ESWAR COLLEGE OF ENGINEERING

(Approved by AICTE, & Affiliated to JNTUK, A.P.)
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DEPARTMENT OF MECHANICAL ENGINEERING

Course Outcomes

A.Y:2021-2022

II.B.TECH I SEM

Course Name:	**VECTOR CALCULUS FOURIER TRANSFORMS and PDE (M-III)**
Course Code:ME2101	**Course Outcomes**
ME2101.1	Interpret the physical meaning of different operators such as gradient, curland divergence
ME2101.2	Estimate the work done against a field ,circulation and fluxusing vector calculus
ME2101.3	Apply the Laplace transform for solving differential equations
ME2101.4	Find or compute the Fourier series of periodic signals
ME2101.5	Know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms (L3)
ME2101.6	identifysolutionmethodsforpartialdifferentialequationsthatmodelphysicalprocesses(L3)

Course Name:	**MECHANICS OF SOLIDS**
Course Code:ME2102	**Course Outcomes**
ME2102.1	Model & Analyze the behavior of basic structural members subjected to various loading and support conditions based on principles of equilibrium.
ME2102.2	Understand the apply the concept of stress and strain to analyze and design structural members and machine parts under axial, shear and bending loads, moment and torsional moment.
ME2102.3	Students will learn all the methods to analyze beams, columns, frames for normal, shear, and torsion stresses and to solve deflection problems in preparation for the design of such structural components.
ME2102.4	Students are able to analyse beams and draw correct and complete shear and bending moment diagrams for beams.
ME2102.5	Students attain a deeper understanding of the loads, stresses, and strains acting on a structure and their relations in the elastic behavior
ME2102.6	Design and analysis of Industrial components like pressure vessels.

Course Name:	**Fluid Mechanics& Hydraulic Machines**
Course Code:ME2103	**Course Outcomes**
ME2103.1	The basic concepts of fluid properties.
ME2103.2	The mechanics of fluids in static and dynamic conditions
ME2103.3	Boundary layer theory, flow separation

ME2103.4	Boundary layer theory dimensional analysis
ME2103.5	Hydrodynamic forces of jet on vanes in different positions.
ME2103.6	Working Principles and performance evaluation of hydraulic pump and turbines.

Course Name:	**PRODUCTION TECHNOLOGY**
Course Code:ME2104	**Course Outcomes**
ME2104.1	Design patterns, Gating, runner and riser systems
ME2104.2	Select a suitable casting process based on the component
ME2104.3	Learn various arc and solid state welding processes and select a suitable process based on the application and requirements
ME2104.4	Understand various bulk deformation processes
ME2104.5	Understand various sheet metal forming and processing of plastics
ME2104.6	Know the different types of manufacturing processes

Course Name:	**KINEMATICS OF MACHINERY**
Course Code:ME2105	**Course Outcomes**
ME2105.1	Contrive a mechanism for a given plane motion with single degree of freedom
ME2105.2	Suggest and analyze a mechanism for a given straight line motion
ME2105.3	Suggest and analyze a mechanism for a given automobile steering motion
ME2105.4	Analyze the motion(velocity and acceleration) of a plane mechanism
ME2105.5	Suggestandanalyzemechanismsforaprescribedintermittentmotionlikeopeningand closing of IC engine valves etc
ME2105.6	Select a power transmission system for a given application and analyze motion of different transmission systems

Course Name:	**COMPUTER AIDED ENGINEERING DRAWING PRACTICE**
Course Code: ME2106	**Course outcomes:**
ME2106.1	To understand the basic principles and conventions of engineering drawing
ME2106.2	To use drawing as a communication mode
ME2106.3	To generate pictorial views using CAD software
ME2106.4	To understand the development of surfaces
ME2106.5	To visualize engineering components

ME2106.6	Knowledge on recent tools

Course Name:	**FLUID MECHANICS & HYDRAULIC MACHINES LAB**
Course Code:ME2107	**Course Outcomes**
ME2107.1	To gain practical exposure on the performance evaluation methods of Turbine flow meter
ME2107.2	To gain practical exposure on the performance evaluation methods of Venturi meter
ME2107.3	To gain practical exposure on the performance evaluation methods of Pelton wheel
ME2107.4	To gain practical exposure on the performance evaluation methods of Francis turbine
ME2107.5	To gain practical exposure on the performance evaluation methods of Reciprocating pump
ME2107.6	To gain practical exposure on the performance evaluation methods of Centrifugal pump

Course Name:	**PRODUCTION TECHNOLOGY LAB**
Course Code:ME2108	**Course Outcomes**
ME2108.1	Design and manufacture simple patterns
ME2108.2	Understanding the properties of moulding sands
ME2108.3	Understand the concept of mould preparation
ME2108.4	Fabricate joints using arc welding.
ME2108.5	Practice on sheet metal operations
ME2108.6	Fabricate joints using Resistant welding.

