MEENAKSHI COLLEGE OF ENGINEERING

No. 12, Vembuliamman koil Street, West K.K. Nagar, Chennai-600 078.

DEPARTMENT OF MECHANICAL ENGINEERING

Course Outcomes – Regulation 2017

Course Name: HS8151 - COMMUNICATIVE ENGLISH

CO1	Read articles of a general kind in magazines and newspapers.
CO2	Participate effectively in informal conversations; introduce themselves and theirfriends and express opinions in English
CO3	Comprehend conversations and short talks delivered in English
CO4	Write short essays of a general kind and personal letters and emails in English

Course Name: MA8151 - ENGINEERING MATHEMATICS-I

CO1	Use both the limit definition and rules of differentiation to differentiate functions.
CO2	Apply differentiation to solve maxima and minima problems.
CO3	Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus, also evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts, in addition to determine convergence/divergence of improper integrals and evaluate convergent improper integrals.
CO4	Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.
CO5	Apply various techniques in solving differential equations
CO6	Use both the limit definition and rules of differentiation to differentiate functions.
CO7	Apply differentiation to solve maxima and minima problems.

Course Name: MA8151 - ENGINEERING PHYSICS

CO1	Analyze the elastic nature of materials and be able to choose the materials depending uponthe modulus of elasticity for different applications.
CO2	Illustrate the advantages of optical communication using LASER.
CO3	Explain the conducting properties of solids, liquids, good thermal conductors and bad thermal conductors.
CO4	Apply the knowledge of quantum mechanics and classical mechanics in addressing the problems related to science and technology.
CO5	Describe the crystal structures, crystal defects and various crystal growth techniques.

Course Name: CY8151- ENGINEERING CHEMISTRY

CO1	The knowledge gained on Water Treatment techniques to facilitate better understanding ofIon exchange process, Zeolite process, Desalination and Reverse Osmosis
CO2	The knowledge gained on Surface Chemistry to facilitate better understanding on absorption of gases and Catalysis.
CO3	The knowledge gained on Engineering Materials to facilitate better understanding on Alloys and Heat treatment process
CO4	The knowledge gained on Fuels to facilitate better understanding on its types and Combustion process
CO5	The knowledge gained on Energy Sources and Storage devices to facilitate better understanding of its processes and applications

Course Name: GE8151- PROBLEM SOLVING AND PYTHON PROGRAMMING

CO1	Develop algorithmic solutions to simple computational problems
CO2	Read, write, execute by hand simple Python programs.
CO3	Structure simple Python programs for solving problems.
CO4	Decompose a Python program into functions.
CO5	Represent compound data using Python lists, tuples , dictionaries.
CO6	Read and write data from/to files in Python Programs.

Course Name: GE8152 -ENGINEERING GRAPHICS

CO1	Represent compound data using Python lists, tuples, dictionaries.
CO2	Read and write data from/to files in Python Programs.
CO3	Represent compound data using Python lists, tuples, dictionaries.
CO4	Read and write data from/to files in Python Programs.
CO5	Represent compound data using Python lists, tuples, dictionaries.

Course Name: GE8151- PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY

CO1	Write, test, and debug simple Python programs
CO2	Implement Python programs with conditionals and loops.
CO3	Develop Python programs step-wise by defining functions and calling them
CO4	Use Python lists, tuples, dictionaries for representing compound data
CO5	Read and write data from/to files in Python.

Course Name: BS8161 - PHYSICS AND CHEMISTRY LABORATORY

CO1	Apply the principles of elasticity.
CO2	The knowledge on optics.
CO3	Understood the thermal properties for engineering applications
CO4	Understood the basic principles of laser
CO5	Determine the Thermal conductivity of a bad conductor.
CO6	Estimate the Iron content and molecular weight
CO7	Knowledge on the quantitative chemical analysis of water quality.

