Course Outcomes (CO)

(R 2017)

:h: B.E, Mechanical Engineering

l Course Name: HS8151 Communicative English

C101.1	Read articles of a general kind in magazines and newspapers.
C101.2	Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English.
C101.3	Comprehend conversations and short talks delivered in English.
C101.4	Write short essays of a general kind.
C101.5	Write personal letters and emails in English.

Course Name: MA8151 Engineering Mathematics-I

C102.1	Use both the limit definition and rules of differentiation to differentiate functions
C102.2	Apply differentiation to solve maxima and minima problems.
C102.3	Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus. Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts. Determine convergence/divergence of improper integrals and evaluate convergent improper integrals.
C102.4	Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.
C102.5	Apply various techniques in solving differential equations.

03 Course Name: PH8151 Engineering Physics

C103.1	The students will gain knowledge on the basics of properties of matter and its applications
C103.2	The students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics
C103.3	The students will have adequate knowledge on the concepts of thermal properties of the materials and their applications in expansion joints and heat exchangers.
C103.4	The students will get knowledge on advanced physics concepts of quantum theory and its applications in tunnelling microscopes,
C103.5	The students will understand the basics of crystals their structures and different crystal growth techniques.

4 Course Name: CY8151 Engineering Chemistry

C104.1	To make the students conversant with boiler feed water requirements, related problems and water treatment techniques.
C104.2	To develop an understanding of the basic concepts of phase rule and its applications to single and two component systems and appreciate the purpose and significance of alloys.
C104.3	Preparation, properties and applications of engineering materials.
C104.4	Types of fuels, calorific value calculations, manufacture of solid, liquid and gaseous fuels.
C104.5	Principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells.

ourse Name: GE8151 Problem Solving and Python

Programming

C105.1	Develop algorithmic solutions to simple computational problems
C105.2	Read, write, execute by hand simple Python programs.
C105.3	Structure simple Python programs for solving problems.
C105.4	Decompose a Python program into functions.
C105.5	Represent compound data using Python lists, tuples, dictionaries. Read and write data from/to files in Python Programs.

)6 Course Name: GE8152 Engineering Graphics

C106.1	Ability to familiarize with the fundamentals and standards of Engineering graphics
C106.2	Ability to perform freehand sketching of basic geometrical constructions and multiple views of objects
C106.3	Ability to Project orthographic projections of lines and plane surfaces
C106.4	Ability to draw projections of solids and development of surfaces
C106.5	Ability to visualize and to project isometric and perspective sections of simple solids

ourse Name: GE8161 Problem Solving and Python

Programming Lab

C107.1	Write, test, and debug simple Python programs.
C107.2	Implement Python programs with conditionals and loops.
C107.3	Develop Python programs step-wise by defining functions and calling them.
C107.4	Use Python lists, tuples, dictionaries for representing compound data.
C107.5	Read and write data from/to files in Python.

3 Course Name: BS8161 Physics & Chemistry Lab

C108.1	To provide the basic practical exposure to all the engineering and technological streams in the field of physics with properties of matter and liquids.
C108.2	To provide the basic practical exposure to all the engineering and technological streams in the field of optics.
C108.3	The students are able to know about the thermal physics .
C108.4	To gain the knowledge about crystalline materials.
C108.5	To develop the knowledge of fiber optics cables optics and its applications

:109 Course Name: HS8251 Technical English

C109.1	Read technical texts
C109.2	Write area- specific texts effortlessly.
C109.3	Listen lectures in their area of specialization.
C109.4	Comprehend talks in their area of specialisation
C109.5	Speak appropriately and effectively in varied formal and informal contexts.

ourse Name: MA 8251 Engineering Mathematics-II

C110.1	Eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.
C110.2	Gradient, divergence and curl of a vector point function and related identities.
C110.3	Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.
C110.4	Analytic functions, conformal mapping and complex integration.
C110.5	Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.