Course Name:	**DRAFTING AND MODELLING LAB**
Course Code: ME2109L	**Course Outcomes**
ME2109L.1	Able to use software like AutoCAD, Invertor/ Pro E/ Unigraphics.
ME2109L.2	Learned basic concept to drawing, edit, dimension, hatching etc. to develop 2D Modelling.
ME2109L.3	Learned basic concept to drawing, edit, dimension, hatching etc. to develop 3D Modelling.
ME2109L.4	Able to make 3D assembling of different machine components
ME2109L.5	Able to make 3D modelling, modification & manipulation along with detailing.
ME2109L.6	Able to prepare surface modelling and sheet metal operations through various

	exercises

Course Name:	**ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE**
Course Code: ME2109L	**Course Outcomes**
ME2109L.1	Understand the concept of Traditional knowledge and its importance
ME2109L.2	Know the need and importance of protecting traditional knowledge
ME2109L.3	Know the various enactments related to the protection of traditional knowledge
ME2109L.4	Understand the concepts of Intellectual property to protect the traditional knowledge
ME2109L.5	traditional knowledge in different sector
ME2109L.6	basic principle of third process reasoning and inference sustainability is at the course of Indian traditional knowledge system

II YEAR II SEM

Course Name:	**Material Science and Metallurgy**
Course Code: ME2201	**Course Outcomes**
ME2201.1	Understand the crystalline structure of different metals and study the stability of phases in different alloy systems
ME2201.2	Study the behaviour of ferrous and non- ferrous metals and alloys and their application in different domains
ME2201.3	Able to understand the effect of heat treatment
ME2201.4	Understand the effect of addition of alloying elements on properties of ferrous metals
ME2201.5	Grasp the methods of making the metal powders and the applications of powder metallurgy
ME2201.6	Comprehend the properties and applications of ceramics, composites and other advanced methods

Course Name:	**Complex Variables and Statistical Methods**
Course Code: ME2202	Course Outcomes
ME2202.1	apply Cauchy-Riemann equations to complex functions in order to determine whether a given continuous function is analytic
ME2202.2	find the differentiation and integration of complex functions used in engineering problems
ME2202.3	make use of the Cauchy residue theorem to evaluate certain integrals
ME2202.4	apply discrete and continuous probability distributions

ME2202.5	design the components of a classical hypothesis test
ME2202.6	infer the statistical inferential methods based on small and large sampling tests

Course Name:	**DYNAMICS OF MACHINERY**
Course Code: ME2203	Course Outcomes
ME2203.1	To compute the frictional losses and transmission in clutches, brakes and dynamometers
ME2203.2	To determine the effect of gyroscopic couple in motor vehicles, ships and aeroplanes
ME2203.3	To analyze the forces in four bar and slider crank mechanisms and design a fly wheel
ME2203.4	To determine the rotary unbalanced mass in reciprocating equipment
ME2203.5	To determine the unbalanced forces and couples in reciprocating and radial engines
ME2203.6	To determine the natural frequencies of discrete systems undergoing longitudinal, torsional and transverse vibrations.

Course Name:	**THERMAL ENGINEERING-I**
Course Code: ME2204	Course Outcomes
ME2204.1	Derive the actual cycle from fuel-air cycle and air-standard cycle for all practical applications
ME2204.2	Explain working principle and various components ofIC engine
ME2204.3	Explain combustion phenomenon ofCI and SI engines and their impact on engine variables
ME2204.4	Analyze the performance of an IC engine based on the performance parameters
ME2204.5	Explain the cycles and systems of a gas turbine and determine the efficiency of gas turbine.
ME2204.6	Explain the applications and working principle of rockets and jet propulsion.