Course Name: HS8251 - TECHNICAL ENGLISH

CO1	Read technical texts and write area- specific texts effortlessly.
CO2	Listen and comprehend lectures and talks in their area of specialisation successfully.
CO3	Speak appropriately and effectively in varied formal and informal contexts.
CO4	Write reports and winning job applications

Course Name: MA8251 - ENGINEERING MATHEMATICS- II

CO1	Eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices,Positive definite matrices and similar matrices
CO2	Gradient, divergence and curl of a vector point function and related identities.
CO3	Evaluation of line, surface and volume integrals using Gauss, Stokes and Green'stheorems and their verification.
CO4	Analytic functions, conformal mapping and complex integration.
CO5	Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.

Course Name: PH8251 - MATERIAL SCIENCE

CO1	The students will have knowledge on the various phase diagrams and theirapplications
CO2	The students will acquire knowledge on Fe-Fe3C phase diagram, variousmicrostructures and alloys.
CO3	The students will get knowledge on mechanical properties of materials and theirmeasurement
CO4	The students will gain knowledge on magnetic, dielectric and superconductingproperties of materials
CO5	The students will understand the basics of ceramics, composites and nano materials

Course Name: BE8253- BASIC ELECTRICAL, ELECTRONICS AND INSTRUMENTATION ENGINEERING

CO1	Understand the concepts of Electrical circuits.
CO2	Understand the concepts of AC circuits.
CO3	Understand electric circuits and working principles of electrical machines.
CO4	Understand the concepts of various electronic devices.
CO5	Choose appropriate instruments for electrical measurement for a specificapplication

Course Name: GE8291- ENVIRONMENTAL SCIENCE AND ENGINEERING

CO1	Public awareness of environment at an infant stage.
CO2	Knowledge about the nature and facts about environment.
CO3	Understand the importance of environment by assessing its impact on the humanworld.
CO4	Understand the interrelationship between living organism and environment
CO5	Understand the features of the earth‟s interior and surface.
CO6	The Knowledge on natural resources, pollution control and waste management.

Course Name: GE8292 -ENGINEERING MECHANICS

CO1	Course Outcome Statements
CO2	Illustrate the vectorial and scalar representation of forces and moments
CO3	Analyze the rigid body in equilibrium
CO4	Evaluate the properties of surfaces and solids
CO5	Calculate dynamic forces exerted in rigid body
CO6	Determine the friction and the effects by the laws of friction

Course Name: GE8261 - ENGINEERING PRACTICES LABORATORY

CO1	Fabricate carpentry components and pipe connections including plumbing works.
CO2	Use welding equipment's to join the structures.
CO3	Carry out the basic machining operations
CO4	Make the models using sheet metal works
CO5	Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundry andfittings
CO6	Carry out basic home electrical works and appliances
CO7	Measure the electrical quantities
CO8	Elaborate on the components, gates, soldering practices.

Course Name: BE8261 -BASIC ELECTRICAL, ELECTRONICS AND INSTRUMENTATION ENGINEERING LABORATORY

CO1	Ability to determine the speed characteristic of different electrical machines
CO2	Ability to design simple circuits involving diodes.
CO3	Ability to design transistors.
CO4	Ability to use operational amplifiers.
CO5	Ability to use operational sensors.

Course Name: MA8353- TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS

CO1	Understand how to solve the given standard partial differential equations
CO2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications
CO3	Appreciate the physical significance of Fourier series techniques in solving one- and two-dimensional heat flow problems and one-dimensional wave equations.
CO4	Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering
CO5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems

Course Name: ME8391 -ENGINEERING THERMODYNAMICS

CO1	Apply the zeroth and first law of thermodynamics by formulating temperature scales and calculating the property changes in closed and open engineering systems.
CO2	Apply the second law of thermodynamics in analysing the performance of thermal devices through energy and entropy calculations
CO3	Apply the second law of thermodynamics in evaluating the various properties of steam through steam tables and Mollier chart
CO4	Apply the properties of pure substance in computing the macroscopic properties of ideal and real gases using gas laws and appropriate thermodynamic relations.
CO5	Apply the properties of gas mixtures in calculating the properties of gas mixtures and applying various thermodynamic relations to calculate property changes.

Course Name: CE8394 -FLUID MECHANICS AND MACHINERY

CO1	Apply mathematical knowledge to predict the properties and characteristics of afluid.
CO2	Can analyse and calculate major and minor losses associated with pipe flow inpiping networks.
CO3	Can mathematically predict the nature of physical quantities
CO4	Can critically analyse the performance of pumps
CO5	Can critically analyse the performance of turbines.

Course Name: ME8351 - MANUFACTURING TECHNOLOGY – I

CO1	Explain different metal casting processes, associated defects, merits and demerits
CO2	Compare different metal joining processes
CO3	Summarize various hot working and cold working methods of metals.
CO4	Explain different metal casting processes, associated defects, merits and demeritsCO2
CO5	Distinguish various methods of manufacturing plastic components

Course Name: EE8353- ELECTRICAL DRIVES AND CONTROLS

CO1	Understand the basic concepts of different types of electrical machines and theirperformance
CO2	Knowledge about D.C motors and induction motors.
CO3	Knowledge about the conventional and solid-state drives
CO4	Understanding the conventional and solid-state speed control of D.C drives.
CO5	Understanding the conventional and solid-state speed control of A.C drives.

Course Name: ME8361 -MANUFACTURING TECHNOLOGY LABORATORY – I

CO1	Demonstrate the safety precautions exercised in the mechanical workshop.
CO2	Make the workpiece as per given shape and size using Lathe.
CO3	Join two metals using arc welding.
CO4	Use sheet metal fabrication tools and make simple tray and funnel. Use different moulding tools, patterns and prepare sand moulds
CO5	Make the workpiece as per given shape and size using Lathe.

Course Name: ME8381 **-COMPUTER AIDED MACHINE DRAWING LABORATORY**

CO1	Ability to draw assembly drawings both manually and using standard CADpackages
CO2	Understand and interpret drawings of machine components.
CO3	Follow the drawing standards, Fits and Tolerances.
CO4	Re-create part drawings, sectional views and assembly drawings as per standards
CO5	Knowledge in handling 2D drafting, 3D modeling and Dimensioning.

Course Name: EE8361 -ELECTRICAL ENGINEERING LABORATORY

CO1	Ability to perform speed characteristic of different electrical machine.
CO2	Ability to perform Load test on DC Shunt & DC Series motor.
CO3	Ability to perform Speed control of DC shunt motor.
CO4	Ability to perform O.C & S.C Test on a single phase transformer.
CO5	Ability to perform Load test on three phase squirrel cage Induction motor.
CO6	Ability to perform Speed control of three phase slip ring Induction Motor

Course Name: HS8381 -INTERPERSONAL SKILLS/LISTENING & SPEAKING

CO1	Listen and respond appropriately.
CO2	Participate in group discussions
CO3	Make effective presentations
CO4	Participate confidently and appropriately in conversations both formal and informal

Course Name: MA8452 -STATISTICAL AND NUMERICAL METHODS

CO1	Apply the concept of testing of hypothesis for small and large samples in real life problems.
CO2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.
CO3	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.
CO4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.

Course Name: ME8492 -KINEMATICS OF MACHINERY

CO1	Discuss the basics of mechanism
CO2	Calculate velocity and acceleration in simple mechanisms
CO3	Develop CAM profiles
CO4	Discuss the basics of mechanism
CO5	Calculate velocity and acceleration in simple mechanisms

Course Name: ME8451 - MANUFACTURING TECHNOLOGY – II

CO1	Explain the mechanism of material removal processes.
CO2	Describe the constructional and operational features of centre lathe and otherspecial purpose lathes
CO3	Describe the constructional and operational features of shaper, planner, milling, drilling sawing and broaching machines.
CO4	Explain the types of grinding and other super finishing processes apart from gear manufacturing processes.
CO5	Summarize numerical control of machine tools and write a part program.

