

2020-2021

MECHANICAL ENGINEERING

2020-2021

Odd semester

COURSE OBJECTIVES AND COURSE OUTCOMES FOR S7

MECHANICAL

ME401: DESIGN OF MACHINE ELEMENTS - I

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To review concepts of statics and strength of materials.	Find out various stresses induced in a machine element under different type of loading conditions.
2	To introduce fundamental approaches to failure prevention of components	Different failure theories and basic concepts of design factors like stress, factor of safety, etc. Devise machine components for its conceptual design.
3	To provide knowledge in the design of common machine elements such as fasteners, shafts, springs cotter joints and couplings.	

ME403: ADVANCED ENERGY ENGINEERING

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To give an idea about global energy scenario and conventional energy sources	Understand energy scenario and the environmental effects of energy conversion.
2	To understand solar, wind and Biomass energy	Become aware of different renewable energy sources and choose sustainable energy
3	To know concepts of other renewable energy sources	
4	To create awareness on the impacts of energy conversion and importance of sustainable energy	

ME405: REFRIGERATION & AIR-CONDITIONING

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1 2 3 4	To introduce vapour compression and vapour adsorption systems	Understand the principles refrigeration of air-conditioning and basic design considerations.
	To impart knowledge on refrigeration cycles and methods to improve performance	Carry out analysis of refrigeration cycles
	To familiarize the components of refrigeration systems	Apply the concepts of indoor environmental comfort
		Perform psychrometric calculations, humidity control and analysis of air-conditioning processes

ME409: MECHATRONICS

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To introduce the features of various sensors used in CNC machines and robots	Know the mechanical systems used in mechatronics
	<input type="checkbox"/> To study the fabrication and functioning of MEMS pressure and inertial sensors	. Integrate mechanical, electronics, control and computer engineering in the design of mechatronics systems
	To enable development of hydraulic/pneumatic circuit and PLC programs for simple	

ME409: COMPRESSIBLE FLUID FLOW

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To familiarize with behavior of compressible gas flow.	Formulate and solve problems in one - dimensional steady compressible flow including: isentropic nozzle flow, constant area flow with friction (Fanno flow) and constant area flow with heat transfer (Rayleigh flow).
2	To understand the difference between subsonic and supersonic flow	Derive the conditions for the change in pressure, density and temperature for flow through a normal shock
3	To familiarize with high speed test facilities	Determine the strength of oblique shock waves on wedge shaped bodies and concave corners
		Know the various measuring instruments used in compressible flow

ME463: AUTOMOBILE ENGINEERING

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To know the anatomy of automobile in general	Practically identify different automotive systems and subsystems.
2	To understand the working of different automotive systems and subsystems	Understand the principles of transmission, suspension, steering and braking systems of an automobile
3	To update the latest developments in automobiles	Develop a strong base for understanding future developments in the automobile industry

ME431: MECHANICAL ENGINEERING LAB

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To conduct the various heat transfer experiments	Conduct experiments to determine thermal conductivity of materials Determine heat transfer coefficient, LMTD etc..
2	To practice calibration of thermometer and pressure gauges	Do calibration of thermometers and pressure gauges Demonstrate the effect of unbalances resulting from rotary motions
3	To do experiments on dynamics	Visualise the effect of dynamics on vibrations in single and multi degree of freedom system Demonstrate the working principle of governor /gyroscope and demonstrate the effect of forces and moments on their motion

COURSE OBJECTIVES AND COURSE OUTCOMES FOR S5

MECHANICAL

ME 301: MACHANICS OF MACHINERY COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To understand the layout of linkages in the assembly of a system/machine. To study the application of friction in different devices.	Able to understand basic elements of Mechanism
2	To study the principles involved in assessing the displacement, velocity and acceleration at any point in a link of a mechanism.	The students will be able to perform velocity analysis of mechanism
3	To analyse the motion resulting from a specified set of linkages in a mechanism.	The students will be able to perform acceleration analysis of mechanism
4	To study the power transmission devices.	The students will be able to perform dimensional synthesis of simple mechanisms Mechanism
5		The students will be able to perform force analysis of belt drives
6		The students will be able to design and analyse clutch and brake

EE 311: ELECTRICAL DRIVES & CONTROL FOR AUTOMATION

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To understand the basic concepts of different types of electrical machines and their Performance	Select a drive for a particular application based on power rating.
2	To know the different methods of starting D.C motors and induction motors.	Select a drive based on mechanical characteristics for a particular drive application.
3	To introduce the controllers for automation	Discuss the controllers used for automation
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HS 300: PRINCIPLES OF MANAGEMENT COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To develop ability to critically analyse and evaluate a variety of management practices in the contemporary context;	Manage people and organisations
2	To understand and apply a variety of management and organisational theories in practice;	Critically analyse and evaluate management theories and practices
3	To be able to mirror existing practices or to generate their own innovative management competencies, required for today's complex and global workplace;	To plan and make decisions for organisations
4	To be able to critically reflect on ethical theories & social responsibility ideologies to create sustainable organisations.	To staffing and related HRD functions

ME 305: COMPUTER PROGRAMMING AND NUMERICAL METHODS

Sl No	Course Objectives	Course Outcomes
1	To equip students with fundamentals of computer programming	The students will be able to write computer programs
2	To provide fundamental idea about the use of computer programming	The students will be able to use numerical solutions for engineering problems
3	To make students to use numerical methods for analyzing the basic engineering problems	To solve application level problems like system of equations and heat equations.