Course Name:	**INDUSTRIALENGINEERINGANDMANAGEMENT**
Course Code: ME2205	Course Outcomes
ME2205.1	Design and conduct experiments, analyse, interpret data and synthesize valid conclusions

ME2205.2	Design a system, component, or process, and synthesize solutions to achieve desired needs
ME2205.3	Use the techniques, skills, and modern engineering tools necessary for engineering practice with appropriate
ME2205.4	considerations for public health and safety, cultural, societal, and environmental constraints
ME2205.5	Function effectively within multi-disciplinary teams and understand the fundamental precepts of effective project management
ME2205.6	Explain and implement various job evaluation methods. Evaluate the overall cost of production for a product.

Course Name:	**MECHANICS OF SOLIDS & METALLURGY LAB**
Course Code:ME2206	**Course Outcomes**
ME2206.1	To observe and understand the microstructure of Mild steel.
ME2206.2	To observe and understand the microstructure of Medium carbon steel.
ME2206.3	To observe and understand the microstructure of High carbon steel
ME2206.4	To study the microstructure of Cast Irons and Nonferrous alloys
ME2206.5	To evaluate the hardness of various materials using
ME2206.6	To determine the hardenability of steels by Jominy End Quench test.

Course Name:	**MACHINE DRAWING**
Course Code:	**Course outcomes:**
ME2207.1	Identify the national and international standards pertaining to machine drawing
ME2207.2	Apply limits and tolerances to assemblies and choose appropriate fits
ME2207.3	Recognize machining and surface finish symbols
ME2207.4	Explain the functional and manufacturing datum
ME2207.5	Illustrate various machine components through drawings.
ME2207.6	knowledge of fastening arrangements such as welding, riveting the different styles of attachment for shaft.

Course Name:	**THEORY OF MACHINES LAB**
Course Code: ME3108L	**Course outcomes:**
ME3108L.1	Explain and discus inversions of four bar, single slider and double slider chain. Steering Mechanisms- Davis and Ackerman;

ME3108L.2	Explain and demonstrate cam and followers arrangements available in laboratory and plot displacement v/s angle of rotation curve for these.
ME3108L.3	Determine co-efficient of friction of different materials using two roller oscillating arrangement and differentiate among.
ME3108L.4	Describe, discuss and differentiate various types of dynamometers, Brakes, Clutches and Gear boxes with their applications
ME3108L.5	Explain the principle and verify the practical vs. theoretical torque relation for gyroscope and its applications.
ME3108L.6	Explain static and dynamic balancing

Course Name:	**PYTHON PROGRAMMING LAB**
Course Code:	**Course Outcomes**
CSAI2102L.1	Solve the different methods for linear
CSAI2102L.2	Non-linear and differential equations.
CSAI2102L.3	Learn the PYTHON Programming language
CSAI2102L.4	Familiar with the strings in PYTHON.
CSAI2102L.5	Familiar with the matrices in PYTHON
CSAI2102L.6	Write the Program scripts and functions in PYTHON to solve the methods

III B.TECH I SEM

Course Name:	**DYNAMICS OF MACHINERY**
Course Code: ME3101	**Course Outcomes**
ME3101.1	To compute the frictional losses and transmission in clutches, brakes and dynamometers
ME3101.2	To determine the effect of gyroscopic couple in motor vehicles, ships and aeroplanes
ME3101.3	To analyze the forces in four bar and slider crank mechanisms and design a flywheel
ME3101.4	To determine the rotary unbalanced mass in reciprocating equipment
ME3101.5	To determine the unbalanced forces and couples in reciprocating and radial engines
ME3101.6	To determine the natural frequencies of discrete systems undergoing longitudinal, torsional and transverse vibrations.

Course Name:	**Design of Machine Members-II**
Course Code: ME3102	**Course Outcomes**

ME3102.1	gives the insight of slider and roller bearings and the life prediction
ME3102.2	Select the suitable bearing based on the application of the loads and predict the life of the bearing.
ME3102.3	Design of IC Engines parts.
ME3102.4	Design of power transmission elements such as gears, belts, chains, pulleys, ropes, levers and power screws.
ME3102.5	Design spur & helical gear for different engineering applications.
ME3102.6	Design the mechanical systems for power transmission such as gears, belts, ropes, chains, keys and levers