Course Name: ME8491 -ENGINEERING METALLURGY

CO1	Explain alloys and phase diagram, Iron-Iron carbon diagram and steel classification.
CO2	Explain isothermal transformation, continuous cooling diagrams and different heattreatment processes.
CO3	Clarify the effect of alloying elements on ferrous and non-ferrous metals
CO4	Summarize the properties and applications of non-metallic materials.
CO5	Explain the testing of mechanical properties.

Course Name: CE8395 -STRENGTH OF MATERIALS FOR MECHANICAL ENGINEERS

CO1	Understand the concepts of stress and strain in simple and compound bars, the importance of principal stresses and principal planes.
CO2	Understand the load transferring mechanism in beams and stress distribution due to shearing force and bending moment
CO3	Apply basic equation of simple torsion in designing of shafts and helical spring
CO4	Calculate the slope and deflection in beams using different methods.
CO5	Analyze and design thin and thick shells for the applied internal and external pressures

Course Name: ME8493 -THERMAL ENGINEERING – I

CO1	Apply thermodynamic concepts of different air standard cycles and solve problems.
CO2	Solve problems in single stage and multistage air compressors.
CO3	Explain the functioning and features of I.C. engines, components and auxiliaries.
CO4	Calculate performance parameters of I.C. Engines.
CO5	Explain the flow in Gas turbines and solve problems.

Course Name: ME8462 -Manufacturing Technology Laboratory – II

CO1	Design different parts of mechanical equipment's
CO2	Apply skills in various designing and manufacturing industries
CO3	Create 2D and 3D models using modeling software's
CO4	Make appropriate selection of CAD functionality to use as tools in the design process
CO5	Communicate effectively the geometry and intent of design features

Course Name: CE8381 - STRENGTH OF MATERIALS AND FLUID MECHANICS AND MACHINERY LABORATORY

CO1	Determine the tensile, torsion and hardness properties of metals by testing
CO2	Determine the stiffness properties of helical and carriage spring
CO3	Apply the conservation laws to determine the coefficient of discharge of aventurimeterand finding the friction factor of given pipe
CO4	Apply the fluid static and momentum principles to determine the metacentric heightand forces due to impact of jet
CO5	Determine the performance characteristics of turbine, rotodynamic pump and positive displacement pump.

Course Name: HS8461-Advanced Reading and Writing

CO1	Read and evaluate different types of texts critically and predict content.
CO2	Write different types of essays using appropriate discourse markers.
CO3	Display critical thinking in various professional contexts.
CO4	Write winning job applications.
CO5	Prepare technical documents like project proposals and statement of purpose

Course Name: ME8595-Thermal Engineering II

CO1	Solve problems in Steam Nozzle
CO2	Explain the functioning and features of different types of Boilers and auxiliaries and Calculate performance parameters.
CO3	Explain the flow in steam turbines, draw velocity diagrams for steam turbines andsolve problems.
CO4	Summarize the concept of Cogeneration, Working features of Heat pumps and Heat Exchangers
CO5	Solve problems using refrigerant table / charts and psychrometric charts

Course Name: ME8593-DESIGN OF MACHINE ELEMENTS

CO1	Explain the influence of steady and variable stresses in machine component design.
CO2	Apply the concepts of design to shafts, keys and couplings.
CO3	Apply the concepts of design to temporary and permanent joints.
CO4	Apply the concepts of design to energy absorbing members, connecting rod andcrank shaft.
CO5	Apply the concepts of design to bearings.

Course Name: ME8501-METROLOGY AND MEASUREMENTS

CO1	Describe the concepts of measurements to apply in various metrologicalInstruments.
CO2	Outline the principles of linear and angular measurement tools used for industrial applications.
CO3	Explain the procedure for conducting computer aided inspection.
CO4	Demonstrate the techniques of form measurement used for industrial components.
CO5	Discuss various measuring techniques of mechanical properties in industrialApplications.