ME303: MACHINE TOOLS & DIGITAL MANUFACTURING COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	The course provides students with fundamental knowledge and principles in material removal processes.	Apply cutting mechanics to metal machining based on cutting force and power consumption.
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.	Operate lathe, milling machines, drill press, grinding machines, etc.
	To demonstrate the fundamentals of machining processes and machine tools.	Select cutting tool materials and tool geometries for different metals.
4	To develop knowledge and importance of metal cutting parameters.	Select appropriate machining processes and conditions for different metals.
5	To develop fundamental knowledge	Learn machine tool structures and

	on tool materials, cutting fluids and tool wear mechanisms.	machining economics.
6	To apply knowledge of basic mathematics to calculate the machining parameters for different machining processes.	Write simple CNC programs and conduct CNC machining.

ME 368: NON-DESTRUCTIVE TESTING COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To introduce the basic principles, techniques, equipment, applications and limitations of NDT methods.	Discuss the basic principles, techniques, equipment used in NDT
2	To enable selection of appropriate NDT methods.	The students will be able to differentiate various defect types.
3	To identify advantages and limitations of non-destructive testing methods.	Ability to apply scientific and technical knowledge to the field of non-destructive testing.
4	To make aware the developments and future trends in NDT.	Recognition of the need and ability to engage in lifelong learning, thought process and development
5		Ability to use the relevant non-destructive testing methods for various engineering practice.
6		Recognize and achieve high levels of professionalism in their work

ME331: MANUFACTURING TECHNOLOGY LAB COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To acquaint the basics of lathe and accessories, shaping and slotting machine, planning machines	At the end of the course, the students will be familiar with the various operations using lathe, shaping, slotting and planning machines.
2	To learn the different tools used for various operations of machines.	Do simple machining operations.
3	To impart training on plane turning, groove cutting, form turning, taper turning, facing and thread cutting.	Conduct cutting force measurements.
4	To physically study machine tools and basic machining processes like milling, grinding etc.	Know the fundamental settings of milling machines and drilling machines.
5	To practice metal cutting in milling machines, tool-grinder machines, cylindrical grinding machines and surface grinding machines.	Understand the working of gear cutting mechanism and indexing.
6	To conduct measurement of metal cutting forces	Understand the machining operations like grinding and planing

EE335: ELECTRICAL & ELECTRONICS LAB COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To give a practical knowledge on the working of electrical machines including dc machines, transformers, induction motors and synchronous motors.	At the end of this course the students will be able to test and validate DC generators, DC motors and Transformers.
2	It also gives the basics about design and implementation of small electronic circuits	Students will have the basic knowledge on working of semiconductor devices.
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COURSE OBJECTIVES AND COURSE OUTCOMES FOR S3

MECHANICAL

MAT201: PARTIAL DIFFERENTIAL EQUATIONS AND COMPLEX ANALYSIS

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	Basic ideas of partial differential equations which are widely used in the modeling.	Understand the concept and the solution of partial differential equation.
2	Basic idea of partial differential equation analysis of a wide range of physical phenomena and has got application across all branches of engineering.	Analyse and solve one dimensional wave equation and heat equation.
3	To understand the basic theory of functions of a complex variable, residue integration and conformal transformation.	Understand complex functions, its continuity differentiability with the use of CauchyRiemann equations.
		Evaluate complex integrals using Cauchy's integral theorem and Cauchy's integral formula, understand the series expansion of analytic function
		Understand the series expansion of complex function about a singularity and Apply residue theorem to compute several kinds of real integrals.