Course Name:	**MECHANICAL MEASUREMENTS & METROLOGY**
Course Code: ME3103	**Course Outcomes**
ME3103.1	Describe the construction and working principles of measuring instruments for measurement of displacement and speed and select appropriate instrument for a given application.
ME3103.2	Describe the construction and working principles of measuring instruments for strain, force, Torque, power, acceleration and Vibration and select appropriate instrument for a given application.
ME3103.3	Explain shaft basis system and hole basis systems for fits and represent tolerances for a given fit as per the shaft basis system and hole basis system and design limit gauges based on the tolerances for quality check in mass production.
ME3103.4	Explain methods for linear, angle and flatness measurements and select a suitable method and its relevant instrument for a given application.
ME3103.5	To measure the threads, gear tooth profiles, surface roughness and flatness using appropriate instruments and analyze the data.
ME3103.6	Principles of measuring instruments and gauges and their uses

Course Name:	**MANAGERIAL ECONOMICS AND FINANCIAL ACCOUNTANCY**
Course Code: ME3104	**Course Outcomes**
ME3104.1	The Learner can able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.
ME3104.2	The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product.
ME3104.3	The knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs.
ME3104.4	The pupil is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units.
ME3104.5	The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis.
ME3104.6	understand the nature of markets, Methods of Pricing in the different market

	structures and to know the different forms of Business organization and the concept of Business Cycles

Course Name:	**IC ENGINES & GAS TURBINES**
Course Code: ME3105	**Course Outcomes**
ME3105.1	CO1: Derive the actual cycle from fuel-air cycle and air- standard cycle for all practical applications.
ME3105.2	CO2: Explain working principle and various components of IC engine
ME3105.3	CO3: Explain combustion phenomenon of CI and SI engines and their impact on engine variables.
ME3105.4	CO4: Analyze the performance of an IC engine based on the performance parameters.
ME3105.5	CO5: Explain the cycles and systems of a gas turbine and determine the efficiency of gas turbine.
ME3105.6	CO6: Explain the applications and working principle of rockets and jet propulsion.

Course Name:	**THERMAL ENGINEERING LAB**
Course Code: ME3106L	**Course Outcomes**
ME3106L.1	Experiment with two stroke and four stroke compression and spark ignition engines for various characteristics
ME3106L.2	Experiment with two stroke and four stroke compression and spark ignition engines for various characteristics.
ME3106L.3	Perform engine friction, heat balance test, volumetric efficiency, load test of petrol and diesel engines.
ME3106L.4	Perform speed test, performance test and cooling temperature on petrol and diesel engines.
ME3106L.5	Utilize air compressor for its performance test and to determine efficiency.
ME3106L.6	Discuss the principles through assembly and disassembly of 2/3 wheelers, 2/4 stroke engines, tractor, heavy duty engines, boilers and their mountings and accessories.

Course Name:	**THEORY OF MACHINES LAB**
Course Code: ME3107L	**Course Outcomes**
ME3107L.1	Explain and discus inversions of four bar, single slider and double slider chain. Steering Mechanisms- Davis and Ackerman;
ME3107L.2	Explain and demonstrate cam and followers arrangements available in laboratory and plot displacement v/s angle of rotation curve for these.

ME3107L.3	Determine co-efficient of friction of different materials using two roller oscillating arrangement and differentiate among.
ME3107L.4	Describe, discuss and differentiate various types of dynamometers, Brakes, Clutches and Gear boxes with their applications
ME3107L.5	Explain the principle and verify the practical vs. theoretical torque relation for gyroscope and its applications.
ME3107L.6	Explain static and dynamic balancing

Course Name:	**MECHANICAL MEASUREMENTS & METROLOGY LAB**
Course Code: ME3108L	**Course Outcomes**
ME3108L.1	To gain knowledge of Calibration experiments with Pressure gauge , Strain gauge
ME3108L.2	To gain knowledge of Calibration experiments with rotameter, Seismic apparatus
ME3108L.3	To gain knowledge of Calibration experiments with Vernier calipers, micrometer, Height gauge and Dial gauges
ME3108L.4	To gain knowledge of Calibration experiments with resistance temperature detector
ME3108L.5	To analyse various machine tools for their alignment
ME3108L.6	To measure angular and taper measurement

III B.TECH II SEM

Course Name:	**OPERATIONS RESEARCH**
Course Code: ME3201	**Course Outcomes**
ME3201.1	Apply the basics of operations research and linear programming problems.
ME32012	Apply the knowledge in solving problems of transportation, assignment and sequencing.
ME3201.3	Judge there placement and gametheories
ME3201.4	Judge the replacement and game theories and apply the knowledge to solve problems
ME3201.5	Discuss the waiting line models and project management techniques.
ME3201.6	Apply the knowledge in solving problems of dynamic programming and simulation.