Course Name: ME8594-DYNAMICS OF MACHINES

CO1	Calculate static and dynamic forces of mechanisms.
CO2	Calculate the balancing masses and their locations of reciprocating and rotatingmasses.
CO3	Compute the frequency of free vibration.
CO4	Compute the frequency of forced vibration and damping coefficient.
CO5	Calculate the speed and lift of the governor and estimate the gyroscopic effect on automobiles, ships and airplanes.

Course Name: ME8511-KINEMATICS AND DYNAMICS LABORATORY

CO1	Explain gear parameters and working of lab equipment's.
CO2	Analyze the kinematics of mechanisms, gyroscopic effect and two-dimensional (planar) rigid-body motion.
CO3	Determine mass moment of inertia of mechanical element, governor effort and range sensitivity and compare for different governors.
CO4	Determine the natural frequency and damping coefficient, torsional frequency and critical speeds of shafts.
CO5	Analyze balancing mass of rotating and reciprocating masses and transmissibility ration.

Course Name: ME8512-THERMAL ENGINEERING LABORATORY

CO1	Conduct tests on heat conduction apparatus and evaluate thermal conductivity of materials.
CO2	Conduct tests on natural and forced convective heat transfer apparatus and evaluate heat transfer coefficient.
CO3	Conduct tests on radioactive heat transfer apparatus and evaluate Stefan Boltzmann constant and emissivity.
CO4	Conduct tests to evaluate the performance of parallel/counter flow heat exchanger apparatus and reciprocating air compressor.
CO5	Conduct tests to evaluate the performance of refrigeration and air conditioning test rigs.

Course Name: ME8513-METROLOGY AND MEASUREMENTS LABORATORY

CO1	Measure the gear tooth dimensions, angle using sine bar, straightness and flatness, thread parameters, temperature using thermocouple, force, displacement,torque and vibration.
CO2	Calibrate the vernier, micrometer and slip gauges and setting up the comparator for the inspection.
CO3	Measure the components precisely using non-contact (optical) measurement system.
CO4	Demonstrate the functions of Coordinate measuring machine and surface roughness tester for measuring complex profiles.
CO5	Explain the machine tool metrology equipment's with its measuring technique like straightness using auto collimator, precision level using spindle tests.

Course Name: ME8651-DESIGN OF TRANSMISSION SYSTEMS

CO1	To apply the concepts of design to belts, chains and rope drives
CO2	To apply the concepts of design to spur, helical gears.
CO3	To apply the concepts of design to worm and bevel gears.
CO4	To apply the concepts of design to gear boxes
CO5	To apply the concepts of design to cams, brakes and clutches

Course Name: ME8691- COMPUTER AIDED DESIGN AND MANUFACTURING

CO1	Explain the 2D and 3D transformations, clipping algorithm, Manufacturing modelsand Metrics
CO2	Explain the fundamentals of parametric curves, surfaces and Solids
CO3	Summarize the different types of Standard systems used in CAD
CO4	Apply NC & CNC programming concepts to develop part programme for Lathe &Milling Machines
CO5	Summarize the different types of techniques used in Cellular Manufacturing andFMS

Course Name: ME8693-HEAT AND MASS TRANSFER

CO1	Apply heat conduction equations to different surface configurations under steady state and transientconditions and solve problems
CO2	Apply free and forced convective heat transfer correlations to internal and external flows through/over various surface configurations and solve problems
CO3	Explain the phenomena of boiling and condensation, apply LMTD and NTU methods of thermalanalysis to different types of heat exchanger configurations and
CO4	Explain basic laws for Radiation and apply these principles to radiative heat transfer betweendifferent types of surfaces to solve problems
CO5	Apply diffusive and convective mass transfer equations and correlations to solve problems fordifferent applications

Course Name: ME8692-FINITE ELEMENT ANALYSIS

CO1	Summarize the basics of finite element formulation
CO2	Apply finite element formulations to solve one dimensional Problems
CO3	Apply finite element formulations to solve two dimensional scalar Problems.
CO4	Apply finite element method to solve two-dimensional Vector problems.
CO5	Apply finite element method to solve problems on iso parametric element anddynamic Problems.