MET201: MECHANICS OF SOLIDS COURSE

1. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To acquaint with the basic concepts of stress and deformation in solids.	Understand basic concepts of stress and strain in solids.
2	To practice the methodologies to analyse stresses and strains in simple structural members, and to apply the results in simple design problems.	Determine the stresses in simple structural members such as shafts, beams, columns etc. and apply these results in simple design problems.
3	To study about shear force and bending moment of beams loaded in different conditions.	Determine principal planes and stresses, and apply the results to combined loading case.
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MET 203: MECHANICS OF FLUIDS

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To study the mechanics of fluid motion.	Calculate pressure variations in accelerating fluids using Euler's and Bernoulli's equations
2	To establish fundamental knowledge of basic fluid mechanics and address specific topics relevant to simple applications involving fluids	Become conversant with the concepts of flow measurements and flow through pipes
3	To familiarize students with the relevance of fluid dynamics to many engineering systems	Apply the momentum and energy equations to fluid flow problems.
4		Evaluate head loss in pipes and conduits.
5		Use dimensional analysis to design physical or numerical experiments and to apply dynamic similarity

MET205: METALLURGY AND MATERIALS SCIENCE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To provide fundamental science relevant to materials.	Identify the crystal structures of metallic materials.
2	To provide physical concepts of atomic radius, atomic structure, chemical bonds, crystalline and non-crystalline materials and defects of crystal structures, grain size, strengthening mechanisms, heat treatment of metals with mechanical properties and changes in structure.	Analyze the binary phase diagrams of alloys Fe-Fe₃C, etc.
3	To enable students to be more aware of the behavior of materials in engineering applications and select the materials for various	Correlate the microstructure with properties, processing and performance of metals.

	engineering applications.	
4	To understand the causes behind metal failure and deformation.	Recognize the failure of metals with structural change.
5	To determine properties of unknown materials and develop an awareness to apply this knowledge in material design.	Select materials for design and construction.
6		Apply core concepts in materials science to solve engineering problems.

HUT200: Professional Ethics

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To enable students to create awareness on ethics.	Understand the core values that shape the ethical behaviour of a professional.
2	To enable students to create awareness on human values	Adopt a good character and follow an ethical life.
3		Explain the role and responsibility in technological development by keeping personal ethics and legal ethics.
4		Solve moral and ethical problems through exploration and assessment by established experiments.
		Apply the knowledge of human values and social values to contemporary ethical values and global issues.

MCN201: SUSTAINABLE ENGINEERING COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To have an increased awareness among students on issues in areas of sustainability.	Able to appreciate and explain the different types of environmental pollution problems and their sustainable solutions
2	To have an insight into global environmental issues.	To be aware of problem related to global environmental issues
3	To establish a clear understanding of the role and impact of various aspects of engineering and engineering decisions on environmental, societal, and economic problems.	Able to apply the concepts of sustainability in their respective area of specialization
4	To understand the role of engineering in achieving sustainable world	To understand the need of waste disposal and management

MEL201: COMPUTER AIDED MACHINE DRAWING

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To introduce students to the basics and standards of engineering drawing related to machines and components.	Acquire the knowledge of various standards and specifications about standard machine components.
2	To teach students technical skills regarding assembly, production and part drawings.	Make drawings of assemblies with the help of part drawings given.
3	To familiarize students with various limits, fits and tolerances.	Ability to select, configure and synthesize mechanical components into assemblies.
4	To help students gain knowledge about standard CAD packages on modeling and drafting.	Apply the knowledge of fits and tolerances for various applications.
5		Able to model components of their choice using CAD software.
6		Get exposure to advanced CAD packages.

MEL203: MATERIAL TESTING LAB COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To provide knowledge on mechanical behaviour of materials	Acquire the knowledge on mechanical behaviour of materials
2	To acquaint with the experimental methods to determine the mechanical properties of materials.	Conduct experiments determine the mechanical properties of materials.

COURSE OBJECTIVES AND COURSE OUTCOMES FOR S1

MECHANICAL

MAT 101: LINEAR ALGEBRA AND CALCULUS

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To give the definition of an infinite series and explain what is meant by the sequence of partial sums. Relate the convergence or divergence of the series to the sequence of partial sums.	Solve the consistent system of linear equations and apply orthogonal to a quadratic form
2	Compute partial derivatives of functions of several variables. Apply the theorem on mixed partial derivatives.	Find the maxima and minima of multivariable functions
3	Use concepts of calculus to the model real-world problems	Find areas and volumes of geometrical shapes, mass and centre of gravity of plane laminas using double and triple integrals
4	Evaluate volumes of bounded solids and areas of bounded regions by using the ideas of double and triple integrals.	Perform various tests to determine whether a given series is convergent, absolutely convergent or conditionally convergent
5	Apply the concept of line integral to work and circulation. Know the definition and properties of conservative vector fields and their relationship to gradient fields.	Determine the power series expansion of a given function
6	Prepare the student for future Engineering positions	Solve the consistent system of linear equations and apply orthogonal to a quadratic form

