ROHINI COLLEGE OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MECHANICAL ENGINEERING

B.E Mechanical Engineering
Anna University Regulation 2017

List of Course Names

Subject No.	SEM	Course code	Course	Course Title
1	I	17C101	HS8151	Communicative English
2	I	17C102	MA8151	Engineering Mathematics - I
3	I	17C103	PH8151	Engineering Physics – I
4	I	17C104	CY8151	Engineering Chemistry
5	I	17C105	GE8151	Problem Solving and Python Programming
6	I	17C106	GE8152	Engineering Graphics
7	I	17C107	GE8161	Problem Solving and Python Programming Laboratory
8	I	17C108	BS8161	Physics and Chemistry Laboratory
9	II	17C109	HS8251	Technical English
10	II	17C110	MA8251	Engineering Mathematics - II
11	II	17C111	PH8251	Materials Science
12	II	17C112	BE8253	Basic Electrical, Electronics and Instrumentation Engineering
13	II	17C113	GE8291	Environmental Science and Engineering
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15	II	17C115	GE8261	Engineering Practices Laboratory
16	II	17C116	BE8261	Basic Electrical, Electronics and Instrumentation Engineering Laboratory
17	III	17C201	MA8353	Transforms and Partial Differential Equations
18	III	17C202	ME8391	Engineering Thermodynamics
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21	III	17C205	EE8353	Electrical Drives and Controls
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53	VII	17C402	ME8793	Process Planning and Cost Estimation
54	VII	17C403	ME8791	Mechatronics
55	VII	17C404	Open Elective - II	Open Elective - II
56	VII	17C405	Professional Elective – II	Professional Elective – II
57	VII	17C406	Professional Elective – III	Professional Elective – III
58	VII	17C407	ME8711	Simulation and Analysis Laboratory
59	VII	17C408	ME8781	Mechatronics Laboratory
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61	VIII	17C410	MG8591	Principles of Management
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63	VIII	17C412	ME8811	Project Work

ROHINI COLLEGE OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MECHANICAL ENGINEERING

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Course Outcomes (CO)

17C101	HS8151 / Communicative English -I
17C101.1	Construct dialogues for informal conversations and make a lead in group; introduce themselves and their friends and express opinions in English.
17C101.2	Develop general comprehending skills and present lucid skills in free writing.
17C101.3	Make use of the basic grammar techniques and utilize it in enhancing language development
17C101.4	Outline informal, personal letters and emails in English.
17C101.5	Extend the proficiency in writing short essays and relate main and subordinate ideas to improve the writing skill.

17C102	MA8151 / Engineering Mathematics - I
17C102.1	Identify maxima or minima of functions of one variable using differentiation..
17C102.2	Identify maxima or minima in two variables using partial differentiation.
17C102.3	Solve proper and improper integrals.
17C102.4	Apply multiple integral techniques in evaluating Area and Volume of Solids
17C102.5	Solve differential equations in Engineering problems.

17C103	PH8151 / Engineering Physics – I
17C103.1	Illustrate basic concepts of stress and strain in solids
17C103.2	Classify the type of optical fiber and Laser
17C103.3	Infer about the transfer of heat energy and its applications
17C103.4	Illustrate the quantum theory and its applications
17C103.5	Outline the various crystal structure and its growth techniques

17C104	CY8151 / Engineering Chemistry
17C104.1	Summarize the water related problems in boilers and their treatment techniques.
17C104.2	Explain the concept and need of catalysis.
17C104.3	Apply the chemical properties to categorize the engineering materials and their uses.
17C104.4	Illustrate the quality of fuel by its properties.
17C104.5	Illustrate the methods of harnessing energy from non-conventional energy sources.

17C105	GE8151 / Problem Solving and Python Programming
17C105.1	Explain algorithmic solutions to simple computational problems.
17C105.2	Explain simple Python statements and expressions.
17C105.3	Apply control flow and functions concept in Python for solving problems
17C105.4	Explain lists, tuples & dictionaries for representing compound data

17C105.5	**Apply files, exception, modules and packages in Python for solving problems**

17C106	**GE8152 / Engineering Graphics**
17C106.1	**Discuss the orthographic views of Engineering components.**
17C106.2	**Relate to basic principles of orthographic projection for drawing projection of points, lines and planes.**
17C106.3	**Apply basic principles of orthographic projection for drawing projection of solids like prisms, pyramids, cone and cylinder.**
17C106.4	**Show the sectioned view of solids and the development of solid surfaces**
17C106.5	**Show the isometric projection and perspective views for simple solids.**