Course Name: ME8694-HYDRAULICS AND PNEUMATICS

CO1	Explain the Fluid power and operation of different types of pumps.
CO2	Summarize the features and functions of Hydraulic motors, actuators and Flowcontrol valves
CO3	Explain the different types of Hydraulic circuits and systems
CO4	Explain the working of different pneumatic circuits and systems
CO5	Summarize the various trouble shooting methods and applications of hydraulic andpneumatic systems.

Course Name: ME8091 -AUTOMOBILE ENGINEERING

CO1	To recognize the various parts of the automobile and their functions and materials.
CO2	To discuss the engine auxiliary systems and engine emission control.
CO3	To distinguish the working of different types of transmission systems.
CO4	To explain the Steering, Brakes and Suspension Systems.
CO5	To predict possible alternate sources of energy for IC Engines

Course Name: ME8681-CAD/CAM LABORATORY

CO1	Follow the drawing standards, Fits and tolerence
CO2	Re-create part drawing, Sectional views and assembly drawing as per the standard
CO3	Exhibit ethical principles in engineering practice
CO4	Perform task as an individual and / or team member to manage the task in time
CO5	Express the Engineering activities with effective presentation and report.
CO6	Interpret the findings with appropriate technological / research citation.

Course Name: ME8682-DESIGN AND FABRICATION PROJECT

CO1	Design and Fabricate the machine element or the mechanical product.
CO2	Demonstrate the working model of the machine element or the mechanical product.
CO3	Exhibit ethical principles in engineering practices
CO4	Perform task as an individual and / or team member to manage the task in time
CO5	Express the Engineering activities with effective presentation and report.
CO6	Interpret the findings with appropriate technological / research citation.

Course Name: HS8581-PROFESSIONAL COMMUNICATION

CO1	Develop the employability, career and soft skills.
CO2	Develop their interview etiquette, presentation and GD skills
CO3	Participate confidently in Group Discussions and Job Interviews.
CO4	Attend job interviews and be successful in them

Course Name: ME8791-MECHATRONICS

CO1	Discuss the functions of sensors, actuators and associated control systems.
CO2	Explain the features of microprocessor and microcontroller
CO3	Discuss various programmable peripheral interface for specific applications
CO4	Summarize the functionality of Programmable Logic Controller
CO5	Associate the mechatronics and actuator systems for real time applications
CO6	Discuss the influence of mechatronics systems (microprocessor, microcontroller & PLC) in industrial automation

Course Name: ME8792-POWER PLANT ENGINEERING

CO1	Discuss the layout of thermal power plant and working principle of various types of boilers
CO2	Explain the working of diesel and gas turbine power plant along with optimization technique
CO3	Discuss the various types of nuclear reactors used in nuclear power plant
CO4	Summarize the principles and working of various renewable energy power plants.
CO5	Explain the energy, economic and environmental issues of power plants
CO6	Paraphrase the different types of power plant, its function and issues related to them

Course Name: ME8793-PROCESS PLANNING AND COST ESTIMATION

CO1	Associate the knowledge of engineering fundamentals for process planning
CO2	Distinguish various process planning activities
CO3	Discuss the various elements involved in costing.
CO4	Estimate the product cost of job done by various manufacturing methods
CO5	Estimate the Machining time for various operations carried out in different machines
CO6	Apply the concept of Process planning and cost estimation for various production process

Course Name: LEAN SIX SIGMA

CO1	To Understand the basics of lean six sigma
CO2	To Interpret the tools and Techniques of lean six sigma to improve productivity.
CO3	To Apply the various methods for reducing the failure.
CO4	To Illustrate the tools for implementation and challenges.
CO5	To Determine the Continuous quality improvement.