CYT 100 : ENGINEERING CHEMISTRY

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To enable the students to acquire knowledge in the concepts of chemistry for engineering applications which enable them to develop abilities and skills that are relevant to the study and practice of chemistry.	Apply the basic concepts of electrochemistry and corrosion to explore its possible applications in various engineering fields.
2	Familiarize the students with different application oriented topics like spectroscopy, electrochemistry, instrumental methods etc.	Apply the basic concepts of electrochemistry and corrosion to explore its possible applications in various engineering fields.
3	Familiarize the students with topics like mechanism of corrosion, corrosion prevention methods, SEM, stereochemistry, polymers, desalination etc.,	Apply the knowledge of analytical method for characterizing a chemical mixture or a compound. Understand the basic concept of SEM for surface characterisation of nanomaterials. CO 4 Learn about the basics of stereochemistry and its application.
4	Enable them to develop abilities and skills that are relevant to the study and practice of chemistry.	Apply the knowledge of conducting polymers and advanced polymers in engineering
5		Study various types of water treatment methods to develop skills for treating wastewater

EST100: ENGINEERING MECHANICS

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	Goal of this course is to expose the students to the fundamental concepts of mechanics and enhance their problem-solving skills..	Recall principles and theorems related to rigid body mechanics
2	It introduces students to the influence of applied force system and the geometrical properties of the rigid bodies while stationary or in motion.	Identify and describe the components of system of forces acting on the rigid body
3	After this course students will be able to recognize similar problems in real-world situations and respond accordingly	Apply the conditions of equilibrium to various practical problems involving different force system.
4	To develop simple mathematical model for engineering problems and carry out static analysis.	Choose appropriate theorems, principles or formulae to solve problems of mechanics
		Solve problems involving rigid bodies, applying the properties of distributed areas and masses

EST130: BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	equip the students with an understanding of the fundamental principles of electrical engineering	Apply fundamental concepts and circuit laws to solve simple DC electric circuits
2	provide an overview of evolution of electronics, and introduce the working principle and examples of fundamental electronic devices and circuits	Develop and solve models of magnetic circuits
3	provide an overview of evolution of communication systems, and introduce the basic concepts in radio communication.	Apply the fundamental laws of electrical engineering to solve simple ac circuits in steady state
		Describe working of a voltage amplifier
		Outline the principle of an electronic instrumentation system
		Explain the principle of radio and cellular communication

SL 130 ELECTRICAL & ELECTRONICS WORKSHOP

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	Electrical Workshop is intended to impart skills to plan and carry out simple electrical wiring.	Demonstrate safety measures against electric shocks.
2	It is essential for the practicing engineers to identify the basic practices and safety measures in electrical wiring.	Identify the tools used for electrical wiring, electrical accessories, wires, cables, batteries and standard symbols
3	Work in a team with good interpersonal skills	Develop the connection diagram, identify the suitable accessories and materials necessary for wiring simple lighting circuits for domestic buildings
		Identify and test various electronic components
		Draw circuit schematics with EDA tools Assemble and test electronic circuits on boards

CYL 120 ENGINEERING CHEMISTRY LAB

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To impart scientific approach and to familiarize with the experiments in chemistry relevant for research projects in higher semesters	Develop skills relevant to synthesize organic polymers and acquire the practical skill to use TLC for the identification of drugs
2	Understand and practice different techniques of quantitative chemical analysis to generate experimental skills and apply these skills to various analyses	Develop the ability to understand and explain the use of modern spectroscopic techniques for analysing and interpreting the IR spectra and NMR spectra of some organic compounds
3	Acquire the ability to understand, explain and use instrumental techniques for chemical analysis	Learn to design and carry out scientific experiments as well as accurately record and analyze the results of such experiments
		Function as a member of a team, communicate effectively and engage in further learning. Also understand how chemistry addresses social, economical and environmental problems and why it is an integral part of curriculum

2018-2019

Even Semester

COURSE OBJECTIVES AND COURSE OUTCOMES FOR S8

MECHANICAL

ME402: Design of Machine Elements-II

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To provide basic design methods for clutches, brakes, belt drives, bearings, gears and connecting rod.	Apply design procedures for industrial requirements.
2	To introduce the design modifications to be considered for ease of manufacturing	Design machine components to ease the manufacturing limitations

ME404: INDUSTRIAL ENGINEERING COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	Apply engineering principles to the work environment	An ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities
2	Use quality tools and data to anticipate and solve issues in the engineering process	An ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies
3	Work collaboratively	An ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes
4	Be employed as a practicing engineer in fields such as design, research, development, testing, manufacturing,	An ability to design systems, components, or processes for broadly-defined engineering

	operations and service systems	technology problems appropriate to program educational objectives
5	Assume positions of leadership and responsibility within an organization	An ability to function effectively as a Member or leader on a technical team
6		An ability to identify, analyze, and solve broadly-defined engineering technology problems

ME 476: MATERIAL HANDLING & FACILITIES PLANNING

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To understand the overall facilities planning process	Identify the value of facility planning on the strategy of a firm. Develop a systematic plant layout
2	To educate product, process and schedule design and their effects on the facility layout	Analyse the safety and environmental aspects in facilities planning
3	To introduce concepts of material handling and safety in industries	Understand various material handling systems and classification of material handling equipment Selection and Maintenance of material handling equipment with safety and ergonomics aspects

CE469: ENVIRONMENTAL IMPACT ASSESSMENT

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To know the various types of environment <input type="checkbox"/>	The students will gain basic knowledge of various impacts
2	To make aware the impact due to various types of pollutants and their assessment technique	

ME452: PROJECT, VIVA-VOCE COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To do a detailed study on a selected topic based on current journals or published papers.	Acquire the basic skills to perform literature survey and present papers
2	To impart the ability to perform as an individual as well as a team member in completing a project work.	Acquire communication skills and improve their leadership quality as well as the ability to work in groups.
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COURSE OBJECTIVES AND COURSE OUTCOMES FOR S6

MECHANICAL

ME312: METROLOGY & INSTRUMENTATION COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To understand the basic principles of measurements.	To know about quality control and quality assurances.
2	To learn the various linear and angular measuring equipments, their principle of operation and applications.	To design a sensors and transducers used for measurements.
3	To learn about various methods of measuring Mechanical parameters.	To understand the importance of quality in engineering products.
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ME304: DYNAMICS OF MACHINERY COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To impart knowledge on force analysis of machinery,	Develop the design and practical problem solving skills in the area of mechanisms
2	To impart knowledge on balancing Of rotating and reciprocating masses	The students will be able to perform dynamic force analysis
3	To impart knowledge on Gyroscopes, Energy fluctuation in Machines	The students will be able to design fly wheels
4	To introduce the fundamentals of vibration, n analysis of single degree of freedom systems.	The students will be able to design governors. The students will be able to analyze gyroscopic effect in various real world problems
5	To understand the physical significance and design of vibration systems with desired conditions	The students will be able to perform dynamic balancing of rotating as well as reciprocating parts of machines.
6		Understand the basics of vibration and apply the concepts in design.

ME308: COMPUTER AIDED DESIGN COURSE

1. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
	On completion of course the students will be able to:	
1	To equip students with fundamentals of computer aided design and to provide elementary algorithms in computer graphics and finite element analysis for basic engineering Problems	Students successfully completing this course are expected to have basic knowledge in computer aided design, capability to prepare fundamental graphics algorithms and solve basic structural problems using finite element method.
2	To introduce the student to the basic tools of computer-aided design (CAD) and computer-aided manufacturing (CAM).	Be able to use a commercial CAD/CAM software package as an engineering tool
3	To expose the student to contemporary computer design tools for aerospace and mechanical engineers.	Integrate the role of graphic communication in the engineering design process
4	To prepare the student to be an effective user of a CAD/CAM system.	Generate and interpret engineering technical drawings of parts and assemblies according to engineering design standards.
5		Use CAD software to generate a computer

		model and technical drawing for a simple, well-defined part or assembly.
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ME302: HEAT AND MASS TRANSFER COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To introduce a basic study of the phenomena of heat and mass transfer, to develop methodologies for solving a wide variety of practical engineering problems,	Understand the basic laws of heat transfer.
2	To apply analytical and numerical methods to solve conduction problems.	Apply principles of heat and mass transfer to basic engineering systems
3	To combine thermodynamics and fluid mechanics principles to analyze heat convection processes.	Demonstrate general knowledge of heat transfer [conduction, convection, radiation], and general knowledge of mass transfer [molecular diffusion, convection].
4	To provide useful information concerning the performance and design complex heat transfer	Analyse the performance and design of heat exchangers.

	applications, such as heat exchangers and fins	
5	To integrate radiation aspects into real-world global heat transfer problems.	Design heat and mass transfer processes and Equipment
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ME306: ADVANCED MANUFACTURING TECHNOLOGY

Sl No	Course objectives	Subject Learning Outcomes or Course Outcome
		On completion of the course, students will be able to:
1	To introduce machining principles and processes in the manufacturing of precision components and products that use conventional and nonconventional technologies.	Become conversant with the non- traditional machining process and to appreciate the effect of process parameters on the surface integrity aspects during the non- traditional machining process.
2	To give basic understanding of the machining capabilities, limitations, and productivity of advanced manufacturing processes.	Appreciate the use of an EDM as a non-traditional method of machining complex and hard materials
3	To describe how PLC's operate and how they control automated equipment and systems	Prescribe a laser materials processing technique suitable for a given product with material, size, precision, and surface quality requirements.
4	To demonstrate tool path simulations with CNC powered equipment	Program and operate a CNC mill and lathe.

5	To introduce CNC programming	Select the tool material and machining process parameters.
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ME 368: MARKETING MANAGEMENT

SI No	Course objectives	Subject Learning Outcomes or Course Outcome
		On completion of the course, students will be able to:
1	To introduce the concept of market and marketing	state the role and functions of marketing within a range of organizations.
2	To give idea about launching a new product	describe key marketing concepts, theories and techniques for analyzing a variety of marketing situations
3	To introduce the various marketing strategies	identify and demonstrate the dynamic nature of the environment in which marketing decisions are taken
4		identify and demonstrate the dynamic nature of the environment in which marketing decisions are taken
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ME332: COMPUTER AIDED MODELLING & ANALYSIS LAB COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To train the students in Solid Modelling and Assembly of machine parts.	At the end of the course, students shall be able to understand various phases in engineering design process through modelling, assembly and finite element analysis.
2	To practice finite element approach in the design of engineering systems.	
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ME 334: MACHINE TOOLS II LAB COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To acquaint with milling machines, grinding machines and drilling machines and to impart training on these machines.	At the end of the course, the students will be familiar with the various operations using milling machines, grinding machines, drilling machines and CNC machines.
2	To acquaint with CNC machines and to impart training on these machines.	Students will be able to develop practical knowledge in advanced machine tools like Shapping machine, Milling machine etc
3	To introduce the students to various welding techniques.	Students will be able to apply fundamental knowledge and principles in material removal processes
4		Ability to develop fundamental knowledge in indexing process for manufacturing gears and cutting slots
5		Students will create models using Milling, Shapping and Slotting processes as per the design
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COURSE OBJECTIVES AND COURSE OUTCOMES FOR S4

MECHANICAL

MAT202: PROBABILITY, STATISTICS AND NUMERICAL METHODS

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	This course introduces students to the modern theory of probability and statistics, covering important models of random variables and techniques of parameter estimation and hypothesis testing.	Understand the concept, properties and important models of discrete random variables and, using them, analyse suitable random phenomena.
2	A brief course in numerical methods familiarises students with some basic numerical techniques for finding roots of equations, evaluating definite integrals	Understand the concept, properties and important models of continuous random variables and, using them, analyse suitable random phenomena.
3		Perform statistical inferences concerning characteristics of a population based on attributes of samples drawn from the population

4		Compute roots of equations, evaluate definite integrals and perform interpolation on given numerical data using standard numerical techniques
5		Apply standard numerical techniques for solving systems of equations, fitting curves on given numerical data and solving ordinary differential equations.

MET202: THERMODYNAMICS COURSE

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To understand basic thermodynamic principles and laws	Understand the laws of thermodynamics and their significance
2	To develop the skills to analyze and design thermodynamic systems.	Apply the principles of thermodynamic for the analysis of thermal systems
3	To enable students to be more aware of the behavior of materials in engineering applications and select the materials for various engineering applications based on their thermal properties.	Understand the applications of thermodynamics
4	To understand the thermal devices completely	Recognize the relations exhibited in thermodynamics.
5	To determine thermal properties of unknown materials and develop an awareness to apply this knowledge in material design.	Select materials for applications as per their thermal properties.

MET 204: MANUFACTURING PROCESS

I. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	<p>To gain theoretical and practical knowledge in material casting processes and develops an understanding of the dependent and independent variables which control materials casting in a production processes.</p>	<p>Illustrate the basic principles of foundry practices and special casting processes, their advantages, limitations and applications.</p>
2	<p>Provide a detailed discussion on the welding process and the physics of welding. Introduce students to different welding processes weld testing and advanced processes to be able to appreciate the practical applications of welding.</p>	<p>Categorize welding processes according to welding principle and material.</p>
3	<p>The course will also provide methods of analysis allowing a mathematical/physical description of forming processes.</p>	<p>Understand requirements to achieve sound welded joint while welding different similar and dissimilar engineering materials.</p>
4	<p>Correlate the material type with the possible fabrication processes</p>	<p>Student will estimate the working loads for pressing, forging, wire drawing etc. processes</p>

5	Generate solutions to problems that may arise in manufacturing engineering	Recommend appropriate part manufacturing processes when provided a set of functional requirements and product development constraints.
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MCN202: CONSTITUTION OF INDIA

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	The study of their own country constitution and studying the importance environment as well as understanding their own human rights help the students to concentrate on their day to day discipline	Explain the background of the present constitution of India and features.
2	Gives the knowledge and strength to face the society and people.	Utilize the fundamental rights and duties.
3		Understand the working of the union executive, parliament and judiciary.
4		Understand the working of the state executive, legislature and judiciary.

5		Utilize the special provisions and statutory institutions.
6		Show national and patriotic spirit as responsible citizens of the country

MET206: FLUID MACHINERY

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To introduce students, the fundamental concepts related to the mechanics of fluids.	Knowledge on basic concepts of fluid properties.
2	To understand the basic principles of fluid machines and devices.	Analyze flow problems associated with statics, kinematics and dynamics of fluids.
3	To apply acquired knowledge on real life problems.	Use Euler's and Bernoulli's equations and the conservation of mass to determine velocities, pressures, and accelerations for incompressible and inviscid fluids.
4	To analyze existing fluid systems and design new fluid systems.	Understand the concepts of viscous boundary layers and the momentum integral.
5		Design and analyze fluid devices such as water turbines and pumps.
6		Understand and rectify problems faced in practical cases of engineering applications.

EST 200: DESIGN AND ENGINEERING

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
	Introduce the undergraduate engineering students the fundamental principles of design engineering,	Explain the different concepts and principles involved in design engineering.
	Make them understand the steps involved in the design process and	Apply design thinking while learning and practicing engineering.
	Familiarize them with the basic tools used and approaches in design. Students are expected to apply design thinking in learning as well as while practicing engineering, which is very important and relevant for today.	Develop innovative, reliable, sustainable and economically viable designs incorporating knowledge in engineering
	Case studies from various practical situations will help the students realize that design is not only concerned about the function but also many other factors like customer requirements, economics, reliability, etc.	
	Along with a variety of life cycle issues. The course will help students to consider aesthetics, ergonomics and sustainability factors in designs and also to practice professional ethics while designing.	

MEL 204: MACHINE TOOLS LAB- I

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To understand the parts of various machine tools and impart hands on experience on lathe, drilling, shaping, milling, slotting, grinding, tool and cutter grinding machines.	The students can operate different machine tools with understanding of work holders and operating principles to produce different part features to the desired quality.
2	To develop knowledge and importance of metal cutting parameters such as feed, velocity and depth of cut etc on cutting force and surface roughness obtainable.	Apply cutting mechanics to metal machining based on cutting force and power consumption.
3	To develop fundamental knowledge on tool materials, cutting fluids and tool wear Mechanisms.	Select appropriate machining processes and process parameters for different metals.
4	To apply knowledge of basic mathematics to calculate the machining parameters for different machining processes.	Fabricate and assemble various metal components by welding and students will be able to visually examine their work and that of others for discontinuities and defects.
5	To study process parameters and practice on arc and gas welding technologies.	Infer the changes in properties of steel on annealing, normalizing, hardening and tempering.
6	To gain knowledge on the structure, properties, heat treatment, testing and applications of ferrous and non ferrous metals	

MEL202: FM & HM LAB

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	This lab is mainly focused to develop a platform where the students can enhance their engineering knowledge in the fluid mechanics domain by applying their theoretical knowledge acquired.	Determine the coefficient of discharge of flow measuring devices (notches, orifice meter and Venturi meter)
2		Calibrate flow measuring devices (notches, orifice meter and Venturi meter)
3		Evaluate the losses in pipes
4		Determine the metacentric height and stability of floating bodies
5		Determine the efficiency and plot the characteristic curves of different types of pumps and turbines

COURSE OBJECTIVES AND COURSE OUTCOMES FOR S2

MECHANICAL

MAT 102: VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND TRANSFORMS

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	This course introduces the concepts and applications of differentiation and integration of vector valued functions, differential equations, Laplace and Fourier Transforms. The topics treated in this course have applications in all branches of engineering.	Apply computing integrals of scalar and vector field over surfaces in three-dimensional space.
2	The objective of this course is to familiarize the prospective engineers with some advanced concepts and methods in Mathematics which include the Calculus of vector valued functions, ordinary differential equations and basic transforms such as Laplace and Fourier Transforms which are invaluable for any engineer's mathematical tool box.	Apply Laplace transforms to solve physical problems arising in engineering
3	The topics treated in this course have applications in all branches of engineering.	Solve homogeneous and non-homogeneous linear differential equation with constant coefficients
		Apply Laplace transforms to solve physical problems arising in engineering
		Apply Fourier transforms to solve physical problems arising in engineering

PHT 100 ENGINEERING PHYSICS B

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	The aim of the Engineering Physics Program is to offer students a solid background in the fundamentals of Physics and to impart that knowledge in engineering disciplines.	Compute the quantitative aspects of waves and oscillations in engineering systems.
2	The program is designed to develop scientific attitudes and enable the students to correlate the concepts of Physics with the core programmes	Apply the interaction of light with matter through interference, diffraction and identify these phenomena in different natural optical processes and optical instruments.
3	Use concepts of calculus to the model real-world problems	Analyze the behaviour of matter in the atomic and subatomic level through the principles of quantum mechanics to perceive the microscopic processes in electronic devices.
		Classify the properties of magnetic materials and apply vector calculus to static magnetic fields and use Maxwell's equations to diverse engineering problems
		Analyze the principles behind various superconducting applications, explain the working of solid state lighting devices and fibre optic communication system

