	Explain the resolution of a system of forces, compute their resultant and solve problems using equations of equilibrium.	Gain the knowledge on the concepts of force, moment and its application.
2	Perform analysis of bodies lying on rough surfaces.	Understand and apply the knowledge on drawing free body diagrams and solve the problems using analytical methods and law of triangle of forces.
3	Explain the concept of analysis of trusses using method of joints and method of sections.	Students are capable of finding centroid, centre of gravity, moment of inertia and polar moment of inertia including transfer methods and their applications.
4	Locate the centroid of a body and compute the area moment of inertia and mass moment of inertia of standard and composite sections.	Understanding the motion in straight line and in curvilinear paths, its velocity and acceleration computation and methods of representing plane motion
5	Explain kinetics and kinematics of particles, projectiles, curvilinear motion, centroidal motion and plane motion of rigid bodies.	Understand and apply the knowledge on concepts of D'Alembert's principle and particle motion.

II YEAR	I SEM	THERMODYNAMICS
S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To understand the concepts of energy transformation, conversion of heat into work.	To differentiate between quality and quantity of energy, heat and work, enthalpy and entropy, Etc.
2	To understand why and how natural processes occur only in one direction unaided.	Quantify the irreversibility's associated with each possibility and choose an optimal cycle.
3	To apply the concepts of thermodynamics to basic energy systems.	Able to analyze Mollier chart, Gas tables in order to estimate thermodynamic properties such as WBT, DBT, RH etc.
4	To understand how the change of state results in a process	Able to utilize psychrometric chart and estimate the various psychrometric properties.
5	Why air standard cycles are important.	Assess which cycle to use for a given application and source of heat.

II YEAR I SEM**FLUID MECHANICS & HYDRAULIC MACHINES**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To give insight knowledge on fluid statics and kinematics.	Gain the knowledge on fluid mechanics fundamentals like fluid statics and fluid kinematics.
2	To gain knowledge on fluid dynamics.	Have basic idea about the fundamental equations used in Fluid Dynamics and are able to apply these concepts in real working environment.
3	To give basic understanding of Hydro Electric power plant and importance of impact of jets.	Study the fundamentals of turbo machinery and elements of hydroelectric power plant.
4	To become familiar about different types of turbines and able to analyse the performance characteristics of various turbines.	Measure the performance of the different types of Hydraulic Turbines.
5	To be able to understand the working of power absorbing devices like pumps and able to analyse their performance.	Calculate the performance of the different types of Hydraulic Pumps.

II YEAR I SEM**MATERIALS ENGINEERING**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To understand various mechanical properties of materials.	Summarizing the concepts of material science properties in the design and development of mechanical systems.
2	To understand how and why the properties of materials are controlled by its structure at the microscopic and macroscopic levels.	Creativeness in new systems components and processes in the field of engineering.
3	To understand how and why the structure and composition of a material may be controlled by processing.	Interpreting the heat treatment process and types of alloys for mechanical engineering applications useful to the society.
4	To create different types of composite materials and its applications.	Produce different methods of composite materials for automobile and aeronautical applications.
5	To remember polymer material classifications and applications.	To recalling relevant knowledge from long term memory in types of polymers.

II YEAR I SEM**MACHINE DRAWING**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To visualize an object and convert it into a drawing,	Student will be able to Visualize and prepare detail drawing of a given object.
2	To gain knowledge of conventional representation of various machining and mechanical details as per IS.	Student will able to draw threads, bolts, nuts, stud bolts, tap bolts, set screws, Keys, Cottered joints and knuckle joint.
3	To gain knowledge of threads, bolts, nuts, stud bolts, tap bolts, set screws, Keys, cottered joints and knuckle joint.	Draw Riveted joints, shaft coupling, pipe joints.
4	To gain knowledge of Riveted joints, shaft coupling, pipe joints.	Draw details and assembly of mechanical systems, Read and interpret a given drawing
5	To become conversant with 2-D and 3-D drafting.	Create 2-D and 3-D models using any standard CAD software with manufacturing considerations.

II YEAR I SEM**KINEMATICS OF MACHINERY**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To impart knowledge on various types of Mechanisms and Synthesize and analyse 4 bar mechanisms.	Understand the principles of kinematic pairs, chains and their classification, DOF, inversions, equivalent chains and planar mechanisms.
2	To impart skills to analyse the position, velocity and acceleration of mechanisms.	Analyse the planar mechanisms for position, velocity and acceleration.
3	To perform synthesis of mechanism by analytical and graphical method.	Synthesize planar four bar and slider crank mechanisms for specified kinematic conditions.
4	To familiarize higher pairs like cams and principles of cams design	Design cams and followers for specified motion profiles.
5	To study the relative motion analysis and design of gears, gear trains.	Evaluate gear tooth geometry and select appropriate gears for the required applications.

II YEAR	ISEM	FM&HM LAB
S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To gain knowledge in performance testing of Hydraulic Turbines and Hydraulic Pumps at constant speed and head.	To provide the students' knowledge in calculating performance analysis in turbines.
2	To provide practical knowledge in verification of principles of fluid flow.	Student's exposure to study various operating characteristics of Centrifugal pump and Reciprocating pump.
3	To calculate c_d , c_c , c_v and Coefficient of impact of various hydraulic systems.	Analyse a variety of fluid flow devices and utilize fluid mechanics principles in design.
4	To understand Major and minor losses.	Get Exposure to verification of Bernoulli's Theorem.
5	Student able to learn about measuring pressure, discharge and velocity of fluid flow.	To provide the students with a solid foundation in fluid flow principles.

II YEAR	I SEM	MATERIALS ENGINEERING LAB
S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To Remembering the composition of metals, mechanical properties depending upon their micro structure.	Summarizing can understand micro structures of different material.
2	To Understand the Heat treatment methods and their effect on micro structure of materials.	Different heat treatment methods and change of mechanical properties based on micro structure of methods.
3	To applying the procedure for Micro Structure of pure metals.	Produce different methods in Iron carbon equilibrium diagrams for material science applications
4	To Know the Hardness of steels by different tests.	Find out the hardenability of the steels Jominy End Quench Test.
5	To learn the processing of different materials in the lab.	Understand the processing of different materials in the lab.