17C107	**GE8161 / Problem Solving and Python Programming Laboratory**
17C107.1	**Apply basic concepts and simple Python programs.**
17C107.2	**Explain Python programs with conditionals and loops.**
17C107.3	**Apply function definition and recursion in Python program.**
17C107.4	**Apply Python lists, tuples, and dictionaries for representing compound data.**
17C107.5	**Apply Read and write data from/to files in python program.**
17C107.6	**Exhibit ethical principles in engineering practices**
17C107.7	**Perform task as individual and /or team member to manage the task in time**
17C107.8	**Express the engineering activities with effective presentation and report**

17C107.9	**Interpret the finding with appropriate technological /research citation**

17C108	**BS8161 / Physics and Chemistry Laboratory**
17C108.1	**Explain the physical parameters such as thickness of a wire, band gap of semiconductor both individually and by team by using experiments**
17C108.2	**Compare the Young's modulus and Rigidity modulus of different materials**
17C108.3	**List the velocity of ultrasonic waves in different liquids like water and kerosene**
17C108.4	**Estimate strength of acids quantitatively based on the conductance and PH level of the solution both individually and in teams**
17C108.5	**Estimate water quality parameters such as dissolved oxygen content, chloride content and iron content of the water samples both individually and in teams**
17C108.6	**Exhibit ethical principles in engineering practices**
17C108.7	**Perform task as individual and /or team member to manage the task in time**
17C108.8	**Express the engineering activities with effective presentation and report**
17C108.9	**Interpret the finding with appropriate technological /research citation**

17C109	**HS8251 / Technical English**
17C109.1	**Interpret the passage listened from talk and comprehension.**
17C109.2	**Rephrase the paragraph of talks and comprehension passages after reading and Interpret charts and graphs.**
17C109.3	**Develop their speaking skills to make technical presentation**

17C109.4	**Summarize, resume, analytical and issue-based essays.**
17C109.5	**Summarize reports and minutes of meeting suitably**

17C110	**MA8251 / Engineering Mathematics - II**
17C110.1	**Apply the concept of orthogonal transformation to diagonalise the given matrix**
17C110.2	**Solve line integral, surface integral and volume integral in Engineering applications.**
17C110.3	**Relate analytic functions by Milne's Thomson method.**
17C110.4	**Solve real definite integrals as contour integrals around unit circle and semi-circle**
17C110.5	**Solve the second order ODE by Laplace transformation.**

17C111	**PH8251 / Materials Science**
17C111.1	**Infer the various phase diagram and micro structural change during cooling.**
17C111.2	**Summarize the ferrous alloys and phase transformations.**
17C111.3	**Interpret the mechanical properties of materials and their hardness testing methods**
17C111.4	**Outline about the ferromagnetism and ferromagnetic materials.**
17C111.5	**Interpret the metallic glasses, Nano Materials and ceramics.**

17C112	**BE8253 / Basic Electrical, Electronics and Instrumentation Engineering**

17C112.1	**Analyze the D.C electric circuits.**
17C112.2	**Analyze the AC electric circuits**
17C112.3	**Explain the working principle & Performance Characteristics of DC and AC machines.**
17C112.4	**Interpret the characteristics of semiconducting devices**
17C112.5	**Explain the working of various measuring instruments**

17C113	**GE8291 / Environmental Science and Engineering**
17C113.1	**Illustrate the features of Ecosystem & biodiversity**
17C113.2	**Choose pollution control methods and waste management.**
17C113.3	**Apply the environmental concepts for conservation and protection of natural resources.**
17C113.4	**Demonstrate the impact of social issues on environment**
17C113.5	**Demonstrate the impact of human on environment.**

17C114	**GE8292 / Engineering Mechanics**
17C114.1	**Illustrate the vector and scalar representation of forces of bodies in two dimension and three dimensions.**
17C114.2	**Show the resultant force, moment for a system of forces.**
17C114.3	**Relate the centroid, center of gravity, moment of inertia for different geometry.**
17C114.4	**Apply the principle of dynamic equilibrium for rigid bodies**
17C114.5	**Demonstrate the value of frictional force under equilibrium condition.**

17C115	GE8261 / Engineering Practices Laboratory
17C115.1	Explain the various manufacturing process in smithy, foundry, fitting, assembling and disassembling and will be able to provide effective presentation.
17C115.2	Summarize the operations of various machine tools lathe , drilling
17C115.3	Develop models by using skills achieved from workshop sections like welding, carpentry, sheet metal and plumbing
17C115.4	Apply the skills of basic electrical engineering for domestic wiring practices
17C115.5	Apply the measuring instruments like energy meter and perform measurements in electrical circuits.
17C115.6	Explain the working of electronic components.
17C115.7	Apply the electronic principle for develop engineering circuits.
17C115.8	Exhibit ethical principles in engineering practices
17C115.9	Perform task as individual and /or team member to manage the task in time
17C115.10	Express the engineering activities with effective presentation and report
17C115.11	Interpret the finding with appropriate technological /research citation

17C116	BE8261 / Basic Electrical, Electronics and Instrumentation Engineering Laboratory
17C116.1	Illustrate the performance, Characteristics and Load test on DC Shunt motor and DC Generator
17C116.2	Analyze the measurement of three phase power and explain the performance of induction motor & Transformer
17C116.3	Demonstrate the various electric circuits laws and theorems

17C116.4	**Apply the simple circuits based on diodes and transistors**
17C116.5	**Summarize the experiment at the time of viva.**
17C116.6	**Exhibit ethical principles in engineering practices**
17C116.7	**Perform task as individual and /or team member to manage the task in time**
17C116.8	**Express the engineering activities with effective presentation and report**
17C116.9	**Interpret the finding with appropriate technological /research citation**

17C201	**MA8353 / Transforms and Partial Differential Equations**
17C201.1	**Formulate simple Engineering problems as Partial Differential Equations**
17C201.2	**Apply the concept of Fourier series in solving boundary value problems**
17C201.3	**Solve the standard Partial Differential Equations in engineering problems like Wave equation, Heat flow equation by Fourier series.**
17C201.4	**Solve Fourier, Fourier Sine and Cosine transforms and properties**
17C201.5	**Understand the discrete transform applied to engineering problems.**

17C202	**ME8391 / Engineering Thermodynamics**
17C202.1	**Explain the basic concepts and Solve the laws of thermodynamics applied to various applications.**
17C202.2	**Explain the concept of Second law, Availability, Entropy in thermal systems and apply entropy for second law applications.**

17C202.3	**Evaluate the properties of pure substance and explain the working of steam cycles**
17C202.4	**Differentiate the properties of ideal, real gases and deduce its relations in thermodynamic aspects**
17C202.5	**Apply the properties of moist air in Psychrometric processes and calculate the properties of gas mixtures.**

17C203	**CE8394 / Fluid Mechanics and Machinery**
17C203.1	**Illustrate the basic properties of fluid and fluid statics.**
17C203.2	**Analysis the flow through the pipes and interpret the conept of development of boundary layer.**
17C203.3	**Apply the dimensional analysis to identify the fundamental variables that**
17C203.4	**Ilustrate the working principles of pumps and its performance.**
17C203.5	**Illustrate the working principles of turbines and its performance.**

17C204	**ME8351 / Manufacturing Technology - I**
17C204.1	**Explain different metal casting processes, associated defects, merits and demerits**
17C204.2	**Compare different metal joining processes.**
17C204.3	**Summarize various hot working and cold working methods of metals.**
17C204.4	**Explain various sheet metal making processes**
17C204.5	**Distinguish various methods of manufacturing plastic components.**

17C205	EE8353 / Electrical Drives and Controls
17C205.1	Understand the basic concept of electric drives.
17C205.2	Understand the characteristics of different types of machines and their performance
17C205.3	Analyze the different methods of starting D.C motors and induction motors
17C205.4	Describe the conventional and solid0state drives of DC motors
17C205.5	Explain the conventional and solid0state drives of AC motors

17C206	ME8361 / Manufacturing Technology Laboratory - I
17C206.1	Demonstrate the safety precautions exercised in the mechanical workshop.
17C206.2	Make the work piece as per given shape and size using Lathe.
17C206.3	Make use of arc welding to join two metals.
17C206.4	Use sheet metal fabrication tools and make simple tray and funnel.
17C206.5	Use different moulding tools, patterns and prepare sand moulds.
17C206.6	Exhibit ethical principles in engineering practices
17C206.7	Perform task as individual and /or team member to manage the task in time
17C206.8	Express the engineering activities with effective presentation and report
17C206.9	Interpret the finding with appropriate technological /research citation

17C207	ME8381 / Computer Aided Machine Drawing
17C207.1	Interpret drawings of machine components, Indian Standards on drawing practices and standard components.
17C207.2	Develop the Mechanical components using standard 2D drafting CAD packages
17C207.3	Design 3D models and gain practical experience in handling assembly drawings by both manual and 3D modeling software systems.
17C207.4	Design structural riveted joints and couplings along with their standard empirical relations.
17C207.5	Develop part drawings, sectional views and assembly drawings as per standards
17C207.6	Exhibit ethical principles in engineering practices
17C207.7	Perform task as individual and /or team member to manage the task in time
17C207.8	Express the engineering activities with effective presentation and report
17C207.9	Interpret the finding with appropriate technological /research citation

17C208	EE8361 / Electrical Engineering Laboratory
17C208.1	Explain the working of DC and AC Starters .
17C208.2	Compare the various characteristics of single phase DC and AC motors.
17C208.3	Calculate the regulation of single and three phase alternators and transformers.
17C208.4	Make use of speed controllers for single and three phase electrical machines.
17C208.5	Develop speed and load characteristics of electrical machines.
17C208.6	Exhibit ethical principles in engineering practices

17C208.7	**Perform task as individual and /or team member to manage the task in time**
17C208.8	**Express the engineering activities with effective presentation and report**
17C208.9	**Interpret the finding with appropriate technological /research citation**

17C209	**HS8381 / Interpersonal Skills / Listening & Speaking**
17C209.1	**Interpret ideas convincingly with clear utterances**
17C209.2	**Build general and academic listening skills and respond in different situation**
17C209.3	**Explain opinion and converse effectively both formal and informal conversations**
17C209.4	**Develop and apply skills to GD**
17C209.5	**Make use of communicative techniques and speak fluently in English throughout their life**
17C209.6	**Exhibit ethical principles in engineering practices**
17C209.7	**Perform task as individual and /or team member to manage the task in time**
17C209.8	**Express the engineering activities with effective presentation and report**
17C209.9	**Interpret the finding with appropriate technological /research citation**

17C210	MA8452 / Statistics and Numerical Methods
17C210.1	Relate the basic hypothesis testing
17C210.2	Design and conduct of engineering experiments involving a single factor ,two and three factors.
17C210.3	Solve the system of linear algebraic equations in Mechanical Engineering
17C210.4	Apply the interpolation technique for solving real time engineering problems
17C210.5	Solve ordinary and partial differential equations using numerical methods .

17C211	ME8492 / Kinematics of Machinery
17C211.1	Apply knowkedge of fundamentals of kinematics to common mechanism and determine kinematics parameters of mechanism
17C211.2	Analysis graphically,velocity and acceleration in various linkage mechanism
17C211.3	Inference of cam profile for various follower mechanism used for different application
17C211.4	Analysis the performance of gear trains for power transmission
17C211.5	Examine the frictional forces in various power transmission systems

17C212	ME8451 / Manufacturing Technology – II
17C212.1	Illustrate the nomenclature of single and multipoint cutting tools used in manufacturing process
17C212.2	Interpret the constructional and working principles of turning machine
17C212.3	Explain the working principles and application of shaping, drilling, boring, milling and gear machines.

17C212.4	**Explain the requirement and application of abrasive process and broaching machines**
17C212.5	**Expalin the contructional features of CNC machines and develop the programming skills for real world applications.**

17C213	**ME8491 / Engineering Metallurgy**
17C213.1	**Explain various binary alloy systems with respective invariant reaction.**
17C213.2	**Apply the concepts of isothermal transformation using heat treatment processes.**
17C213.3	**Explain various Ferrous and non-ferrous metals with its application**
17C213.4	**Explain various non-metallic materials with its applications**
17C213.5	**Demonstrate the working of various material testing equipments and find material properties**

17C214	**CE8395 / Strength of Materials for Mechanical Engineers**
17C214.1	**Apply the various stresses and strain relations induced in different materials due to tension and compression.**
17C214.2	**Develop the shear force and bending moment diagrams of various type of beams under different loading conditions**
17C214.3	**Illustrate the stresses and deformation of circular structures and helical structures subjected to torsion**
17C214.4	**Apply the stress distribution of shear and bending in various sections of beams.**
17C214.5	**Apply the principal plane and stresses in two dimensional bodies and thick cylinders**

17C215	ME8493 / Thermal Engineering I
17C215.1	Apply the concept of thermodynamic cycles to solve problems.
17C215.2	Analyze the performance characteristics of reciprocating air compressor.
17C215.3	Analyze the functions of an Internal Combustion engines and Illustrates the combustion in Internal combustion engines.
17C215.4	Analyze the performance parameters of an Internal combustion engines and concept of auxiliary systems.
17C215.5	Analyze the performance of gas turbine cycles.

17C216	ME8462 / Manufacturing Technology Laboratory –II
17C216.1	Make use of milling machine and carryout various milling operations
17C216.2	Utilize gear generation methods to form gears
17C216.3	Make use of different machine tools for finishing operations
17C216.4	Develop cutting edges using tool and cutter grinder
17C216.5	Make use of CNC machines to perform various operations.
17C216.6	Exhibit ethical principles in engineering practices
17C216.7	Perform task as individual and /or team member to manage the task in time
17C216.8	Express the engineering activities with effective presentation and report
17C216.9	Interpret the finding with appropriate technological /research citation

17C217	CE8381 / Strength of Materials and Fluid Mechanics and Machinery Laboratory
17C217.1	Analyze the property of materials using different testing process.
17C217.2	Analyze the behaviour of the material under impact conditions.
17C217.3	Experiment with variety of practical fluid flow devices and utilize fluid mechanics principles.
17C217.4	Demonstrate the various flow merers to find coefficient of discharge.
17C217.5	Demonstrate the theoritical and experimental analysis of turbines and pumps.
17C217.6	Exhibit ethical principles in engineering practices
17C217.7	Perform task as individual and /or team member to manage the task in time
17C217.8	Express the engineering activities with effective presentation and report
17C217.9	Interpret the finding with appropriate technological /research citation

17C218	HS8461 / Advanced Reading and Writing
17C218.1	Interpret variety of texts adapting different reading skills.
17C218.2	Relate the lucid skills in free writing
17C218.3	Apply skills pertaining to present essays in the frame of the scientific method
17C218.4	Develop various types and formats of reports, email, resume, letters, to meet particular needs or purposes
17C218.5	Apply skills pertaining problem solving creative and critical thinking in everyday life.
17C218.6	Exhibit ethical principles in engineering practices

17C218.7	**Perform task as individual and /or team member to manage the task in time**
17C218.8	**Express the engineering activities with effective presentation and report**
17C218.9	**Interpret the finding with appropriate technological /research citation**

17C301	**ME8593 / Design of Machine Elements**
17C301.1	**Determine the stress acting on various machine elements**
17C301.2	**Design a shaft and couplings based on various load conditions**
17C301.3	**Analyze the temporary, permanent joints and design joints based on applications**
17C301.4	**Design energy storing devices for the specific applications**
17C301.5	**Select appropriate bearing, from the standard catalog for varied applications**

17C302	**ME8594 / Dynamics of Machines**
17C302.1	**Expalin the forces required by various machine components to overcome inertia**
17C302.2	**Interpret the concept of balancing of rotating and Reciprocating mass**
17C302.3	**Analyze free longitudinal, damped and transversal vibration of a system**
17C302.4	**Analyse the forced vibration of a system.**
17C302.5	**Explain the control mechanisms of governor and gyroscope with their applications.**

17C303	ME8595 / Thermal Engineering - II
17C303.1	Explain the types of nozzles and apply the concept for different velocity flow through nozzle
17C303.2	Explain the functioning and features of different types of boiler and auxiliaries and calculate performance parameters
17C303.3	Explain the type of flow in steam turbines and calculate the efficiency at optimal operating conditions
17C303.4	Summarize the concept of cogeneration, working features of heat pump and heat exchangers
17C303.5	Explain various types of refrigeration and air conditioning syatems

17C304	ME8501 / Metrology and Measurements
17C304.1	Explain the errors during caliboration of Measuring system
17C304.2	Interpret the use of Linear and Angular Measurement instruments
17C304.3	Compare the various advanced masurement techniques and devices in engineering applications
17C304.4	Interpret measurement of field variables like Flatness, Straightness, Roundness.
17C304.5	Explain the measuring instruments to measure power, flow and temperature.

17C305	OAT551 / Automotive Systems
17C305.1	Demonstrate the various parts of the automobile and their functions and materials.
17C305.2	Explain the engine auxiliary systems and engine emission control.
17C305.3	Distinguish the working of different types of transmission systems.
17C305.4	Explain the Steering, Brakes and Suspension Systems.
17C305.5	Select possible alternate sources of energy for IC Engines.

17C306	ME8511 / Kinematics and Dynamics Laboratory
17C306.1	Demonstrate the various types of gears, gear trains, kinematic mechanisms, and universal joints.
17C306.2	Experiment with the Turn table apparatus, bi-filar suspension, single and double rotor systems, equivalent spring mass system.
17C306.3	Inspect the critical speed of shaft under the given load conditions and the gyroscopic effect and couple on motorized gyroscope
17C306.4	Develop the characteristic curves of Watt, Porter, Proell and Hartnell governors and motion curves for the given cam follower setup.
17C306.5	Examine the balancing of rotating masses in dynamic balancing machine.
17C306.6	Exhibit ethical principles in engineering practices
17C306.7	Perform task as individual and /or team member to manage the task in time
17C306.8	Express the engineering activities with effective presentation and report
17C306.9	Interpret the finding with appropriate technological /research citation

17C307	ME8512 / Thermal Engineering Laboratory
17C307.1	Make use of heat conduction apparatus and evaluate thermal conductivity of materials.
17C307.2	Experiment with natural and forced convective heat transfer apparatus and evaluate heat transfer coefficient.
17C307.3	Experiment with the radiative heat transfer apparatus and evaluate Stefan Boltzmann constant and emissivity.
17C307.4	Analyze the performance of parallel/counter flow heat exchanger apparatus and reciprocating air compressor.
17C307.5	Analyze the performance of refrigeration and airconditioning test rigs.
17C307.6	Exhibit ethical principles in engineering practices
17C307.7	Perform task as individual and /or team member to manage the task in time
17C307.8	Express the engineering activities with effective presentation and report
17C307.9	Interpret the finding with appropriate technological /research citation

17C308	ME8513 / Metrology and Measurements Laboratory
17C308.1	Experiment with the methods for measuring the diameters and thickness of the material using various precision measuring equipment's.
17C308.2	Apply the methods for measuring the angles and surface finish of different materials precisely using measuring equipment's.
17C308.3	Utilize the methods of measuring the temperature and comparing with sensor,
17C308.4	Experiment with the force measurement setup with load cell and torque related with deflection using torque measuring equipment.
17C308.5	Examine any object nomenculture using different mesureing techniques
17C308.6	Exhibit ethical principles in engineering practices
17C308.7	Perform task as individual and /or team member to manage the task in time
17C308.8	Express the engineering activities with effective presentation and report
17C308.9	Interpret the finding with appropriate technological /research citation

17C309	ME8651 / Design of Transmission Systems
17C309.1	Analyse the concept of design in the flexible drive elements like belt, chain and rope drives.
17C309.2	Develop a method of various types of gears with parallel axis
17C309.3	Develop a method for various types of gears with inclination with axis.
17C309.4	Explain the techniques used in industrial design multispeed gear box application
17C309.5	Categorize a suitable design for cam, clutches and brakes for automotive applications.

17C310	ME8691 / Computer Aided Design and Manufacturing
17C310.1	Explain the 2D and 3D transformation, clipping algorithm and manufacturing models
17C310.2	Apply the concepts of parametric curves , surface and solids
17C310.3	Explain the different types of standards used in CAD
17C310.4	Utilize NC & CNC programming concepts to develop part programme for lathe & milling machine.
17C310.5	Interpret various types of techniques used in cellular manufacturing and FMS

17C311	ME8693 / Heat and Mass Transfer
17C311.1	Apply the concept of heat condition equation with different surface configuration under steady and transient heat conduction.
17C311.2	Apply the concept of free and forced convection correlations with the different fluid flow elements.
17C311.3	Apply the applications of phase change heat transfer and LMTD and NTU methods of heat exchangers.
17C311.4	Analyse the concept of radiation and application in heat transfer systems.
17C311.5	Analyse the concept of diffusion & convective mass transfer correlations.

17C312	ME8692 / Finite Element Analysis
17C312.1	Apply the basics of finite element equations.
17C312.2	Apply the use of one dimensional finite element equations

17C312.3	**Analyse the finite element equations to solve two dimensional scalar variable problems.**
17C312.4	**Analyse the use of Finite element equations for solving axisymmetric elements.**
17C312.5	**Explain the concept of using finite element methods to solve iso parametric elements**

17C313	**ME8694 / Hydraulics and Pneumatics**
17C313.1	**Apply the concepts of fluid flow and analyse the operation of different types of pumps.**
17C313.2	**Explain the features and function of hydraulic motors, actuators and flow control values.**
17C313.3	**Explain the different types of hydraulic circuits and systems.**
17C313.4	**Analyse the various pneumatic circuits and systems.**
17C313.5	**Interpret the different trouble shooting methods for various hydraulic and pneumatic application.**

17C314	**PR8592 / Welding Technology**
17C314.1	**Explain various types of Gas and Arc welding processes.**
17C314.2	**Explain the working principles of resistance welding process and various process parameters influence on their performance.**
17C314.3	**Interpret the working of various types of solid state welding processes.**
17C314.4	**Select the suitable welding process for aerospace, nuclear and automobile industries.**
17C314.5	**Explain design principles in weld joints and apply the concept of quality control and testing of weldments in industrial environment.**

17C315	ME8681 / CAD / CAM Laboratory
17C315.1	Make use of standard software tools to create 2D and 3D product models.
17C315.2	Develop the part drawing and the sectional views which are utilized in real time application
17C315.3	Apply the knowledge of dimensioning sets and tolerance of mechanical components
17C315.4	Understand the part drawings and components and combine into assembly view
17C315.5	Utilize CNC part programming and perform manufacturing using G and M Codes
17C315.6	Exhibit ethical principles in engineering practices
17C315.7	Perform task as individual and /or team member to manage the task in time
17C315.8	Express the engineering activities with effective presentation and report
17C315.9	Interpret the finding with appropriate technological /research citation

13C316	ME8682 / Design and Fabrication Project
13C316.1	Utilize the design principles and develop concept for the project
13C316.2	Estimate the time frame and cost for the project execution and completion
13C316.3	Analyze the project progress with remedial measures individual in a team
13C316.4	Examine the environmental impact of the project
13C316.5	Demonstrate the project functionality along with report and presentation

13C316.6	**Assess health, safety and legal relevant to professional engineering practices.**
13C316.7	**Apply the Engineering knowledge in design and economically manufacturing of components to support the society need.**
13C316.8	**Justify ethical principles in engineering practices**
13C316.9	**Perform multi-disciplinary task as an individual and / or team member to manage the project/task.**
13C316.10	**Comprehend the Engineering activities with effective presentation and report.**
13C316.11	**Interpret the findings with appropriate technological / research citation**

17C317	**HS8581 / Professional Communication**
17C317.1	**Develop adequate Soft Skills, Employability and Career Skills required for the working place.**
17C317.2	**Apply the presentation skills and introduce oneself and make effective paper presentation**
17C317.3	**Make use of GD Strategies and participating in Group Discussion**
17C317.4	**Apply the interview etiquette and present oneself well in the interview**
17C317.5	**Relate the stress management & career management strategies in one's career development**
17C317.6	**Exhibit ethical principles in engineering practices**
17C317.7	**Perform task as individual and /or team member to manage the task in time**
17C317.8	**Express the engineering activities with effective presentation and report**
17C317.9	**Interpret the finding with appropriate technological /research citation**

17C401	ME8792 / Power Plant Engineering
17C401.1	Illustrate various types of power plants and working principle of boilers.
17C401.2	Explain the layout, construction and working of the components inside a thermal power plant
17C401.3	Explain the layout, construction and working of the components inside nuclear and hydro power plants.
17C401.4	Analyze the principles of various renewable power plants.
17C401.5	Interpret the Economics of power plants.

17C402	ME8793 / Process Planning and Cost Estimation
17C402.1	Apply the knowledge of engineering fundamentals for process planning
17C402.2	Classify various method of production system
17C402.3	Analyze the cost estimation for various products after process planning
17C402.4	Demonstrate the cost of production for various jobs manufactured by different manufacturing process
17C402.5	Identify the Machining time for various operations carried out in different machines

17C403	ME8791 / Mechatronics
17C403.1	Demonstrate a fundamental knowledge of sensors, actuators and associated control systems.
17C403.2	Select appropriate sensors and actuators in automating systems.
17C403.3	Explain and use various controllers to control the various mechatronics systems.

17C403.4	**Simplify a system with Programmable Logic Controller.**
17C403.5	**Apply the fundamental principles of integral design to the solution of practical problems related to automation systems.**

17C404	**OML751 / Testing of Materials**
17C404.1	**Explain the classification and purpose of material testing**
17C404.2	**Interpret the mechanical testing : Principles, Techniques, Methods, Advantages and Limitations, Applications.**
17C404.3	**Interpret the Non-Distructive testing :Principles, Techniques, Methods, Advantages and Limitations, Applications**
17C404.4	**Explain various material characterization techniques and its principles, types, advantages and limitations, applications.**
17C404.5	**Interpret Thermal and chemical testing principles, advantages and applications.**

17C405	**ME8073 / Unconventional Machining Processes**
17C405.1	**Summarize the needs and classification of unconventional machining process.**
17C405.2	**Explain the working principle of energy based machining process.**
17C405.3	**Explain the working principle of electrical energy based machining process.**
17C405.4	**Compare chemical and electro-chemical energy based processes**
17C405.5	**Discuss the working principle of thermal energy based machining process.**

17C406	ME8097/ Non Destructive Testing and Evaluation
17C406.1	Summarize the fundamentals of various NDT methods.
17C406.2	Explain the principles and testing knowledge for surface NDE methods like Liquid Penetrant Testing and Magnetic Particle Testing.
17C406.3	Explain the materials and testing procedure by Thermography and Eddy Current Testing.
17C406.4	Interpret Ultrasonic Testing (UT) And Acoustic Emission test of various products.
17C406.5	Understand the principles and procedure steps in Radiography.

17C407	ME8711 / Simulation and Analysis Laboratory
17C407.1	Understand the basic concepts ANSYS Software
17C407.2	Understand the basic concepts of different types Load conditions in structure
17C407.3	Apply the different methods analysis required for the structural members
17C407.4	Analyse theVibration of spring0mass systems.
17C407.5	Analyse the Harmonic, transient and spectrum motion of simple systems
17C407.6	Exhibit ethical principles in engineering practices
17C407.7	Perform task as individual and /or team member to manage the task in time
17C407.8	Express the engineering activities with effective presentation and report
17C407.9	Interpret the finding with appropriate technological /research citation

17C408	ME8781 / Mechatronics Laboratory
17C408.1	Make use of assembly language programming of 8085 , stepper motor interface
17C408.2	Analyze the basic hydraulic and pneumatic circuits using software
17C408.3	Compare the Basic hydraulic and Pneumatic Trainer Kit with manual and electrical Controls and PLC Control
17C408.4	Understand the Image processing system with hardware & software
17C408.5	Understand thetrsffic light control system
17C408.6	Exhibit ethical principles in engineering practices
17C408.7	Perform task as individual and /or team member to manage the task in time
17C408.8	Express the engineering activities with effective presentation and report
17C408.9	Interpret the finding with appropriate technological /research citation

17C409	ME8712 / Technical Seminar
17C409.1	Summarize the various thermodynamics laws to engineering application
17C409.2	Discuss various mechanism for design of mechanical system
17C409.3	Compute the properties and strength of engineering material
17C409.4	Point out various manufacturing process suitable for making products
17C409.5	Compute the fluid properties and flow characteristics

17C409.6	**Exhibit ethical principles in engineering practices**
17C409.7	**Perform task as individual and /or team member to manage the task in time**
17C409.8	**Express the engineering activities with effective presentation and report**
17C409.9	**Interpret the finding with appropriate technological /research citation**

17C410	**MG8591 / Principles of Management**
17C410.1	**Understand the Evolution of Management, culture and types of Organization**
17C410.2	**Examine various Strategic planning tools and Techniques also can take part in decision making process.**
17C410.3	**Explain the need and importance of decision making for managers in the organization**
17C410.4	**Build the leadership style, Barriers to effective Communication, its impact and methods to overcome them**
17C410.5	**Explain various Controlling techniques to maintain standards in Organizations**

17C411	**MG8091 / Entrepreneurship Development**
17C411.1	**Show the concept of entrepreneurship and need for becoming an entrepreneur.**
17C411.2	**Develop competencies and motivation to become an entrepreneur.**
17C411.3	**Demonstrate their plan to start a small enterprise.**
17C411.4	**Analyze the financial and accounting details needed for starting and running a small enterprise.**
17C411.5	**Summarize the various supports available to start a small enterprise.**

17C412	ME8811 / Project Work
17C412.1	Use literature to identify the objective, scope and the concept of the work
17C412.2	Apply suitable methods and materials to carry out experiments by conserving eco-system
17C412.3	Develop a prototype/experimental set-up necessary to complete the project
17C412.4	Discuss the results obtained to derive conclusions
17C412.5	Defend the work by preparing a report as per the University format.
17C412.6	Assess health, safety and legal relevant to professional engineering practices.
17C412.7	Comply the environmental needs and sustainable development.
17C412.8	Justify ethical principles in engineering practices
17C412.9	Perform multi-disciplinary task as an individual and / or team member to manage the project/task.
17C412.10	Comprehend the Engineering activities with effective presentation and report.
17C412.11	Interpret the findings with appropriate technological / research citation

HOD **PRINCIPAL**