Course Name: ME8073 -UNCONVENTIONAL MACHINING PROCESSES

CO1	Explain the need for unconventional machining processes and its classification
CO2	Compare various thermal energy and electrical energy based unconventional machining processes
CO3	Summarize various chemical and electro-chemical energy based unconventional machining processes
CO4	Explain various nano abrasives based unconventional machining processes.
CO5	Distinguish various recent trends based unconventional machining processes.

Course Name: ME8097-NON-DESTRUCTIVE TESTING AND EVALUATION

CO1	The student will be able to explain the fundamental concepts of NDT.
CO2	The student will be able to discuss the different methods of NDE.
CO3	The student will be able to explain the concept of Thermography and Eddy currenttesting.
CO4	The student will be able to explain the concept of Ultrasonic Testing and AcousticEmission.
CO5	The student will be able to explain the concept of Radiography.

Course Name: ME8072 -RENEWABLE SOURCES OF ENERGY

CO1	Discuss the importance and economics of renewable energy
CO2	Describe the method of power generation from Solar energy
CO3	Explain the method of power generation from Wind energy
CO4	Elaborate the method of power generation from Bio energy
CO5	Discuss the Tidal energy, Wave Energy, OTEC, Hydro energy, Geothermal Energy,Fuel Cells and Hybrid Systems

Course Name: ME8711-SIMULATION AND ANALYSIS LABOARATORY

CO1	To Analyze the stresses and strains induced in plates, brackets and beams and heattransfer problems
CO2	To calculate the natural frequency and mode shape analysis of 2D components andbeams
CO3	Demonstrate the use of MATLAB software for multi-physic type of problems.

Course Name: ME8781- MECHATRONICS LABOARATORY

CO1	Demonstrate the functioning of mechatronics system with Pneumatic and Hydraulic
CO2	Demonstrate the functioning of mechatronics system with Electrical systems
CO3	Demonstrate the functioning of control system with the help of PLC andmicrocontrollers

Course Name: ME8712-TECHNICAL SEMINAR

CO1	To Understand the various forms of communication Skills.
CO2	To develop the presentation of technical papers or recent advances in context.
CO3	To apply the concepts learned from different journals and Presentation.

Course Name: MG8591-PRINCIPLES OF MANAGEMENT

CO1	The student will be able to discuss the evolution of management, functions and roles of manager
CO2	The student will be able to explain the different types of planning process and tools used for planning.
CO3	The student will be able to elaborate different organization structures and functions of human resources manager
CO4	The student will be able to illustrate the different theories of motivation and leadership.
CO5	The student will be able to describe the control techniques and the role of technology in management

Course Name: IE8693 -PRODUCTION PLANNING AND CONTROL

CO1	Identify production planning and control activities
CO2	Discuss production planning and control activities such as Work Study and TimeStudy
CO3	Analyze production planning & Process Planning activities
CO4	Analyze Various techniques of cost Estimation
CO5	Plan manufacturing requirements planning and enterprise resource planning (ERP).

Course Name: ME8811-PROJECT WORK

CO1	To develop a design for a challenging practical problem to find a solution
CO2	To formulate a proper methodology to derive the solution as a team with confinedtime duration.
CO3	To demonstrate the project work both in oral and written format

Course Name: PRODUCTION TECHNOLOGY FOR AGRICULTURAL MACHINERY

CO1	Summarize various engineering materials, their classifications and their properties
CO2	Explain the constructional and operational features of Centre lathe, Shaper, Planner, Milling, Drilling and Grinding machine
CO3	Compare different metal joining process such as Fusing welding, manual arc welding, Gas tungsten arc welding etc
CO4	Describe the various types of advanced manufacturing processes such as abrasive flow machining, abrasive jet machining, water jet machining, etc.,
CO5	Discuss about constructional features of CNC machining and manual partprogramming in CNC lathe & CNC milling.