Course Name:	**HEAT TRANSFER**
Course Code: ME3202	**Course Outcomes**

ME3202.1	Compute rate of heat transfer for 1D, steady state composite systems without heat generation.
ME3202.2	Analyze the system with heat generation, variable thermal conductivity, fins and 1D transient conduction heat transfer problems.
ME3202.3	Develop the empirical equations for forced convection problems by using Buckingham's pi theorem.
ME3202.4	Compute the rate of heat transfer for natural convection systems and design and analysis of heat exchangers.
ME3202.5	Solve the heat transfer systems with phase change and radiation.
ME3202.6	understand different modes of heat transfer and apply these basics in the design of thermal systems

Course Name:	**CAD/CAM**
Course Code: ME3203	**Course Outcomes**
ME3203.1	Identify the various elements and their activities in the Computer Integrated Manufacturing Systems.
ME3203.2	Describe the mathematical basis in the technique of representation of geometric entities including points, lines, and parametric curves, surfaces and solid, and the technique of transformation of geometric entities using transformation matrix
ME3203.3	Describe the use of GT and CAPP for the product development
ME3203.4	understand the different geometric modeling techniques like solid modeling, surface modeling, feature based modeling etc. and to visualize how .5the components look like before its manufacturing or fabrication
ME3203	K.nowledge onthe part programming, importance of group technology, computer aided process planning, computer aided quality control
ME3203	learn the overall configuration and elements of computer integrated manufacturing systems

Course Name:	**UNCONVENTIONAL MACHINING PROCESSES**
Course Code: ME3204C	**Course Outcomes**
ME3204C.1	Perform experiments in the advanced unconventional machining processes such as laser beam machining and electron beam machining
ME3204C.2	Understand the characteristics and importance of different types of unconventional machining processes
ME3204C.3	Identify the appropriate unconventional machining process for the implementation in a typical industrial scenario based on the applications
ME3204C.4	Understand the significance of tools and resources used for machining the components in unconventional machining
ME3204C.5	Machine the components through ECM / EDM and other machining processes

ME3204C.6	Knowledge fundamentals and operational behaviors of different types of unconventional / nontraditional machining processes

Course Name:	**AUTOMOBILE ENGINEERING**
Course Code: ME3205C	**Course Outcomes**
ME3205C.1	Discuss various components of four wheeler automobile
ME3205C.2	Apply the knowledge of different parts of transmission system
ME3205C.3	Judge about Steering system
ME3205C.4	Judge about Suspension system
ME3205C.5	Justify the braking system and electrical system used in automobiles
ME3205C.6	Analyse the concepts about engine specifications and service, safety and electronic systems used in automobiles

Course Name:	**SIMULATION OF MECHANICAL SYSTEMS LAB**
Course Code: ME3206L	**Course Outcomes**
ME3206L.1	Knowledge on Mechanical Rotational System with stick-slip motion, Linkage Mechanism & Steering Mechanism using MATLAB/SCILAB
ME3206L.2	Solving the Mass-Spring-Damper with controller using MATLAB/SCILAB
ME3206L.3	determining on Double Mass-Spring- Damper using MATLAB/SCILAB
ME3206L.4	Solving the Simple Mechanical System using MATLAB/SCILAB
ME3206L.5	Knowledge on Mechanical System with Translational Friction using MATLAB/SCILAB
ME3206L.6	Knowledge on Mechanical System with Translational Hard stop using MATLAB/SCILAB

Course Name:	**HEAT TRANSFER LAB**
Course Code: ME3207L	**Course Outcomes**
ME3207L.1	Determine the heat transfer rate and coefficient.
ME3207L.2	Determine the thermal conductivity, efficiency and effectiveness
ME3207L.3	Determine the emissivity and Stefan Boltzman constant.
ME3207L.4	Determine critical heat flux and investigate Lambert's cosine law
ME3207L.5	Experiment with Virtual labs and analyze conduction, HT coefficient
ME3207L.6	Experiment with Virtual labs and investigate Lambert's laws.