:111 Course Name: PH8251 Material Science

C111.1	The students will have knowledge on the various phase diagrams and their applications
C111.2	The students will acquire knowledge on Fe-Fe2C phase diagram various microstructures and alloys
C111.3	The students will get knowledge on mechanical properties of materials and their measurements
C111.4	The students will gain knowledge on magnetic dielectric, and superconducting materials and properties of materials
C111.5	The students will understand the basics of ceramics , composites and nano materials

urse Name: BE8253 Basic Electrical, Electronics and

Instrumentation Engineering

C112.1	
C112.2	
C112.3	
C112.4	
C112.5	

e Name: GE8291 Environment science and engineering

C113.1	Public awareness of environment at infant stage.
C113.2	Pollution controlling aids
C113.3	Development and improvement in standard of living has lead to serious environmental disasters.
C113.4	Ignorance and incomplete knowledge has lead to misconceptions. Knowledge about water conservation methods.
C113.5	World's Population related problems and AIDS

4 Course Name: GE8292 Engineering Mechanics

C114.1	Ability to illustrate the vectorial and scalar representation of forces and moments
C114.2	Ability to analyse the rigid body in equilibrium
C114.3	Ability to evaluate the properties of surfaces and solids
C114.4	Ability to calculate dynamic forces exerted in rigid body
C114.5	Ability to determine the friction and the effects by the laws of friction

L5 Course Name: GE8261 Engineering Practices

Laboratory

C115.1	Ability to Fabricate carpentry components and pipe connections including plumbing works
C115.2	Ability to Use welding equipments to join the structures
C115.3	Ability to Carry out the basic machining operations
C115.4	Ability to Make the models using sheet metal works
C115.5	Ability to Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundry and fittings

me: MA8353 Transforms and Partial Differential Equations

C201.1	Understand how to solve the given standard partial differential equations.
C201.2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.
C201.3	Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.
C201.4	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.
C201.5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.

ırse Name: ME8391 Engineering Thermodynamics

C202.1	Apply the first law of thermodynamics for simple open and closed systems under steady and unsteady conditions
C202.2	Apply second law of thermodynamics to open and closed systems and calculate entropy and availability
C202.3	Apply Rankine cycle to steam power plant and compare few cycle improvement methods
C202.4	Derive simple thermodynamic relations of ideal and real gases
C202.5	Calculate the properties of gas mixtures and moist air and its use in psychometric Processes

03 Course Name: CE8394 Fluid Mechanics and

Machinery

C203.1	Apply mathematical knowledge to predict the properties and characteristics of a fluid.
C203.2	Can analyse and calculate major and minor losses associated with pipe flow in piping networks
C203.3	Can mathematically predict the nature of physical quantities
C203.4	Can critically analyse the performance of pumps
C203.5	Can critically analyse the performance of turbines

ɔurse Name: ME8351 Manufacturing Technology –I

C204.1	Explain different metal casting processes, associated defects, merits and demerits
C204.2	Compare different metal joining processes
C204.3	Summarize various hot working and cold working methods of metals
C204.4	Explain various sheet metal making processes
C204.5	Distinguish various methods of manufacturing plastic components

Course Name: ME8361 Manufacturing Technology

Lab - I

C206.1	Use different machine tools to manufacturing gears
C206.2	Ability to use different machine tools to manufacturing gears
C206.3	Ability to use different machine tools for finishing operations
C206.4	Ability to manufacture tools using cutter grinder
C206.5	Develop CNC part programming

'se Name: ME8381 Computer Aided Machine drawing

Lab

C207.1	Follow the drawing standards, Fits and Tolerances
C207.2	Re-create part drawings, sectional views and assembly drawings as per standards

Name: HS8381 Interpersonal Skills / Listening & Speaking

C209.1	Ability to Listen and respond appropriately
C209.2	Ability to participate in group discussions
C209.3	Ability to make effective presentations
C209.4	Ability to give information and converse with accuracy
C209.5	Participate confidently in conversations both formal and informal

