ESWAR COLLEGE OF ENGINEERING

(Approved by AICTE, & Affiliated to JNTUK, A.P.)

KESANUPALLI (V), NARASARAOPETA-522549, AP

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DEPARTMENT OF MECHANICAL ENGINEERING

Course Outcomes

A.Y:2020-2021

Year/Sem: II B.Tech I SEM

Course Name:	
Course Code: ME2101	**Course outcomes:**
ME2101.1	Interpret the physical meaning of different operators such as gradient, curl and divergence
ME2101.2	Estimate the work done against a field, circulation and flux using 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
ME2101.6	Identify solution methods for partial differential equations that model physical processes

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	learn all the methods to analyze beams, columns, frames for normal, shear, and torsion stresses
ME2102 .4	solve deflection problems in preparation for the design of such structural components able to analyse beams and draw correct and complete shear and bending moment diagrams for beams.
ME2102 .5	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:	
Course Code: ME2103	**Course outcomes:**
ME2103.1	Understand the crystalline structure of different metals and study the stability of phases in different alloy systems
ME2103.2	Study the behavior of ferrous and non ferrous metals and alloys and their application in different domains

ME2103.3	Able to understand the effect of heat treatment, addition of alloying elements on properties of ferrous metals
ME2103.4	Able to understand the addition of alloying elements on properties of ferrous metals
ME2103.5	Grasp the methods of making of metal powders and applications of powder metallurgy
ME2103.6	Comprehend the properties and applications of ceramic, composites and other advanced methods.

Course Name:	
Course Code: ME2104	**Course outcomes:**
ME2104.1	Able to design the patterns and core boxes for metal casting processes
ME2104.2	Able to design the gating system for different metallic components
ME2104.3	Know the different types of manufacturing processes
ME2104.4	Know the different types of FOUNDRY PROCESSES
ME2104.5	Be able to use forging, extrusion processes
ME2104.6	Learn about the different types of welding processes used for special fabrication.

Course Name:	
Course Code: ME2105	**Course outcomes:**
ME2105.1	Undergoing the Basic concepts of thermodynamics
ME2105.2	Undergoing the Laws of thermodynamics
ME2105.3	Undergoing the Concept of entropy
ME2105.4	Undergoing the THERMODYNAMIC RELATIONS
ME2105.5	Property evaluation of vapors and their depiction in tables and charts
ME2105.6	Evaluation of properties of perfect gas mixtures.

Course Name:	
Course Code: ME2107	**Course outcomes:**
ME2107.1	Draw and represent standard dimensions of different mechanical fasteners and joints and Couplings.
ME2107.2	Draw different types of bearings showing different components
ME2107.3	Assemble components of a machine part and draw the sectional assembly drawing showing the dimensions of all the components of the assembly as per bill of materials

ME2107.4	Methods of dimensioning, general rules for sizes and placement of dimensions for holes, centers, curved tapered features and surface finish indication
ME2107.5	To prepare manufacturing drawings indicating fits, tolerances, surface finish and surface treatment requirements
ME2107.6	Select and represent fits and geometrical form of different mating parts in assembly drawings

Course Name:	**METALLURGY& MECHANICS OF SOLIDS LAB**
Course Code: ME2108L	**Course outcomes:**
ME2108L.1	To observe and understand the microstructure of Mild steel.
ME2108L.2	To observe and understand the microstructure of Medium carbon steel.
ME2108L.3	To observe and understand the microstructure of High carbon steel
ME2108L.4	To study the microstructure of Cast Irons and Nonferrous alloys
ME2108L.5	To evaluate the hardness of various materials using
ME2108L.6	To determine the hardenability of steels by Jominy End Quench test.

Course Name:	**PRODUCTION TECHNOLOGY LAB**
Course Code: ME2109L	**Course outcomes:**
ME2109L .1	Design and manufacture simple patterns
ME2109L .2	Understanding the properties of moulding sands
ME2109L .3	Understand the concept of mould preparation
ME2109L .4	Fabricate joints using arc welding.
ME2109L .5	Practice on sheet metal operations
ME2109L .6	Fabricate joints using Resistant welding.

Course Name:	**ENVIRONMENTAL SCIENCE**
Course Code: ME2110	**Course outcomes:**
ME2110.1	Overall understanding of the natural resources.
ME2110.2	Basic understanding of the ecosystem and its diversity.
ME2110.3	Acquaintance on various environmental challenges induced due to unplanned anthropogenic activities
ME2110.4	Knowledge on bidervisity and its conservation
ME2110.5	An understanding of the environmental impact of developmental activities.
ME2110.6	Awareness on the social issues, environmental legislation and global treaties.

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II B.TECH II SEM

Course Name:	**COMPLEX VARIABLES & STATISTICAL METHODS**
Course Code: ME2201	**Course outcomes:**
ME2201.1	Apply Cauchy-Riemann equations to complex functions in order to determine whether a given continuous function is analytic (L3)
ME2201.2	Find the differentiation and integration of complex functions used in engineering problems (L5)
ME2201.3	Make use of the Cauchy residue theorem to evaluate certain integrals (L3)
ME2201.4	Apply discrete and continuous probability distributions (L3)
ME2201.5	Design the components of a classical hypothesis test (L6)
ME2201.6	Infer the statistical inferential methods based on small and large sampling tests (L4)

Course Name:	**KINEMATICS OF MACHINERY**
Course Code: ME2202	**Course outcomes:**
ME2202.1	Able to Contrive a mechanism for a given plane motion with single degree of freedom.
ME2202.2	Able to Suggest and analyze a mechanism for a given straight line motion and automobile steering motion.
ME2202.3	Able to Analyze the motion (velocity and acceleration) of a plane mechanism.
ME2202.4	Able to analyze mechanisms for a prescribed intermittent motion like opening and closing of IC engine valves etc.
ME2202.5	Able to Suggest mechanisms for a prescribed intermittent motion like opening and closing of IC engine valves etc.
ME2202.6	Able to Select a power transmission system for a given application and analyze motion of different transmission systems

Course Name:	**APPLIED THERMODYNAMICS**
Course Code: ME2203	**Course outcomes:**
ME2203.1	Expected to learn the working of steam power cycles and also should be able to analyze and evaluate the performance of individual components
ME2203.2	Student is able to learn the principles of combustion , stochiometry and flue gas analysis
ME2203.3	Students will be able to design the components and calculate the losses and efficiency of the boilers, nozzles and impulse turbines**.**
ME2203.4	Students will be able to design the components and calculate the losses and efficiency of reactions turbines and condensers.

ME2203.5	Student is able to learn various types of compressors, principles of working and their performance evaluation.
ME2203.6	study the thermodynamic analysis of major components of Rankine cycle, refrigeration cycles and compressible fluids and to analyze the energy transfers and transformations in these components including individual performance evaluation

Course Name:	**FLUID MECHANICS & HYDRAULIC MACHINES**
Course Code: ME2204	**Course outcomes:**
ME2204.1	The basic concepts of fluid properties.
ME2204.2	The mechanics of fluids in static and dynamic conditions.
ME2204.3	Boundary layer theory, flow separation and dimensional analysis.
ME2204.4	Hydrodynamic forces of jet on vanes in different positions.
ME2204.5	Working Principles and performance evaluation of hydraulic pump and turbines.
ME2204.6	understand the properties of fluids, its kinematic and dynamic behavior through various laws of fluids

Course Name:	**METAL CUTTING & MACHINE TOOLS**
Course Code: ME2205	**Course outcomes:**
ME2205.1	Learned the fundamental knowledge and principals in material removal process.
ME2205.2	Acquire the knowledge on operations in conventional, automatic, Capstan and turret lathes
ME2205.3	capable of understanding the working principles and operations of shaping, slotting, planning , drilling and boring machines.
ME2205.4	able to make gear and keyway in milling machines and understand the indexing mechanisms
ME2205.5	Understand the different types of unconventional machining methods and principles of finishing processes.
ME2205.6	knowledge of basic mathematics to calculate the machining parameters for different machining processes

Course Name:	**DESIGN OF MACHINE MEMBERS – I**
Course Code: ME2206	**Course outcomes:**
ME2206.1	Able to Calculate stresses in different types of springs subjected to static loads and dynamic loads.
ME2206.2	Able to Calculate different stresses in the machine components subjected to various static loads, failures and suitability of a material for an engineering application.
ME2206.3	Able to. Calculate dynamic stresses in the machine components subjected to variable loads.

ME2206.4	able to Design riveted, welded, bolted joints, keys, cotters and knuckle joints subjected to static loads and their failure modes
ME2206.5	Able to Design the machine shafts and suggest suitable coupling for a given application.
ME2206.6	Able to select proper materials to different machine elements based on their physical and mechanical properties

Course Name:	**FLUID MECHANICS & HYDRAULIC MACHINERY LAB**
Course Code: ME2207L	**Course outcomes:**
ME2207L.1	To gain practical exposure on the performance evaluation methods of Turbine flow meter
ME2207L.2	To gain practical exposure on the performance evaluation methods of Venturi meter
ME2207L.3	To gain practical exposure on the performance evaluation methods of Pelton wheel
ME2207L.4	To gain practical exposure on the performance evaluation methods of Francis turbine
ME2207L.5	To gain practical exposure on the performance evaluation methods of Reciprocating pump
ME2207L.6	To gain practical exposure on the performance evaluation methods of Centrifugal pump

Course Name:	**MACHINE TOOLS LAB**
Course Code: ME2209L	**Course outcomes:**
ME2209L.1	Demonstrate about general purpose machine tools in the machine shop.
ME2209L.2	Perform various operations on lathe machine.
ME2209L.3	Perceive different operations on drilling machine.
ME2209L.4	Experiment with basic operations on shaping machine.
ME2209L.5	Utilize slotting machine to make keyways.
ME2209L.6	Experiment with the basic operations on milling machine.

COURSE OUTCOME STATEMENTS

Course Name:	**IPR&P**
Course Code: ME2210	**Course outcomes:**
ME2210.1	Understand the concepts of Intellectual property to protect the traditional knowledge
ME2210.2	Understand the concept of Traditional knowledge and its importance
ME2210.3	Know the need and importance of protecting traditional knowledge
ME2210.4	Know the various enactments related to the protection of traditional knowledge
ME2210.5	knowledge and intellectual property mechanism of traditional knowledge and protection
ME2210.6	importing basic principle of third process reasoning and inference sustainability is at the course of Indian traditional knowledge system

III B.TECH I SEM

Course Name:	**Dynamics of Machinery**
Course Code: ME3101	**Course outcomes:**
ME3101.1	Analyze stabilization of sea vehicles, aircrafts and automobile vehicles
ME3101.2	Compute frictional losses, torque transmission of mechanical systems.
ME3101.3	Analyze dynamic force analysis of slider crank mechanism
ME3101.4	Knowledge and analyse on design of flywheel.
ME3101.5	Understand how to determine the natural frequencies of continuous systems starting from the general equation of displacement.
ME3101.6	Understand balancing of reciprocating and rotary masses.

Course Name:	**METAL CUTTING & MACHINE TOOLS**
Course Code: ME3102	**Course outcomes:**
ME3102.1	Apply cutting mechanics to metal machining based on cutting force and power consumption
ME3102.2	Operate lathe, milling machines, drill press, grinding machines, etc.
ME3102.3	Select cutting tool materials and tool geometries for different metals.
ME3102.4	Select appropriate machining processes and conditions for different metals.
ME3102.5	Learn machining economics & principles of CNC Machines
ME3102.6	Design jigs and Fixtures for simple parts.

Course Name:	**DESIGN OF MACHINE MEMBERS– II**
Course Code: ME3103	**Course outcomes:**
ME3103.1	The student will able to select the suitable bearing based on the application of the loads and predict the life of the bearing
ME3103.2	Design power transmission elements such as gears, belts, chains, pulleys, ropes, levers and power screws.
ME3103.3	Design of IC Engines parts.
ME3103.4	Utilize the knowledge to design power screws.
ME3103.5	Justify power transmission systems and to design pulleys and geardrives.
ME3103.6	Apply the concepts in designing various machine tool elements.

Course Name:	**OPERATIONS RESEARCH**
Course Code: ME3104	**Course outcomes:**
ME3104.1	Apply the basics of operations research and linear programming problems.
ME3104.2	Apply the knowledge in solving problems of transportation, assignment and sequencing.
ME3104.3	Judge there placement and gametheories
ME3104.4	Judge the replacement and game theories and apply the knowledge to solve problems
ME3104.5	Discuss the waiting line models and project management techniques.
ME3104.6	Apply the knowledge in solving problems of dynamic programming and simulation.

Course Name:	**THERMAL ENGINEERING – II**
Course Code: ME3105	**Course outcomes:**
ME3105.1	Explain the basic concepts of thermal engineering and boilers.
ME3105.2	Discuss the concepts of steam nozzles and steam turbines.
ME3105.3	Gain knowledge about the concepts of reaction turbine
ME3105.4	Gain knowledge about the concepts of steam condensers.
ME3105.5	Discuss the concepts of reciprocating and rotary type of compressors.
ME3105.6	Acquire knowledge about the centrifugal and axial flow compressors.

Course Name:	**THEORY OF MACHINES LAB**
Course Code: ME3106L	**Course outcomes:**
ME3106L.1	Explain and discus inversions of four bar, single slider and double slider chain. Steering Mechanisms- Davis and Ackerman;
ME3106L.2	Explain and demonstrate cam and followers arrangements available in laboratory and plot displacement v/s angle of rotation curve for these.
ME3106L.3	Determine co-efficient of friction of different materials using two roller oscillating arrangement and differentiate among.
ME3106L.4	Describe, discuss and differentiate various types of dynamometers, Brakes, Clutches and Gear boxes with their applications
ME3106L.5	Explain the principle and verify the practical vs. theoretical torque relation for gyroscope and its applications.
ME3106L.6	. Explain static and dynamic balancing

Course Name:	**MACHINE TOOLS LAB**
Course Code:	**Course outcomes:**
ME3107L.1	Demonstrate about general purpose machine tools in the machine shop.

ME3107L.2	Perform various operations on lathe machine.
ME3107L.3	Perceive different operations on drilling machine.
ME3107L.4	Experiment with basic operations on shaping machine.
ME3107L.5	Utilize slotting machine to make keyways.
ME3107L.6	Experiment with the basic operations on milling machine.

Course Name:	
Course Code: ME3108L	**Course outcomes:**
ME3108L	Experiment with two stroke and four stroke compression and spark ignition engines for various characteristics
ME3108L	Experiment with two stroke and four stroke compression and spark ignition engines for various characteristics.
ME3108L	Perform engine friction, heat balance test, volumetric efficiency, load test of petrol and diesel engines.
ME3108L	Perform speed test, performance test and cooling temperature on petrol and diesel engines.
ME3108L	Utilize air compressor for its performance test and to determine efficiency.
ME3108L	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:	**IPR & PATENTS**
Course Code:	**Course outcomes:**
ME3109.1	Distinguish and Explain various forms of IPRs.
ME3109.2	Distinguish and Explain various forms of IPRs.
ME3109.3	Apply statutory provisions to protect particular form of IPRs.
ME3109.4	Analyse rights and responsibilities of holder of Patent, Copyright, Trademark, Industrial Designetc.
ME3109.5	Identify procedure to protect different forms of IPRs national and international level
ME3109.6	Develop skill of making search using modern tools and technics.

III B.TECH II SEM

Course Name:	
Course Code: ME3201	**Course outcomes:**
ME3201.1	To describe the concept of metrology
ME3201.2	To explain about metrology instruments and application for various

	measurements.
ME3201.3	To discuss the concept of computer applications in metrology.
ME3201.4	To acquire the principles of various Inspection, Instruments and Methodology.
ME3201.5	To develop the knowledge in the area of non-contact inspection
ME3201.6	able to design tolerances and fits for selected product quality. They can choose appropriate method

Course Name:	**INSTRUMENTATION & CONTROL SYSTEMS**
Course Code:	**Course outcomes:**
ME3202.1	Identify the different types of mechanical instruments.
ME3202.2	Recognise parts of mechanical instruments
ME3202.3	Interpret the types of measurements that can be made with different mechanical instruments
ME3202.4	Measure with mechanical instruments
ME3202.5	select appropriate device for the measurement of parameters like temperature, pressure, speed, stress, humidity, flow velocity etc.,
ME3202.6	justify its use through characteristics and performance.

Course Name:	**REFRIGERATION & AIR CONDITIONING**
Course Code:	**Course outcomes:**
ME3203.1	Calculate the COP of air refrigeration systems
ME3203.2	Describe various components used in vapour-Compression refrigeration system and Estimate the performance
ME3203.3	Discuss the working principles of vapour absorption, steam jet, thermoelectric and vortex tube refrigeration systems
ME3203.4	Recognize the properties of air, summarize the various Psychometric processes and acquire the knowledge of load estimation
ME3203.5	Evaluate cooling and heating loads in an air conditioning and describe the various components of air conditioning system
ME3203.6	undergoing the refrigerating cycles and evaluate their performance

Course Name:	**HEAT TRANSFER**
Course Code: ME3204	**Course outcomes:**
ME3204.1	Understand the basic modes of heat and mass transfer.
ME3204.2	Apply principles of heat and mass transfer to predict transfer coefficients
ME3204.3	Analyze working of various heat transfer equipment
ME3204.4	Design heat and mass transfer equipment.

ME3204.5	Evaluate no. of stages required for given mass transfer problem.
ME3204.6	Analyze the concepts of heat transfer with phase change and condensation along with heat exchangers.

Course Name:	
Course Code: ME3205F	**Course outcomes:**
ME3205F.1	The student shall understand the principles of solar, wind, biomass, geo thermal green energy systems
ME3205F.2	The student shall understand the working of solar, wind, biomass green energy systems
ME3205F.3	The student shall understand the principles and working of geo thermal, ocean energies and green energy systems
ME3205F.4	The student shall understand the principles and working of geo thermal, ocean energies and green energy systems
ME3205F.5	Knowledge their significance in view of their importance in the current scenario and
ME3205F.6	Knowledge potential future applications

Course Name:	**HEAT TRANSFER LAB**
Course Code:	**Course outcomes:**
ME3206L.1	Determine the heat transfer rate and coefficient.
ME3206L.2	Determine the thermal conductivity, efficiency and effectiveness
ME3206L.3	Determine the emissivity and Stefan Boltzman constant.
ME3206L.4	Determine critical heat flux and investigate Lambert's cosine law
ME3206L.5	Experiment with Virtual labs and analyze conduction, HT coefficient
ME3206L.6	Experiment with Virtual labs and investigate Lambert's laws.

Course Name:	**METROLOGY & INSTRUMENTATION LAB**
Course Code: ME3208L	**Course outcomes:**
ME3208L.1	To gain knowledge of Calibration experiments with Pressure gauge , Strain gauge
ME3208L.2	To gain knowledge of Calibration experiments with rotameter, Seismic apparatus
ME3208L.3	To gain knowledge of Calibration experiments with Vernier calipers, micrometer, Height gauge and Dial gauges
ME3208L.4	To gain knowledge of Calibration experiments with resistance temperature detector
ME3208L.5	To analyse various machine tools for their alignment

ME3208L.6	To measure angular and taper measurement

Course Name:	**COMPUTATIONAL FLUID DYNAMICS LABORATORY**
Course Code: ME3209L	**Course outcomes:**
ME3209L.1	Recognize the importance of CFD in Heat and Fluid flow.
ME3209L.2	Analyze forced convection heat transfer coefficient over regular bodies like sphere, cylinder.
ME3209L.3	: Estimation of drag coefficient in circular pipe under turbulent flow and bent pipe.
ME3209L.4	: Recognize how to handling moving boundaries and wall effects in motion of fluid.
ME3209L.5	Analyze how to handle power law fluids in CFD.
ME3209L.6	ability to describe various flow features in terms of appropriate fluid mechanical principles and force balances.

Course Name:	**PROFESSIONAL ETHICS & HUMAN VALUES**
Course Code: ME3209	**Course outcomes:**
ME3209.1	Understanding basic purpose of profession, professional ethics and various moral and social issues.
ME3209.2	Awareness of professional rights and responsibilities of a Engineer, safety and risk benefit analysis of a Engineer
ME3209.3	Acquiring knowledge of various roles of Enbgineer In applying ethical principles at various professional levels
ME3209.4	Professional Ethical values and contemporary issues
ME3209.5	Excelling in competitive and challenging environment to contribute to industrial growth.
ME3209.6	a comprehensive understanding of a variety issues that are encountered by every professional in discharging professional duties.

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.