Course Name:	**CAD /CAM LAB**
Course Code: ME3208L	**Course Outcomes**
ME3208L.1	able to appreciate the utility of the tools like ANSYS or FLUENT in solving real time problems and day to day problems.
ME3208L.2	Use of these tools for any engineering and real time applications
ME3208L.3	Acquire knowledge on utilizing these tools for a better project in their curriculum
ME3208L.4	Acquire knowledge on industry problems with confidence
ME3208L.5	developing skills in CAD software like AutoCAD and Creo to create 2D and 3D parts
ME3208L.6	performing analysis with ANSYS, developing CNC programs

IV B.TECH I SEM

Course Name:	**MECHATRONICS**
Course Code: ME4101	**Course outcomes:**
ME4101.1	Understand key elements of Mechatronics system, representation into block diagram
ME4101.2	Understand concept of transfer function, reduction and analysis
ME4101.3	Understand principles of sensors, its characteristics, interfacing with DAQ microcontroller
ME4101.4	Understand the concept of PLC system and its ladder programming, and significance of PLC systems in industrial application
ME4101.5	Understand the system modeling and analysis in time domain and frequency domain.
ME4101.6	Understand control actions such as Proportional, derivative and integral and study its significance in industrial applications

Course Name:	**CAD/CAM**
Course Code: ME4102	**Course outcomes:**
ME4102.1	Describe the mathematical basis in the technique of representation of geometric entities including points, lines, and parametric curves, surfaces and solid, and the technique of transformation of geometric entities using transformation matrix
ME4102.2	Describe the use of Group Technologyt
ME4102.3	Knowledge CAPP for the product development
ME4102.4	Identify the various elements and their activities in the Computer Integrated Manufacturing Systems.

ME4102.5	Explain fundamental and advanced features of CNC machines
ME4102.6	Illustrate Group Technology, CAQC and CIM concepts

Course Name:	**FINITE ELEMENT METHODS**
Course Code: ME4103	**Course outcomes:**
ME4103.1	Understand the concepts behind variational methods and weighted residual methods in FEM
ME4103.2	Identify the application and characteristics of FEA elements such as bars, beams, plane and isoparametric elements, and 3-D element
ME4103.3	Develop element characteristic equation procedure and generation of global stiffness equation will be applied.
ME4103.4	Able to apply Suitable boundary conditions to a global structural equation, and reduce it to a solvable form.
ME4103.5	Able to identify how the finite element method expands beyond the structural domain, for problems involving dynamics, heat transfer, and fluid flow.
ME4103.6	Upon completion of this course, the students can able to understand different mathematical Techniques used in FEM analysis and

Course Name:	**POWER PLANT ENGINEERING**
Course Code: ME4104	**Course outcomes:**
ME4104.1	Basic knowledge of Different types of Power Plants, site selection criteria of each one of them
ME4104.2	Understanding of Thermal Power Plant Operation, turbine governing, different types of high pressure boilers including supercritical and supercharged boilers, Fluidized bed combustion systems
ME4104.3	Design of chimney in thermal power plants, knowledge of cooling tower operation, numerical on surface condenser design
ME4104.4	Basic knowledge of Different types of Nuclear power plants including Pressurized water reactor, Boiling water reactor, gas cooled reactor, liquid metal fast breeder reactor
ME4104.5	Understanding of Power Plant Economics, Energy Storage including compressed air energy and pumped hydro etc
ME4104.6	Discussing environmental and safety aspects of power plant operation

Course Name:	**ADDITIVE MANUFACTURING**
Course Code: ME4105C	**Course outcomes:**
ME4105C.1	Demonstrate appropriate level of understanding on principles of additive manufacturing processes

ME4105C.2	Choose appropriate materials for additive manufacturing processes
ME4105C.3	Apply suitable CAD tools and CAD interface for additive manufacturing process
ME4105C.4	Develop physical prototypes by identifying suitable process with optimum process parameters
ME4105C.5	Demonstrate the knowledge of Additive Manufacturing and Rapid Prototyping technologies.
ME4105C.6	Discuss fundamentals of Reverse Engineering.

Course Name:	**ADVANCED MATERIALS**
Course Code: ME4106A	**Course outcomes:**
ME4106A.1	Demonstrate the Properties of constituents, classification of composites and their suitability for the structural applications.
ME4106A.2	Demonstrate the Manufacturing processes.
ME4106A.3	Demonstrate the Smart materials and their applications.
ME4106A.4	Demonstrate the Nano materials in comparison with bulk materials.
ME4106A.5	Understand the mechanics of different materials. This understanding will include concepts such as anisotropic material behaviour
ME4106A.6	Constituent properties and manufacturing processes of different composites. Suitability of smart and nano materials for engineering applications.

Course Name:	**CAD/CAM LAB**
Course Code: ME4107L	**Course outcomes:**
ME4107L.1	Able to appreciate the utility of the tools like ANSYS or FLUENT in solving real time problems and day to day problems.
ME4107L.2	Use of these tools for any engineering and real time applications
ME4107L.3	Acquire knowledge on utilizing these tools for a better project in their curriculum
ME4107L.4	Acquire knowledge on industry problems with confidence
ME4107L.5	Developing skills in CAD software like AutoCAD and Creo to create 2D and 3D parts
ME4107L.6	Performing analysis with ANSYS, developing CNC programs

Course Name:	**MECHATRONICS LAB**
Course Code: ME4108L	**Course outcomes:**
ME4108L.1	Understand the Characteristics of LVDT
ME4108L.2	Measure load, displacement and temperature using analogue and digital

	sensors.
ME4108L.3	Develop PLC programs for control of traffic lights, water level, lifts and conveyor belts.
ME4108L.4	Simulate and analyze PID controllers for a physical system using MATLAB.
ME4108L.5	Develop pneumatic and hydraulic circuits using Automaton studio.
ME4108L.6	Design, Simulate & Analyze on AUTOMATION STUDIO SOFTWARE

IV B.TECH II SEM

Course Name:	**PRODUCTION PLANNING AND CONTROL**
Course Code: ME4201	**Course outcomes:**
ME4201.1	To understand the different types of production systems and the internal organization of production planning and control.
ME4201.2	To estimate forecasts in the manufacturing and service sectors using selected quantitative and qualitative techniques.
ME4201.3	To understands the importance and function of inventory and to be able to apply for its control
ME4201.4	To understands the importance and function of inventory and to be able to apply for its management
ME4201.5	To apply routing procedures and differentiate schedule and loading and interpret scheduling policies and aggregate planning
ME4201.6	To understand dispatching procedure and applications of computers in production planning and control.

Course Name:	**AUTOMOBILE ENGINEERING**
Course Code: ME4203	**Course outcomes:**
ME4203.1	Discuss various components of four wheeler automobile
ME4203.2	Apply the knowledge of different parts of transmission system
ME4203.3	Judge about Steering system
ME4203.4	Judge about Suspension system
ME4203.5	Justify the braking system and electrical system used in automobiles
ME4203.6	Analyse the concepts about engine specifications and service, safety and electronic systems used in automobiles

Course Name:	**NON - DESTRUCTIVE EVALUATION**
Course Code:	**Course outcomes:**
ME4204.1	Comprehensive, theory based understanding of the techniques and methods of radio graphic technique
ME4204.2	Comprehensive, theory based understanding of the techniques and methods of Ultrasonic test
ME4204.3	Comprehensive, theory based understanding of the techniques and methods of Liquid Penetrant Test
ME4204.4	Comprehensive, theory based understanding of the techniques and methods of Eddy Current Test

ME4204.5	Comprehensive, theory based understanding of the techniques and methods of Eddy Current Test &Infrared And Thermal Testing
ME4204.6	Apply methods knowledge of non destructive testing to evaluate products of railways, automobiles, aircrafts, chemical industries etc.

Course Name:	**UNCONVENTIONAL MACHINING PROCESSES**
Course Code: ME4202	**Course outcomes:**
ME4202.1	Understand the concepts of modern machining processes. .
ME4202.2	Learn the principles of ultrasonic machining.
ME4202.3	Apply the principles and procedure of electro chemical and processes.
ME4202.4	Apply the principles and procedure of chemical machining processes
ME4202.5	Apply the principles and procedure of thermal metal removal processes
ME4202.6	Illustrate the principles and procedure of electron beam machining, laser beam machining and plasma machining.