Course Name: ME8492 Kinematics of Machinery

C211.1	Ability to discuss the basics of mechanism
C211.2	Ability to calculate velocity and acceleration in simple mechanisms
C211.3	Ability to develop CAM profiles
C211.4	Ability to Solve problems on gears and gear trains
C211.5	Ability to examine friction in machine elements

urse Name: ME8451 Manufacturing Technology– II

C212.1	Ability to explain the mechanism of material removal processes
C212.2	Ability to describe the constructional and operational features of centre lathe and other special purpose lathes
C212.3	Describe the constructional and operational features of shaper, planner, milling, drilling, sawing and broaching machines
C212.4	Explain the types of grinding and other super finishing processes apart from gear manufacturing processes
C212.5	Ability to summarize numerical control of machine tools and write a part program

3 Course Name: ME8491 Engineering Metallurgy

C213.1	Explain alloys and phase diagram, Iron-Iron carbon diagram and steel classification
C213.2	Explain isothermal transformation, continuous cooling diagrams and different heat treatment processes
C213.3	Clarify the effect of alloying elements on ferrous and non-ferrous metals
C213.4	Summarize the properties and applications of non-metallic materials.
C213.5	Explain the testing of mechanical properties

me: CE8395 Strength of Materials For Mechanical Engineers

C214.1	Understand the concepts of stress and strain in simple and compound bars, the importance of principal stresses and principal planes
C214.2	Understand the load transferring mechanism in beams and stress distribution due to shearing force and bending moment
C214.3	Apply basic equation of simple torsion in designing of shafts and helical spring
C214.4	Calculate the slope and deflection in beams using different methods.
C214.5	Analyze and design thin and thick shells for the applied internal and external pressures

5 Course Name: ME8493 Thermal Engineering-I

C215.1	Calculate the mean effective pressure and air standard efficiency of different gas power cycles.
C215.2	Calculate the performance test on IC engines.
C215.3	Sketch the velocity diagrams of single and multi-stage turbines.
C215.4	Explain the classification and working principle of various types of air compressors.
C215.5	Calculate properties of moist air and COP of vapor refrigeration systems by using refrigeration table and chart.

Course Name: ME8462 Manufacturing Technology

Lab-II

C216.1	Demonstrate contour milling and generate a spur gear from a cylindrical work piece.
C216.2	Perform helical gear cutting operation and generate gear using hobbing machine.
C216.3	Generate gear using gear shaping machine and demonstrate plain surface grinding operation.
C216.4	Perform cylindrical grinding operation and practice Tool angle grinding with tool and Cutter Grinder.
C216.5	Measure cutting forces in Milling / Turning Process and develop CNC part programming.

. Strength of Materials and Fluid Mechanics and Machinery Laboratory

C217.1	Ability to perform Tension, Torsion, Hardness, Compression, and Deformation test on Solid materials

urse Name: HS8461 Advanced Reading and Writing

C218.1	Ability to read and evaluate texts critically
C218.2	Ability to write different types of essays
C218.3	Ability to write reports and winning job applications
C218.4	Ability to organize ideas, projects and to write e-mails.
C218.5	Ability to display critical thinking in various professional contexts.

1 Course Name: ME8595 Thermal Engineering-II

C301.1	Solve problems in Steam Nozzle
C301.2	Explain the functioning and features of different types of Boilers and auxiliaries and calculate performance parameters
C301.3	Explain the flow in steam turbines, draw velocity diagrams for steam turbines and solve problems
C301.4	Summarize the concept of Cogeneration, Working features of Heat pumps and Heat exchangers
C301.5	Solve problems using refrigerant table / charts and psychrometric charts