EST110: ENGINEERING GRAPHICS

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To enable the student to effectively perform technical communication through graphical representation as per global standards.	Draw the projection of points and lines located in different quadrants
2	Learn to sketch and take field dimensions.	Prepare multi view orthographic projections of objects by visualizing them in different positions
3	Learn to take data and transform it into graphic drawings.	Draw sectional views and develop surfaces of a given object
4	Learn basic Auto Cad skills.	Prepare pictorial drawings using the principles of isometric and perspective projections to visualize objects in three dimensions.
5	Learn basic engineering drawing formats	Convert 3D views to orthographic views
6	Prepare the student for future Engineering positions	Obtain multiview projections and solid models of objects using CAD tools

EST 120 BASICS OF CIVIL AND MECHANICAL ENGINEERING

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To provide an insight and inculcate the essentials of Civil Engineering discipline to the students of all branches of Engineering and to provide the students an illustration of the significance of the Civil Engineering Profession in satisfying the societal needs.	Recall the role of civil engineer in society and to relate the various disciplines of Civil Engineering. Describe the importance, objectives and principles of surveying.
2	To design a system component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.	Explain different types of buildings, building components, building materials and building construction.
3	To introduce the students to the basic principles of mechanical engineering.	Summarise the basic infrastructure services MEP, HVAC, elevators, escalators and ramps. Discuss the Materials, energy systems, water management and environment for green buildings. Describe the working of hydraulic machines. Explain the working of power transmission elements. Describe the basic manufacturing, metal joining and machining processes.
4	To apply knowledge of mathematics, science, and engineering to mechanical engineering problems.	Analyse thermodynamic cycles and calculate its efficiency. Illustrate the working and features of IC Engines. Explain the basic principles of Refrigeration and Air Conditioning.
5	To provide an insight and inculcate the essentials of Civil Engineering discipline to the students of all branches of Engineering and to provide the students an illustration of the significance of the Civil Engineering Profession in satisfying the societal needs.	Recall the role of civil engineer in society and to relate the various disciplines of Civil Engineering. Describe the importance, objectives and principles of surveying.

EST102 COMPUTER PROGRAMMING

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	Understand important concepts of C programming, pre-processor directives, data types, operators, input and output, control statements	<p>Analyze a computational problem and develop an algorithm/flowchart to find its solution.</p> <p>Able to develop simple C programs for performing calculations like area of rooms, volume of a vessel etc.</p> <p>Able to develop programs for multiplication and addition tables, simple menu driven applications</p>
2	Introduce arrays, strings, structure and union, enumerated data types, sorting and searching	<p>Develop readable* C programs with branching and looping statements, which uses Arithmetic, Logical, Relational or Bitwise operators.</p> <p>Able to develop programs for sorting and searching simple things</p> <p>Write readable C programs which use pointers for array processing and parameter passing</p>
3	Provide the concept of pointers and give brief idea about its application storage classes,	Write readable C programs with arrays, structure or union for storing the the data to be processed

HUN102 - PROFESSIONAL COMMUNICATION

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	Clear, precise, and effective communication has become a sine qua non in today's information-driven world given its interdependencies and seamless connectivity.	Develop vocabulary and language skills relevant to engineering as a profession.
2	Any aspiring professional cannot but master the key elements of such communication.	Analyze, interpret and effectively summarize a variety of textual content.
3	The objective of this course is to equip students with the necessary skills to listen, read, write, and speak so as to comprehend and successfully convey any idea, technical or otherwise, as well as give them the necessary polish to become persuasive communicators.	Create effective technical presentations. Discuss a given technical/non-technical topic in a group setting and arrive at generalizations/consensus
		Identify drawbacks in listening patterns and apply listening techniques for specific needs
		Create professional and technical documents that are clear and adhering to all the necessary conventions

ESL 102 BASICS OF CIVIL AND MECHANICAL ENGINEERING

Sl. No.	Course Objectives	Subject Learning Outcomes or Course Outcomes
		On completion of course the students will be able to:
1	To provide an insight and inculcate the essentials of Civil Engineering discipline to the students of all branches of Engineering and to provide the students an illustration of the significance of the Civil Engineering Profession in satisfying the societal needs.	Recall the role of civil engineer in society and to relate the various disciplines of Civil Engineering. Describe the importance, objectives and principles of surveying.
2	To design a system component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.	Explain different types of buildings, building components, building materials and building construction.
3	To introduce the students to the basic principles of mechanical engineering.	Summarise the basic infrastructure services MEP, HVAC, elevators, escalators and ramps. Discuss the Materials, energy systems, water management and environment for green buildings. Describe the working of hydraulic machines. Explain the working of power transmission elements. Describe the basic manufacturing, metal joining and machining processes.
4	To apply knowledge of mathematics, science, and engineering to mechanical engineering problems.	Analyse thermodynamic cycles and calculate its efficiency. Illustrate the working and features of IC Engines.