II Year B.Tech II-Sem



II YEAR II SEM		APPLIED THERMODYNAMICS
S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	Introduction, Engine Types and their Operation. Application of the principles of thermodynamics to components and systems.	To be able to recognize main and supplementary elements of SI and CI engines and define operational principles.
2	Understand and describe the gas exchange and combustion processes in diesel engines.	To be able to describe the most important combustion concepts and problems in concern with SI engines and CI engines.
3	Good understanding of the various IC engines, Compressors and cycles for electricity generation.	To be able to analyse energy distribution in an internal combustion engines. Develop problem solving skills through the application of thermodynamics.
4	The purpose of this course is to enable the student to gain an understanding of how thermodynamic principles govern the behaviour of various systems	To understand the velocity triangles in compressors. Solve problems associated with Rotodynamic compressors.
5	Student have knowledge of methods of analysis and design of complicated thermodynamic systems.	Solve problems associated with reciprocating compressors and expanders and internal combustion engines.

II YEAR II SEM		STRENGTH OF MATERIALS
S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To understand the nature of stresses induced in material under different loads.	Determine the simple stresses and strains when members are subjected to axial loads.
2	To plot the variation of shear force and bending moments over the beams under different types of loads.	Draw the shear force and bending moment diagrams for the beam subjected to different loading conditions.
3	To understand the behaviour of beams subjected to shear loads.	Evaluate stresses induced in different cross-sectional members subjected to shear loads.
4	To understand the behaviour of beams under complex loading.	Evaluate the deflections in beams subjected to different loading conditions.
5	To analyse the cylindrical shells under circumferential and radial loading.	Analyse the Shafts and thick cylindrical shells.

II YEAR II SEM		DYNAMICS OF MACHINERY
S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To study about gyroscope and its effects during precession motion of moving vehicles.	Knowledge acquired about Gyroscope and its precession motion.
2	To understand the force-motion relationship in components subjected to external forces and analysis of standard mechanisms.	Able to predict the force analysis in mechanical system and able to solve the problem.
3	Able to learn about the working of Clutches, Brakes, Dynamometers and Fly wheel.	The student will learn about the kinematics and dynamic analysis of machine elements.
4	To study about the balancing, unbalancing of rotating masses and the effect of Dynamics of undesirable vibrations.	Ability to understand the importance of balancing and implications of computed results in dynamics to improve the design of a mechanism.
5	To understand the working principles of different type governors and its characteristics.	Student gets the exposure of different governors and its working principle.

II YEAR II SEM		MANUFACTURING PROCESSES
S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	The primary objective of this course is to introduce the concept of manufacturing technology with the help of various processes widely employed in industries.	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2	The course consists of casting, welding, sheet metal forming, extrusion and forging processes with the related details of equipment and applications.	Acquire knowledge and hands-on competence in applying the concepts of manufacturing science in the design and development of mechanical systems.
3	To understand various metal working process. To appreciate the capabilities, advantages and the limitations of the processes.	Competence to design a system, component or process to meet societal needs within realistic constraints.
4	To understand the various concepts of drawing, its classification and their applications.	Demonstrate creativeness in designing new systems components and processes in the field of engineering in general and mechanical engineering in particular.
5	To understand the various concepts of metal forming and forging along with their applications.	An ability to formulate solve complex engineering problem using modern engineering and information Technology tools.

II YEAR II SEM		PROBABILITY AND STATISTICS
S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To understand a random variable that describes randomness or an uncertainty in certain realistic situations which can be either discrete or continuous type?	Describe randomness in certain realistic situation which can be either discrete or continuous type.
2	To learn functions of multiple random variables through joint distributions since the random situations are described as functions of multiple random variables.	Provide very good insight which is essential for industrial applications by learning probability distributions.
3	To learn some of the important probability distributions like Binomial, Poisson Distributions (discrete case) .	Make data-driven decisions by using correlation and regression.
4	To understand linear relationship between two variables and also to predict how a dependent variable changes based on adjustments to an independent variable.	Understand the importance of sampling distribution of a given statistic of a random sample.
5	To make inferences about a population from sample data (large and small samples) using probability theory.	Draw statistical inference using samples of a given size which is taken from a population and to apply statistical methods for analysing experimental data.

II YEAR II SEM		INTELLECTUAL PROPERTY RIGHTS
S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To understand various agreements on IPR internationally.	It allows students how to prepare and protect the Inventions ,startup ideas and rights of patents and copy rights etc.
2	Create awareness on the protection of Intellectual property rights.	Students get the knowledge on TRIPS.
3	Understand the issues and legal systems of Intellectual Property Internationally.	This subject brings awareness to the students the basic legal aspects at present following at Global level.
4	To create awareness on Licensing and Transferring the intellectual property rights, understand the process of agreements for the transfer.	Student gets the exposure of license agreement legal systems and generalities.
5	To understand various agreements on IPR internationally.	Student gets exposure to licensing and transfer of intellectual property and the agreements based on transfer.

II YEAR II SEM		DIGITAL ELECTRONICS
S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To introduce basic postulates of Boolean algebra and shows the correlation between Boolean expressions.	Analyse different methods used for simplification of Boolean expressions.
2	To introduce the methods for simplifying Boolean expressions.	Design and implement Combinational and Sequential circuits.
3	To outline the formal procedures for the analysis and design of combinational and sequential circuits.	Design and implement Synchronous and Asynchronous Sequential Circuits.
4	To introduce the concept of memories and programmable logic devices.	Explain about memories & Programmable logic devices.
5	To illustrate the concept of synchronous and asynchronous sequential circuits.	Implement the concept of synchronous and asynchronous sequential circuits.

II YEAR II SEM		DATABASE SYSTEMS
S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To understand the basic concepts and the applications of database systems.	Demonstrate the basic elements of a relational database management system.
2	To Master the basics of SQL and construct queries using SQL.	Ability to identify the data models for relevant problems.
3	To understand the relational database design principles.	Ability to design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respect data.
4	To become familiar with the basic issues of transaction processing and concurrency control.	Ability to explain issues of transaction processing and concurrency control.
5	To become familiar with database storage structures and access techniques.	Ability to select the database storage structures and access techniques.

II YEAR II**SEMINTRODUCTION TO DATA STRUCTURES**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	Exploring basic data structures such as stacks and queues.	Ability to select the data structures that efficiently model the information in a problem.
2	Introduces a variety of data structures such as hash tables, search trees, heaps, graphs.	Ability to assess efficiency trade-offs among different data structure implementations or Combinations.
3	Introduces sorting algorithms.	Implement and know the application of algorithms for sorting.
4	Able to learn Representation of Trees, Properties, Graph Representations.	Implement the representation of Trees, Properties, and Graph Representations.
5	Able to know Priority Queue, Different Types, insertion and Deletion.	Ability to write programme using Priority Queue, Different Types, insertion and Deletion.

II YEAR II SEM**STRENGTH OF MATERIALS LAB**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To determine experimental data include universal testing machines and torsion equipment.	Analyse and design structural members subjected to tension, compression, torsion, bending and combined stresses using the fundamental concepts of stress, strain and elastic behaviour of materials.
2	To determine experimental data for spring testing machine, compression testing machine, impact tester, hardness tester.	Understand the basic concepts of stress, strain, deformation, and material behaviour under different types of loading (axial, torsion, bending).
3	To determine stress analysis and design of beams subjected to bending and shearing loads using several methods.	Perform stress analysis and design of beams subjected to bending and shearing loads using several methods.
4	To determine Flexural strength of a beam.	Calculate the stresses and strains in axially-loaded members subject to flexural loadings.
5	To determine experimental stress with fatigue and compression Tests.	Ability to conduct compression tests and Fatigue of cast iron and steel.

II YEAR II SEM**MANUFACTURING PROCESSES LAB**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To know about the casting of different materials.	Learn about patterns and casting of metals.
2	Study and Practice different welding processes.	Understand the concept of Arc, Spot, TIG welding and brazing process.
3	To learn the operation of hydraulic press operation for different materials.	Understand the Process of simple, compound and progressive press and Hydraulic press.
4	Understand the Process of blow and Injection Moulding.	Learn the Moulding process of plastic materials.
5	To learn the Processing of different materials.	Understand the processing of different materials in the lab.



III Year B.Tech I-Sem



III YEARISEM**COMPUTER INTEGRATED MANUFACTURING TECHNOLOGIES**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	Learn about the geometry of metal cutting theory, mechanism of chip formation and mechanics of orthogonal cutting and merchant's force diagram.	Students should be able to understand the function of micro controllers and PLCs.
2	Gain the knowledge and features, working principles and applications of lathe, shaper, planer, slotter, milling, drilling, and machines.	Apply Computer aided process planning, MRP and CNC part programming.
3	Learn about the ways to reduce the surface roughness by using different Machining processes.	Understand the fundamentals of metal cutting, chip formation, cutting forces involved in orthogonal metal cutting, and different cutting forces will be learned.
4	To understand computer aided planning and control and computer monitoring.	Analyse the classification of lathe, shaper, planer, slotter, milling, drilling, and machines.
5	To understand APT and CNC programming concepts.	Evaluate the surface finishing operations with abrasive processes such as Grinding and broaching machines, types and working principle.

III YEAR I SEM**MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To create the evolution and basic principles of managerial economics and to understand the concept of demand, its significance.	To understand fundamental concepts of economics and enables students how these concepts are utilized in business management.
2	To understand analysis of cost and production in the process of utility creation.	Evaluates students to understand the production, its process and impact of various costs on production.
3	To understand the concept of market, types of markets and how firms determine price output	To understand students to know types of markets and how firms determine their production levels
4	To understand the theory of capital and its significance, accounting principles, and various formats for preparation of final accounts.	It remembers students to understand how business will maintain accounting books and financial position of the business in the market.
5	To analyse various capital budgeting methods to take decision making towards projects and investments.	To understand Students should be able that how to take better decisions towards investment proposals.

III YEAR I SEM**INTERNAL COMBUSTION ENGINES**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	Applications and the principles of thermodynamics to components and systems.	Recognize and recall the importance of thermal power plant and its thermodynamic analysis for improvement of efficiency.
2	The purpose of this course is to enable the student to gain an understanding of how thermodynamic principles govern the behavior of various systems.	Understand the operation of steam boiler, steam nozzle, condenser and steam turbine.
3	Students have knowledge of methods of analysis and design of complicated thermodynamic systems.	Able to do thermodynamic analysis for steam nozzles, condensers and steam turbines.
4	Acquires knowledge about thermodynamic analysis for steam nozzles.	Evaluate the thermodynamic efficiency of gas turbine and jet propulsion systems.
5	Acquires knowledge on condensers and steam turbines.	Create the jet propulsion system and do the thermodynamic analysis for better efficiency.

III YEAR I SEM**MACHINE DESIGN-I**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	The students should be able to understand. Types of loading on machine elements and allowable stresses.	Acquires the knowledge about the principles of design.
2	To understand Stress concentration and the factors responsible. Determination of stress concentration factor; experimental methods.	Understands the concepts of principal stresses.
3	To develop the Knowledge on Basic failure mechanisms of riveted joints. Concepts of design of a riveted joint, welded joints and Bolted Joints to determine the forces in welds and riveted joints.	Understand different welded and riveted joints structure and able to apply its knowledge to analyze its strength when subjected to simple.
4	To learn the design Procedure for the different machine elements such as fasteners, couplings, keys, axially loaded joints etc.	Explain and design the basic of mechanical design process of simple machine components like.
5	To learn the design Procedure for the different Shafts under loading condition, able to know various shafts coupling.	Design the solid hollow shafts and to finding the critical speeds.

III YEAR I SEM**DESIGN OF HYDRAULIC AND PNEUMATIC SYSTEMS**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To provide student with knowledge on the application of fluid power in process, construction and manufacturing Industries.	Identify hydraulic and pneumatic components and its symbol and usage.
2	To study the fundamental principles, design and operation of hydraulic and pneumatic machines, components and systems and their application in recent automation revolution.	Ability to design hydraulic and pneumatic circuits.
3	To provide students with an understanding of the fluids and components utilized in modern industrial fluid power system.	Identify and analyse the functional requirements of a power transmission system for a given application.
4	To develop a measurable degree of competence in the design, construction and operation of fluid power circuits.	Ability to visualize how the hydraulic/pneumatic circuit will work to accomplish the function.
5	To emphasize basic theory, components sizing, construction and function, how to read pneumatics and fluid power circuit diagrams using the correct symbols and troubleshooting techniques.	Ability to Design and understand the electro-hydraulic and electro-pneumatic circuits.

III YEAR I SEM**INNOVATION AND DESIGN THINKING**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	Understand the conceptual development techniques to find solution for a critical design issue.	The importance of design in innovation.
2	Understand Principles to translate the conceptual ideas to engineering design.	Design tools and processes can generate innovative new ideas.
3	Understand Principles of Design for Manufacturing and Assembly.	Design and design thinking to innovative in areas such as engineering, software development and business operations.
4	To know about the design for assembly principles.	Strengthen students' individual and collaborative capabilities to identify customer needs, create sound concept hypotheses, and collect appropriate data.
5	To know about the design for environment and design for recycling.	To describe the various case studies for design for environment.

III YEAR I SEM		MECHANICAL VIBRATIONS
S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	Fully understand and appreciate the importance of vibrations in mechanical design of machine parts.	Ability to analyse the mechanical model of a linear vibratory system.
2	To understand the fundamentals of Vibration Theory.	To be able to model reciprocating and oscillatory motions of mechanical systems.
3	Operate in different vibratory conditions.	To be able to model undamped and damped mechanical systems and structures.
4	To know about different degrees of freedom.	To be able to model single- and multi-degree of freedom systems.
5	To be able to mathematically model real-world mechanical vibration problems.	An ability to identify, formulate, and solve engineering problems.

III YEAR I SEM		ROBOTICS & AUTOMATION
S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	This introductory course is valuable for students who wish to learn about robotics through a study of industrial robot systems analysis and design.	Upon the completion of this course, the student will be able to Describe the various elements that make an industrial robot system
2	This course is suited to students from engineering and science backgrounds that wish to broaden their knowledge through working on a subject that integrates multi-disciplinary technologies.	Able to know different technologies in industrial robotics.
3	This course is to analyse the industrial robotic applications.	Discuss various applications of industrial robot systems.
4	To understand the robot manipulators of their Kinematics and Kinetic control m.	Analyse robot manipulators in terms of their kinematics, kinetics, and control.
5	The performance of manipulate can analyse through simulation by MATLAB.	Model robot manipulators and analyse their performance, through running simulations using a MATLAB-based Robot Toolbox.

III YEAR I SEM**INTRODUCTION TO JAVA PROGRAMMING**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To Create Java Programs That Leverage The Object-Oriented Features Of The Java Language, Such As Encapsulation, Inheritance And Polymorphism;	A competence to design, write, compile, test and execute straightforward programs using a high level language;
2	Use Data Types, Arrays And Strings;	An appreciation of the principles of object oriented programming;
3	Implement Error-Handling Techniques Using Exception Handling,	An awareness of the need for a professional approach to design and the importance of good documentation to the finished programs.
4	Create And Event-Driven GUI Using AWT Components.	Be able to implement, compile, test and run Java programs comprising more than one class, to address a particular software problem.
5	Understand the principles of inheritance, packages and interfaces by different classes.	Demonstrate the concepts of polymorphism and inheritance.

III YEAR I SEM**SOFTWARE PROJECT MANAGEMENT**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	Understanding the specific roles within a software organization as related to project and process management.	Describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project.
2	Understanding the basic infrastructure competences (e.g., process modelling and measurement).	Compare and differentiate organization structures and project structures.
3	Understanding the basic steps of project planning, project management.	It focuses Implement a project to manage project schedule, expenses and resource to with the application of suitable project management tools.
4	Understand the quality assurance, and process management and their relationships.	Principles, techniques, methods & tools for model-based management of software projects, assurance of product quality.
5	To create a software system with a predetermined functionality and quality in a given time frame and with given costs.	Models are required for determining target values and for continuously controlling these values.

III YEAR I SEM		ENTERPRISE RESOURCE PLANNING
S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To know the basics of ERP.	To know the strategic importance of Enterprise Resource Planning.
2	To understand the key implementation of ERP.	To Understand and implement ERP in various Sectors.
3	To know the business modules of ERP.	To understand the business modules of ERP.
4	To evaluate the current and future trends in ERP.	To explain the Future and current trends In ERP.
5	To explain Organizational and Industrial impact; Success and Failure factors of ERP.	To understand the Industrial impact; Success and Failure factors of ERP.

III YEAR I SEM		NANO TECHNOLOGY
S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To learn about basis of Nano Materials.	Upon completion of course, students will familiarize about Nano Technology.
2	In this course we focus on synthetic aspects for the design of nanostructured materials.	Students should demonstrate the preparation of Nano Technology.
3	We describe different approaches including both the bottom-up(includes both chemical and physical methods) and the top-down methods(mainly physical methods) for the synthesis of nanostructured materials.	Upon course completion, students will develop knowledge in characteristic Nano Technology & Nano Materials.
4	The course will then focus on different type of nanostructures with a special emphasis on carbon nanotubes (CNT), metal and metal oxide nanoparticles, core-shell nanostructures and self-assembly of these nanostructures.	Student should able to explain about carbon nanotube metal oxide formation.
5	The dependence of various properties (dielectric, magnetic and optical) with size will be discussed.	Student able to understand different properties along with sizes.

III YEAR I SEM**THERMAL ENGINEERING AND ENERGY RESOURCES LAB**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To study procedure to draw the valve and port timing diagram of CI/SI engines.	Draw the valve and port timing diagram of SI engine & CI engine.
2	To understand the performance characteristics of IC engines (both SI and CI engines) in terms of heat balancing, economical speed variations, air fuel ratio influence on the engine.	Calculate & Compare the performance characteristics of diesel and petrol engines.
3	To demonstrate and understand Morse test on multi cylinder SI engine.	Apply the concept of Morse test on multi cylinder SI engine.
4	To understand working and performance of reciprocating air compressor.	Analyse the efficiency of reciprocating air compressor.
5	To Study design and working of the different types of boilers..	Understand the working of boilers.

III YEAR I SEM**MANUFACTURING TECHNOLOGY LAB**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To know about the casting of different materials.	Learn about patterns and casting of metals.
2	Study and Practice different welding processes.	Understand the concept of Arc, Spot, TIG welding and brazing process.
3	To learn the operation of hydraulic press operation for different materials.	Understand the Process of simple, compound and progressive press and Hydraulic press.
4	Understand the Process of blow and Injection Moulding.	Learn the Moulding process of plastic materials.
5	To learn the Processing of different materials.	Understand the processing of different materials in the lab.

III YEAR I SEM		CONSTITUTION OF INDIA
S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To enable the students to understand the constitution's origin and its power.	Improve their knowledge about Indian constitution..
2	To enable the students to analyse the political principles.	Value their identity and exercise their fundamental rights.
3	To enable the students to be aware of their fundamental rights and duties.	Understand how differently government bodies function.
4	Student able to learn about federal structure Parliamentary form of Governments.	Students can explain about federal structure of governance.
5	Student able know about historical perspectives of the constitutional amendments in India.	Student to understand the historical perspectivesEmergency provisions: Local self-government.



III Year B.Tech II-Sem



III YEAR II SEM		HEAT TRANSFER
S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	Student can able to learn about modes of heat transfer and conduction heat transfer.	To identify the modes of heat transfer and calculate the conduction in various solids.
2	Solve lumped and Heisler charts parameter transient heat transfer problems.	Calculate unsteady state heat conduction problems applied to different geometries.
3	Student can learn types of convection and dimensional analysis.	To solve the heat convection in various medium.
4	Student can learn phases of heat transfer, heat exchanger performance.	To evaluate the heat transfer in phase change process, design heat exchange equipment based on the need that fit to application.
5	Student able to learn different laws of Radiation and its applications.	To learn about the radiation and its use in real life.

III YEAR II SEM		COMPUTER AIDED DESIGN
S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To provide an overview of how computers are being used in design, development of manufacturing plans and manufacture.	Understand the applications of computer in the design and manufacturing.
2	To get effective knowledge on the usage of mathematical equations in model development through the computer.	Understand and develop the Mathematical representations of curves used in geometric construction.
3	To understand different functions of computers in design and manufacturing.	Understand the concept and working principle of NC, CNC, and DNC and can develop a program using G and M codes.
4	To understand the need for integration of CAD and CAM .	Make use of GT, FMS and CAPP concepts and are able to apply these concepts in bringing the benefits of mass production in real working environment.
5	Study of different types of production, Knowledge of group technology (GT).	Plan the computer integrated production planning in working environment and able to analyse the quality of a product through computer aided quality control.

III YEAR II SEM**MACHINE DESIGN-II**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To apply principles of design to mechanical power transmission elements like bearings and to design appropriate bearing.	To gain the knowledge on bearings and Select suitable bearings and its constituents from manufacturers catalogues under given loading conditions.
2	To design the engine parts like piston, connecting rod and analyze design procedure different loading conditions.	Calculate the design parameter for energy storage element and engine components, connecting rod and piston.
3	To introduce the concept, procedures, and data to analyze machine elements in power transmission systems.	To understand the types belt drives and Select suitable belt drives and associated elements from manufacturers catalogues under given loading conditions to design the springs for different loading conditions.
4	To apply principles of design and Analyze the forces in mechanical power transmission elements such gears.	Select appropriate gears for power transmission on the basis of given load and speed Design gears based on the given conditions.
5	Implement basic principles for the design of power screws And the forces, couples, torques etc.	Analyse power screws subjected to loading.

III YEARII SEM**SMART MANUFACTURING TECHNOLOGIES**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	This course introduces the concepts of Industrial Internet of Things, and Cloud Computing.	Students should be able to understand basic concepts of computer integrated manufacturing.
2	The objective of this course is to learn the statistics and optimization methodologies in smart manufacturing systems.	Students should be able to understand basic Components of Knowledge Based Systems.
3	The students will know how to apply artificial intelligence (AI) and data mining (DM) techniques.	Understand the Concept of Artificial Intelligence.
4	Evaluation criteria and industry benchmarks for determining where and how smart manufacturing processes can benefit your organization.	Students should be able to understand Automated Process Planning.
5	Detailed understanding of how sensors, automation and data science are transforming individual processes.	Students should be able to understand about grouping the parts.

III YEAR II SEM**COMPUTATIONAL FLUID DYNAMICS**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	Understand The Geometrical model of a fluid flow.	Demonstrate & explain geometrical model of a fluid flow.
2	Solve one and two-dimensional ordinary and partial differential equations using traditional CFD tools.	Describe specific boundary conditions and solution parameters.
3	Understand the various discretization techniques.	Analyse the results and draw the appropriate inferences.
4	Understand the turbulence models and grid generation techniques.	Solve fluid flow fields using CFD methods.
5	How to apply explicit, implicit and semi-implicit methods of finite differencing.	Model fluid flow problems and heat transfer.

III YEAR II SEM**TOOL DESIGN**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To understand the functions and design principles of Jigs, fixtures and press tools.	Upon completion of this course, the students can able to design jigs, fixtures and press tools.
2	To gain proficiency in the development of required views of the final design.	Students can able to follow the general principles to design jigs, fixtures and press tools.
3	To gain the knowledge on Press Working Terminologies And Elements Of Cutting Dies.	Students can understand the terminology and elements of cutting dies.
4	To explain between bending and drawing.	Student can Differentiate between bending and drawing.
5	To know about different types of the forming techniques.	Student can explain about all other forms forming techniques.

III YEAR II SEM**EMBEDDED SYSTEMS**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To understand the basics of microprocessors and microcontrollers architecture and its functionalities.	The student will learn the internal organization of popular 8086/8051 microprocessors/microcontrollers.
2	Understand the core of an embedded system.	Understand and design the Embedded systems.
3	To learn the design process of embedded system applications.	Understand Embedded Firmware design approaches.
4	To understands the RTOS and inter-process communication.	Learn the basics of RTOS.
5	How to apply explicit, implicit and semi-implicit methods of finite differencing.	Model fluid flow problems and heat transfer.

III YEAR II SEM**INTERNET OF THINGS & APPLICATIONS**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To study IoT Networking Core.	Understand IoT Networking Core.
2	To study IoT related network fundamentals.	Understand IoT related network fundamentals.
3	To study IoT Architecture.	Understand IoT Architecture.
4	To study IoT Application Development procedure.	Understand IoT Application Development procedure.
5	To study various case studies and IoT applications.	Understand various case studies and IoT applications.

III YEAR II SEM		SOFTWARE TESTING
S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	Knowing the concepts of Software Engineering and software development life cycle.	Analyze the strategies for software testing.
2	Understanding the foundations, techniques, and tools in the area of software testing and its practice in the industry.	Identify the issues in test management and testing activity.
3	Learning the functional aspect of the various testing techniques.	Apply the suitable testing strategy for a given application.
4	Knowledge of the creation of test cases and usage of testing tools.	Development of test cases and selection of appropriate testing tool.
5	Learning about different testing types in software testing.	Identify the suitable testing techniques in software testing.

III YEAR II SEM		TOTAL QUALITY MANAGEMENT
S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To facilitate the understanding of Quality Management principles and process.	The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.
2	To understand Customer focus, Employee focus and their involvement and Supplier Management.	To give the students an overview of TQM, various Quality aspects and.
3	Student able to know about Organizing for TQM.	Student can able to manage industrial quality organizing for TQM.
4	To gain the knowledge on The Cost of Quality	To give importance of Top Management Commitment in any organization for maintaining product / services quality.
5	To gain the knowledge on all Universal Standards of Quality..	To give suitable standards of quality for TQM.

III YEAR II SEM

MANAGEMENT INFORMATION SYSTEMS

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To understand the competitive advantage of using information systems in the organization for the needful assistance in decision making and management.	Ability to apply Concepts & applications of Management Information Systems.
2	To learn how to plan for information systems & implementation.	Ability to perform Information Systems Planning & Implementations.
3	To learn about Management of IS: Information system planning.	Able to explain Information system planning.
4	To understand Building of Information Systems Structured Analysis Tools, System Design.	Ability to adapt Building of Information Systems Structured Analysis Tools, System Design.
5	To study about security aspects of information systems.	Ability to adapt Cyber-crime and information security procedures.

III YEAR II SEM

OPERATING SYSTEM CONCEPTS

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To learn the fundamentals of Operating Systems.	Create processes and threads.
2	To learn the mechanisms of OS to handle processes and threads and their communication.	Develop algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time, and Response Time.
3	To learn the mechanisms involved in memory management in contemporary OS.	For a given specification of memory organization develop the techniques for optimally allocating memory to processes.
4	Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols.	Design and implement file management system.
5	To know the components and management aspects of concurrency management.	For a given I/O devices and OS (specify) develop the I/O management functions in OS as part of a uniform.

III YEAR II SEM

CAD/CAM LAB

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To study the need of computers in Industrial Manufacturing, product cycle, CAD/CAM hardware, computer graphics.	Understand the need of computers in industrial manufacturing, product cycle, CAD/CAM hardware, and computer graphics.
2	To study geometric modelling which includes curve representation and surface representation.	Understand the geometric modelling to represent curves and surfaces.
3	To study drafting and modelling systems which includes basic geometric commands and numerical control?	Understand the basic geometric commands and numerical control.
4	To understand the concept of group technology in part family, production flow analysis, and computer aided process planning.	Understand the concept of group technology, production flow analysis, process planning.
5	To study computer aided quality control and computer integrated manufacturing systems.	Understand computer aided quality control and computer integrated manufacturing.

III YEAR II SEM

HEAT TRANSFER LAB

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	The primary objective of this course is to provide the fundamental knowledge necessary.	Perform experiments to determine the thermal conductivity of a metal rod.
2	To understand the behaviour of thermal systems.	Conduct experiments to determine convective heat transfer coefficient for free and forced convection and correlate with theoretical values.
3	This course provides a detailed experimental analysis,	Estimate the effective thermal resistance in composite slabs
4	Including the application and heat transfer through solids, fluids, and vacuum.	Determine surface emissivity of a test plate.
5	Convection, conduction, and radiation heat transfer in one and two dimensional steady and unsteady systems are examined.	Estimate performance of effectiveness of fin.

III YEAR II SEM

TECHNICAL COMMUNICATION & SOFT SKILLSLAB

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To make the students recognize the role of Technical English in their academic and professional fields.	The students will be able to understand information which assists in completion of the assigned job tasks more successfully.
2	To improve language proficiency and develop the required professional skills.	Students will be able to communicate their ideas by writing projects, reports, instructions, diagrams and many other forms of professional writing.
3	To equip students with tools to organize, comprehend, draft short and long forms of technical work.	Students will also be able to adhere to ethical norms of scientific communication.
4	To strengthen their individual and collaborative work strategies.	Students will be able to strengthen their individual and collaborative work strategies.
5	The future placement needs of the studentsgroup discussions and mock interviews.	Acquiring and improving the skills required for placements and professional success.



IV Year B.Tech I-Sem



IV YEAR ISEM**AUTOMATION & CONTROL ENGINEERING**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To perform one or more processing operations.	The importance of automation in industries and Identification of key elements of mechatronics system.
2	To understand the need of Mechatronics systems.	Set up testing strategies to evaluate performance characteristics of different types of sensors and transducers.
3	To make students familiar with the constructions and working principle of different types of sensors and transducers.	Describe and analyse working principles of various types of motors, differences, characteristics and selection criteria, control methods.
4	Understand the fundamental concepts of electro mechanics and fluid mechanics (hydraulics and pneumatics) of Actuators and drive systems.	Understand fundamental elements of drive systems, analyse the steady-state characteristics of a few commonly used types of actuators used in the industry.
5	To impart knowledge on the control elements.	The students will be able to handle different types of controller like electronic, pneumatic and hydraulic.

IV YEAR ISEM**OPERATIONS RESEARCH**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	Define and formulate linear programming problems & appreciate their limitations.	Student will be able to Identify & develop operational research models from the verbal description of the real system.
2	Solve linear programming problems using appropriate techniques interpret the results obtained.	Understand the mathematical tools that are needed to solve optimization problems.
3	Conduct and interpret post-optimal and sensitivity analysis and explain the primal-dual relationship.	Develop a report that describes the model analyses the results & propose recommendations in language understandable in Management Engineering.
4	Develop mathematical skills to analyse & solve integer programming and network models arising from a wide range of applications.	Student able to understand Multi-criteria decision techniques, Decision making under uncertainty and risk, Game theory, and Dynamic programming.
5	Effectively communicate ideas, explain procedures and interpret results and solutions in simulation.	Use mathematical software to solve the proposed simulation models.

IV YEAR ISEM

MECHANICAL MEASUREMENTS & INSTRUMENTATION

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To study concept of architecture of the measurement system.	Learner should be able to Identify and select proper measuring instrument for specific application Illustrate working principle of measuring instruments.
2	To deliver working principle of mechanical measurement system.	Explain calibration methodology and error analysis related to measuring instruments.
3	To impart knowledge of mathematical modelling of the control system and control system under different time domain.	Mathematically model and analyse for different measurements.
4	To analyse the stress and strain measurements and humidity measurements.	Acquire knowledge in stress and strain measurements and Humidity measurement.
5	To understand the Measurement of Force, Torque and Power Elements of Control Systems.	Identify, analysis, and solve mechanical engineering problems useful to the society.

IV YEAR ISEM

FINITE ELEMENT ANALYSIS

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To understand the functions and design principles of Jigs, fixtures and press tools.	Learner should be able to Identify and select proper measuring instrument for specific application Illustrate working principle of measuring instruments.
2	To gain proficiency in the development of required views of the final design.	Explain calibration methodology and error analysis related to measuring instruments.
3	To enable the students to understand fundamentals of finite element analysis.	Mathematically model and analyse for different measurements.
4	To learn the principals involved in the discretization of domain with various elements, polynomial interpolation and assembly of global arrays.	Acquire knowledge in stress and strain measurements and Humidity measurement.
5	To learn the application of FEM in various structural and non-structural problems by incorporating boundary conditions.	Identify, analysis, and solve mechanical engineering problems useful to the society.

IV YEAR I SEM**PRODUCTION & OPERATIONS MANAGEMENT**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To create a comprehensive exposure to and its significance of POM in Industries.	The understand significance of POM, students able to Illustrate production planning functions and manage manufacturing functions in a better way.
2	To understand students with various activities of scheduling and control operation to give insight into the ongoing & futuristic trends in the control of inventory.	Memorable competency in scheduling and sequencing in manufacturing operations and effect affordable manufacturing lead time.
3	To analyse and apply techniques to quality control	To apply the techniques of quality control and control inventory with cost effectiveness.
4	To remember the importance of material management.	Get conversant with various documents procedural aspects and preparation of orders for various MRP and stores management.
5	To understand and to apply various analyse in cost reduction in production.	Analysed and applied various techniques in cost reduction.

IV YEAR I SEM**HEATING VENTILATION AND AIR CONDITIONING**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	The course aims to emphasize the importance of heating and ventilation systems.	Students will assist in the installations of Heating, Air Conditioning and Refrigeration equipment.
2	This program includes heating, ventilation and air conditioning.	Perform preventive maintenance on heating and air conditioning systems.
3	Graduates will possess the skills necessary to obtain an entry-level HVAC Technician position.	Students will identify site hazards.
4	Graduates will have an understanding of safe HVAC practices	The student shall understand the principles and working HVAC systems.
5	Graduates will understand the importance of professional behaviour and life-long learning, and will meet the challenges of continued technological growth within the field.	To be able to study and analyse psychrometric chart in refrigeration systems. Develop problem solving skills through the application of thermodynamics.

IV YEAR ISEM**PRODUCT DESIGN & DEVELOPMENT**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To study the basic concepts of product design and development process.	Ability to select suitable design and development process for a given application.
2	To study the applicability of product design and development in industrial applications.	Suitable ergonomic principles can be identified for the product development.
3	To acquaint the practical knowledge regarding conceptualization design and development of a new product.	Appropriate standardization method can be used for product and process development.
4	To study the concepts of Ergonomics in context of the product design has been explained with the help of case studies.	Cost estimation methods can be developed to minimise the cost.
5	To understand the fundamental concept of Rapid Prototyping as well the working principles of the basic rapid prototyping techniques.	Able to classify and select proper rapid prototyping and reverse engineering techniques for specific technical applications.

IV YEAR ISEM**MECHANICAL MEASUREMENTS & INSTRUMENTATION LAB**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To prepare the students for successful career in industry and motivate for higher education.	At the end of the course, the student will be able to characterize and calibrate measuring devices.
2	To provide strong foundation in basic science and mathematics necessary to formulate, solve and analyse Control and Instrumentation problems.	Identify and analyse errors in measurement.
3	To provide strong foundation in circuit theory, control theory and signal processing concepts.	Analyse measured data using regression analysis.
4	To provide good knowledge of Instrumentation systems and their applications.	To understand the Calibration of Pressure Gauges temperature.
5	To provide knowledge of advanced control theory and its applications to engineering problems.	Analyse LVDT, capacitive transducer and rotameter.

IV YEAR ISEM**AUTOMATION AND CONTROL ENGINEERING LAB**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To prepare the students for successful career in industry and motivate for higher education.	At the end of the course, the student will be able to characterize and calibrate measuring devices.
2	To provide strong foundation in basic science and mathematics necessary to formulate, solve and analyse Control and Instrumentation problems	Identify and analyse errors in measurement.
3	To provide strong foundation in circuit theory, control theory and signal processing concepts.	Analyse measured data using regression analysis.
4	To provide good knowledge of Instrumentation systems and their applications.	To understand the Calibration of Pressure Gauges temperature.
5	To provide knowledge of advanced control theory and its applications to engineering problems.	Analyse LVDT, capacitive transducer and rotameter.

IV YEAR I SEM**PROJECT –I (PROJECT OR SUMMER INTERNSHIP)**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To acquaint with the process of undertaking literature survey/industrial visit and identifying the problem	Identify a topic in advanced areas of Mechanical Engineering.
2	To familiarize the process of solving the problem in a group	Review literature to identify gaps and define objectives & scope of the work
3	To acquaint with the process of applying basic engineering fundamental in the domain of practical applications	Generate and implement innovative ideas for social benefit.
4	To inculcate the process of research	Develop conceptual design and methodology of solution for the problem.
5	To work with group and share responsibilities.	Learn team work and share responsibility.



IV Year B.Tech II-Sem



IV YEAR IISEM**AUTOMOBILE ENGINEERING**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To understand basics of automobile engineering, conversant with vehicle structure & Engines.	Ability to identify & description of different components & system of automobile.
2	To make the student conversant with auxiliary systems.	Students will be able to explain working principle of various systems automobile.
3	To make the student conversant with transmission systems.	Students will be able to explain working principle of transmission systems.
4	To make the student conversant with steering, brakes & suspension systems.	Able to understand steering, brakes & suspension systems.
5	To make the student conversant with alternative energy sources.	Students will be able to understand different alternative energy sources used in IC engine.

IV YEAR IISEM**INDUSTRIAL ENGINEERING AND MANAGEMENT**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To understand the concepts of management and organization structure.	The concepts of management and organization structure are understood by students.
2	To Remember the plant location and work study objectives and work measurements.	The plant location and work study objectives and learned and remembered.
3	To Create importance of material management and TQM.	Importance of material management and TQM are known.
4	To evaluate PERT CPM for various projects.	Evaluated PERT CPM various techniques for various projects.
5	To apply quality control techniques and to understand functions of HRM.	Applied quality control techniques and remembered functions of HRM.

IV YEAR IISEM**MAINTENANCE & SAFETY ENGINEERING**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To ensure the desired plant availability at an optimum cost within the safety prescription.	Describe the various categories of maintenance.
2	Student able to know about the objectives of maintenance.	Assemble, dismantle and align mechanisms in sequential order.
3	To minimize the total cost of unavailability and resources.	Carry out plant maintenance using tribology, corrosion and preventive maintenance.
4	Explain the repair methods of beds and slide ways.	Student gets the exposure of Maintenance Policies and Preventive Maintenance.
5	Discuss various condition monitoring techniques.	Explain the repair methods of material handling equipment's.

IV YEAR IISEM**TECHNOLOGY MANAGEMENT**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	The course aims at providing an overview of various issues connected with Management of Technology in organizations.	Understanding Technology Management and applying thoughts.
2	The course provides an exposure to technology related issues like technology identification,	Carry out Technology Transfers.
3	The course also provides an appreciation of linkages of technology with policy and support systems.	Student gets the exposure of Technology strategy.
4	This course aims to know Technology forecasting, technology acquisition and technology absorption.	Student can understand the Technology forecasting, technology acquisition and technology absorption.
5	This course aims to know Technology environment in country Science & Technology in India.	Student can explain Technology environment in country Science & Technology in India.

IV YEAR IISEM**RENEWABLE ENERGY SOURCES**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To explain concept of various forms of Non-renewable and renewable energy.	Understanding Of Commercial Energy And Renewable Energy Sources.
2	To outline division aspects and utilization of renewable energy sources for both domestics and industrial applications.	Knowledge In Working Principle Of Various Energy Systems.
3	To analysis the environmental and cost economics of using renewable energy sources compared to fossil fuels.	Capability To Do Basic Design Of Renewable Energy Systems.
4	At the end of the course, the students are expected to identify the new methodologies / technologies for effective utilization of renewable energy sources.	Upon Completion Of This Course, The Students Can Able To Identify The New Methodologies / Technologies For Effective Utilization Of Renewable Energy Sources.
5	This course aims to understand the Technologies For Effective Utilization Of Renewable Energy Sources.	Able to know the Technologies For Effective Utilization Of Renewable Energy Sources.

IV YEAR IISEM**BIOMASS ENGINEERING**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	Gain knowledge on biomass energy.	Students should able to get knowledge on bio-mass energy.
2	Gain knowledge of sustainable energy.	Students should able to understand the concept Thermo chemical Conversion.
3	Gain knowledge on renewable energy policies.	Students should able to implement Biological Conversion.
4	To have an exposure on the types of biomass, its surplus availability and characteristics.	Students should able to know about Chemical Conversion.
5	Analyse the technologies available for conversion of biomass to energy in terms of its technical competence and economic implications.	Student gets a practical understanding on the various biomass energy conversion technologies and its relevance towards solving the present energy crisis.

IV YEAR IISEM**ENERGY CONSERVATION AND MANAGEMENT**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	Understand and analyse the energy data of industries.	Students should be able to carry out energy accounting and balancing.
2	Carry out energy accounting and balancing.	Students should be able to suggest methodologies for energy savings.
3	Conduct energy audit and suggest methodologies for energy savings and utilize the available resources in optimal ways.	Students can be able to analyze the energy data of industries.
4	To impart knowledge in the domain of energy conservation.	Apply knowledge of Energy Conservation Opportunities in a range of contexts.
5	To bring out Energy Conservation Potential and Business opportunities across different user segments under innovative business models.	Develop innovative energy efficiency solutions and demand management strategies.

IV YEAR IISEM**TECHNICAL SEMINAR**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To survey selected topics addressing issues of science in society today.	Identify and compare technical and practical issues related to the area of program specialization.
2	To familiarize with scientific literature.	Outline annotated bibliography of research demonstrating scholarly skills.
3	To collect information on each topic.	Prepare a well-organized report employing elements of technical writing and critical thinking.
4	To assimilate, synthesize and integrate information.	Demonstrate the ability to describe, interpret and analyse technical issues and develop competence in presenting.
5	To organize the information on each topic into an analysis.	To effectively communicate by making an oral presentation before an evaluation committee.

IV YEAR IISEM**MAJOR PROJECT**

S No	COURSE OBJECTIVES	COURSE OUTCOMES
1	To provide an opportunity to work in group on a topic / problem / experimentation.	Identify methods and materials to carry out experiments/develop code.
2	To encourage creative thinking process.	Reorganize the procedures with a concern for society, environment and ethics.
3	To provide an opportunity to analyse and discuss the results to draw conclusions.	Analyse and discuss the results to draw valid conclusions.
4	To acquire and apply fundamental principles of planning and carrying out the work plan project through observations, discussions and decision making process.	Prepare a report as per recommended format and defend the work.
5	To acquire the knowledge to publishing papers in peer reviewed journals/conference proceedings.	Explore the possibility of publishing papers in peer reviewed journals/conference proceedings.