Course Name: ME8593 Design of Machine Elements

C302.1	Explain the influence of steady and variable stresses in machine component design.
C302.2	Apply the concepts of design to shafts, keys and couplings
C302.3	Apply the concepts of design to temporary and permanent joints
C302.4	Apply the concepts of design to energy absorbing members, connecting rod and crank shaft.
C302.5	Apply the concepts of design to bearings

urse Name: ME8501 Metrology and Measurements

C303.1	Describe the concepts of measurements to apply in various metrological instruments
C303.2	Outline the principles of linear and angular measurement tools used for industrial applications
C303.3	Explain the procedure for conducting computer aided inspection
C303.4	Demonstrate the techniques of form measurement used for industrial components
C303.5	Discuss various measuring techniques of mechanical properties in industrial applications

Course Name: ME8594 Dynamics of Machines

C304.1	Calculate static and dynamic forces of mechanisms
C304.2	Calculate the balancing masses and their locations of reciprocating and rotating masses
C304.3	Compute the frequency of free vibration
C304.4	Compute the frequency of forced vibration and damping coefficient.
C304.5	Calculate the speed and lift of the governor and estimate the gyroscopic effect on automobiles, ships and airplanes

ourse Name: ME8511 Kinematics & Dynamics Lab

C306.1	Explain gear parameters, kinematics of mechanisms, gyroscopic effect and working of lab equipment's
C306.2	Determine mass moment of inertia of mechanical element, governor effort and range sensitivity, natural frequency and damping coefficient, torsional frequency, critical speeds of shafts, bala

Course Name: ME8512 Thermal Engineering Lab

C307.1	Conduct a test to find thermal conductivity of various engineering materials.
C307.2	Measure heat transfer rate in free and forced convection environment.
C307.3	Measure emissivity of grey surface.
C307.4	Measure the effectiveness of parallel and counter flow heat exchanger.
C307.5	Measure COP of refrigeration and air conditioning system and performance of air compressor and fluidized bed cooling tower.

C308 Course Name: ME8513 Metrology and

Measurements Lab

C308.1	Check the dimensions and the dimensional deviations of given parts.
C308.2	Inspect the dimensions, angularity and parallelism of a given component.
C308.3	Construct the torque characteristic curves to various loads at various distances.
C308.4	Evaluate the straightness of surfaces and determine size of irregularities on a machined surface.
C308.5	Measure the vertical distances or height of objects, taper angle of slope for a given component, various parameters of threads and gear wheel.

urse Name: ME8651 Design of Transmission systems

C309.1	Design belt drives (flat belt, V-belt), chain drives, rope drives, belt drive pulleys & chain sprockets.
C309.2	Design spur and straight helical gears based on strength and wear consideration.
C309.3	Design straight bevel gear, worm gear pair and cross helical gear.
C309.4	Design various gear boxes (sliding mesh, constant mesh, multispeed) through geometric progression, standard step ratio, ray diagram, kinematics layout.
C309.5	Design various cams, clutches, internal and external shoe brakes using basic knowledge acquired from earlier studies.

lame: ME8691 Computer Aided Design and Manufacturing

C310.1	Explain the 2D and 3D transformations, clipping algorithm, Manufacturing models and Metrics
C310.2	Explain the fundamentals of parametric curves, surfaces and Solids
C310.3	Summarize the different types of Standard systems used in CAD
C310.4	Apply NC & CNC programming concepts to develop part programme for Lathe & Milling Machines
C310.5	Summarize the different types of techniques used in Cellular Manufacturing and FMS

. Course Name: ME8693 Heat and Mass Transfer

C311.1	Apply heat conduction equations to different surface configurations under steady state and transient conditions and solve problems
C311.2	Apply free and forced convective heat transfer correlations to internal and external flows through/over various surface configurations and solve problems
C311.3	Explain the phenomena of boiling and condensation, apply LMTD and NTU methods of thermal analysis to different types of heat exchanger configurations and solve problems
C311.4	Explain basic laws for Radiation and apply these principles to radiative heat transfer between different types of surfaces to solve problems
C311.5	Apply diffusive and convective mass transfer equations and correlations to solve problems for different applications

! Course Name: ME8692 Finite Element Analysis

C312.1	Explain the steps involved in FEA and also the types of weight residual methods.
C312.2	Formulate FE equation for structural, heat transfer and vibration problems.
C312.3	Predict finite element equations for two dimensional thermal and torsion problems.
C312.4	Predict finite element equations for axisymmetric bodies, plate and shell.
C312.5	Apply matrix solution techniques to dynamic problems.

Course Name: ME8694 Hydraulics and Pneumatics

C313.1	Explain the Fluid power and operation of different types of pumps
C313.2	Summarize the features and functions of Hydraulic motors, actuators and Flow control valves

Course Name: ME8681 C.A.D. / C.A.M. Laboratory

C315.1	Create 2D and 3D models using modeling software.
C315.2	Understand the CNC control in modern manufacturing system.
C315.3	Prepare CNC part programming and perform manufacturing.
C315.4	Create the CL Data and Post process generation using CAM packages.
C315.5	Apply CAPP in Machining and Turning Centre.

urse Name: ME8682 Design and Fabrication Project

C316.1	Develop conceptual and engineering design of any mechanical components and also to fabricate them using different manufacturing tools.

ourse Name: HS8581 Professional Communication

C317.1	Make effective presentations
C317.2	Participate confidently in Group Discussions

C317.3	Attend job interviews and be successful in them
C317.4	Develop adequate Soft Skills required for the workplace

Course Name: ME8792 Power Plant Engineering

C401.1	Explain the layout, construction and working of the components inside a thermal power plant
C401.2	Explain the layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants
C401.3	Explain the layout, construction and working of the components inside nuclear power plants
C401.4	Explain the layout, construction and working of the components inside Renewable energy power plants
C401.5	Explain the applications of power plants while extend their knowledge to power plant economics and environmental hazards and estimate the costs of electrical energy production

e Name: ME8793 Process Planning and Cost Estimation

C402.1	Explain the methods of process planning and the various steps involved in process selection.
C402.2	Examine the various steps involved in process planning activities.
C402.3	Explain the procedure of cost estimation.
C402.4	Estimate the production cost of a given component produced in foundry shop, forging shop & welding shop.
C402.5	Calculate the machining time for different operations performed in lathe, milling, shaping, planning, drilling, boring & grinding.

C403 Course Name: ME8791 Mechatronics

C403.1	State the specifications of sensors and choose the suitable sensors for real time applications.
C403.2	Combine the real time control systems with peripheral devices through programmable interface techniques.
C403.3	Test the input output terminals of PLC based control system by interfacing technique.
C403.4	Construct the ladder logic circuits for simple automation system.
C403.5	Design Mechatronics system with the help of microprocessor, PLC and other electrical and electronic Circuits.

ourse Name: ME8791 Simulation and Analysis Lab

C407.1	Simulate simple problems in vibrations and simple mechanisms using simulation software.
C407.2	Perform analysis of stress, truss/beam and dynamic analysis of mechanical members.
C407.3	Perform two dimensional stress analysis in plate and asymmetric shells.
C407.4	Analyze the temperature distribution in one dimensional heat transfer problems (walls and fins).
C407.5	Analyze the temperature distribution in two dimensional heat transfer problems (plates and shell).

Course Name: ME8781 Mechatronics Laboratory

C408.1	Ability to create the program for arithmetic functions and the program for sorting, code conversion functions.
C408.2	Ability to formulate the program codes to interface with traffic light controller and stepper motor.
C408.3	Ability to compare the set speed with actual speed of DC motor by interfacing suitable speed sensors.
C408.4	Ability to integrate all the hydraulic, pneumatic and electro pneumatic circuits by using simulation software.
C408.5	Ability to create the program for arithmetic functions and the program for sorting, code conversion functions.

409 Course Name: ME8712 Technical Seminar

C409.1	Upon completion of the course, students will be able to have clear understanding of managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowle

Course Name: MG8591 Principle of Management

C410.1	Upon completion of the course, students will be able to have clear understanding of managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowle

C412 Course Name: ME8811 Project work

C412.1	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology