



KARPAGA VINAYAGA

COLLEGE OF ENGINEERING AND TECHNOLOGY

(Approved by AICTE, affiliated to Anna University and accredited by NAAC)

GST Road, Chinnakolampakkam, Madhuranthakam Taluk, Chengalpattu District - 603 308, Tamil Nadu

SUBJECTISE CO STATEMENTS FOR 2013 REGULATION - MECHANICAL ENGINEERING

Sl.No	Subject Code	Subject Name	CO Code	CO Statements
1	C101	HS8151 Communicative English	C101.1	Listen, understand and respond to others in different situations
			C101.2	write with clarity in simple, apt and flawless language with coherence and cohesion
			C101.3	Explain the basic grammar techniques and utilise it in enhancing language development.
			C101.4	Read and comprehend a variety of texts adopting different reading skills
			C101.5	Develop flair for any kind of writing with rich vocabulary and proper syntax
			C101.6	Write technical articles and present papers on any topic of any genre.
2	C102	MA8151 Engineering Mathematics – I	C102.1	Explain mathematical techniques to problems in a wide range of practical engineering problems
			C102.2	Constructs arguments to prove and justify results
			C102.3	Manipulates algebraic expressions involving exponential functions
			C102.4	Manipulates algebraic expressions involving logarithmic functions
			C102.5	Apply techniques of integration to calculate areas and volumes
			C102.6	Interpret and communicate mathematics in a variety of problem solving.
3	C103	PH8151 Engineering Physics	C103.1	Explain the Young's modulus and Rigidity modulus of elasticity of materials and its determination through experimental methods
			C103.2	Describe the characteristics of laser light and their application in semiconductor laser
			C103.3	Discuss the principle behind the propagation of light through an optical fibre and its application in sensors.
			C103.4	Explain the different modes of heat transfer
			C103.5	Relate and explain the quantum concepts in electron microscopes
			C103.6	Describe the unit cell characteristics and the growth of crystals

4	C104	CY8151	Engineering Chemistry	C104.1	Explain basics of polymer chemistry
				C104.2	Describe the types of polymers, polymerization reactions, polymerization techniques and fabrication methods of polymers for engineering applications
				C104.3	Explain second law of thermodynamics and second law based derivations of importance in engineering applications in all disciplines
				C104.4	Explain phase rule in the alloying and the behaviour of one component and two component systems using phase diagram
				C104.5	Explain importance of photophysical and photochemical processes and spectroscopy
				C104.6	Explain basics of nano materials, their properties and applications
5	C105	GE8151	Problem Solving and Python Programming	C105.1	Elaborate the organization of digital computer and design the solution for simple computing problems using algorithm, flowchart and pseudo code.
				C105.2	Apply the different looping structure to solve simple scientific and statistical problems.
				C105.3	Identify the solutions for simple problems using arrays and strings
				C105.4	Demonstrate the usage of dynamic memory allocation and pointer variables.
				C105.5	Explain the concepts of structure and union with an example programs.
				C105.6	Develop simple software and applications
6	C106	GE8152	Engineering Graphics	C106.1	Perform free hand sketching of basic geometrical construction and multiple views of objects
				C106.2	Construct orthographic projection of straight lines and planes surface
				C106.3	Construct orthographic views of simple solids
				C106.4	Develop lateral surfaces of sectioned solids
				C106.5	Build isometric and perspective views of simple solids
				C106.6	Develop graphic skills for communication of concept, ideas and design of engineering products
7	C107	GE8161	Problem Solving and Python Programming Laboratory	C107.1	Explain fundamental concepts and basic commands in C
				C107.2	Develop, compile and debug programs in C language
				C107.3	Formulate problems and implement algorithms in C.
				C107.4	Select programming components that efficiently solve computing problems in real-world.
				C107.5	Apply good programming design methods for program development.
				C107.6	Develop recursive programs.

8	C108	BS8161	Physics and Chemistry Laboratory	C108.1	Assess optical fibre parameters using laser properties.
				C108.2	Measure the velocity of ultrasonic waves in a given liquid medium
				C108.3	Compute the wavelength of mercury spectrum using properties of light
				C108.4	Compute the thermal conductivity of a bad conductor using Lee's method.
				C108.5	Estimate acids and bases quantitatively based on the conductance of the solution
				C108.6	Estimate acids and bases quantitatively based on pH level of the solution
9	C109	HS8251	Technical English	C109.1	Breakdown the ideas in to its elementary constituents, analyze and act after a meaning full thought process
				C109.2	Analyze the phrase and passage and explicitly pass on the ideas meaning fully
				C109.3	Manage to interpret the given phrase or the graphical rendering and review the contents well individually or as a group
				C109.4	Concentrate on the communication aspect of complicated ideas and respond positively
				C109.5	Debate the issues and find the rudiments of the problem individually and as a group.
				C109.6	Respond intelligently and seek clarification and understand completely.
10	C110	MA8251	Engineering Mathematics – II	C110.1	Apply Laplace transform technique to solve the given ordinary differential equation
				C110.2	Explain concepts of vector calculus, needed for problems in all engineering disciplines.
				C110.3	Compute line, surface and volume integral using Gauss divergence, Green's and stoke's theorem.
				C110.4	Find the singularities and its corresponding residues for the given function.
				C110.5	Find double integral over general areas and triple integral over general volumes
				C110.6	Apply Gauss Divergence theorem for evaluating the surface integral.
11	C111	PH8251	Materials Science	C111.1	Explain various phase diagrams and their applications.
				C111.2	Describe the Fe-Fe ₃ C phase diagram, various microstructures and alloys.
				C111.3	Explain the mechanical properties of materials and their measurement
				C111.4	Discuss the magnetic, dielectric and superconducting properties of materials.
				C111.5	Summarize the properties and applicationsof ceramics, composites and nanomaterials.
				C111.6	Explain the principles of materials science for mechanical engineering applications.

12	C112	BE8253	Basic Electrical, Electronics and Instrumentation Engineering	C112.1	Explain the basic theorems used in Electrical circuits and the different components and function of electrical machines.
				C112.2	Describe the Ohm's Law – Kirchoff's Laws
				C112.3	Explain the fundamentals of semiconductor and applications.
				C112.4	Explain the principles of digital electronics
				C112.5	Identify the electrical components explain the characteristics of electrical machines.
				C112.6	Identify electronics components and use of them to design circuits.
13	C113	GE8291	Environmental Science and Engineering	C113.1	Extend the knowledge about ecosystem and biodiversity at local, national and global level.
				C113.2	Summarize causes, effects, preventive and control measures of various types of pollution.
				C113.3	Explain the different natural resources and the need for their conservation.
				C113.4	Interpret the social issues and how to solve the issues.
				C113.5	Illustrate sustainable development, relationship between human population and environment.
				C113.6	appreciate the importance of environment by assessing its impact on the human world
14	C114	GE8292	Engineering Mechanics	C114.1	Illustrate the equilibrium of a particle in space using principle of laws of mechanics
				C114.2	Analyse the equilibrium of rigid bodies in two dimensions and in three dimensions.
				C114.3	Evaluate the properties of the surfaces and solid
				C114.4	Calculate dynamic forces exerted in rigid bodies
				C114.5	Formulate the effect of friction on moving bodies
				C114.6	Predict the effect of force and motion of rigid bodies
15	C115	GE8261	Engineering Practices Laboratory	C115.1	Identify Tools and Techniques used for Sheet Metal Fabrication
				C115.2	Use welding equipment to join the structures.
				C115.3	Measure various electrical quantities
				C115.4	Explain the working of electronic components and its utilization
				C115.5	Apply electronic principles to develop circuits for primitive application
				C115.6	Demonstrate Plumbing requirements of domestic buildings

16	C116	BE8261	Basic Electrical, Electronics and Instrumentation Engineering Laboratory	C116.1	Demonstrate the load test, OCC, load characteristics and speed control of DC shunt and DC series motor
				C116.2	Experiment with load test, OC and SC test on a single phase transformer
				C116.3	Explain the regulation of an alternator by EMF and MMF methods
				C116.4	Perform load test, speed control on various phase of induction motor
				C116.5	Interpret the DC and AC starters
				C116.6	Construct the V curves and inverted V curves of synchronous Motor
17	C201	MA8353	Transforms and Partial Differential Equations	C201.1	Solve the given standard partial differential equations
				C201.2	Appreciate the physical significance of fourier series techniques in solving one and two dimensional heat flow problems
				C201.3	Apply partial differential equation for the solution of physical engineering problems
				C201.4	Evaluate the given integral using fourier transform technique
				C201.5	Solve partial differential equation by using Z transform techniques for discret time sysytem
				C201.6	Apply mathematical priciple on transform and partial differential equation to solve mechanical Engineering problem
18	C202	ME8391	Engineering Thermodynamics	C202.1	Apply the first law of thermodynamics towards flow and non flow process
				C202.2	Analyze the performance of energy systems using second law of thermodynamics
				C202.3	Apply rankine cycle to steam power plant and compare few cycle improvement methods
				C202.4	Apply simple thermodynamic relations of ideal and real gases
				C202.5	Evaluate the properties of gas mixtures and moist air and its use in pshycrometric processes
				C202.6	Apply the Thermodynamic Principles to Mechanical Engineering Application.
19	C203	CE8394	Fluid Mechanics and Machinery	C203.1	Predict the fluid properties and characteristics at stagnant and dynamic conditions.
				C203.2	Determine major and minor losses associated with pipe flow in piping networks.
				C203.3	apply the mathematical knowledge to validate the flow properties by dimensional analysis
				C203.4	Analyze the perforamance characteristics of various types of pumps
				C203.5	Select the suitable turbine for specific applications based on the performance characteristics.
				C203.6	Examine the various parts of hydraulic machines and types of flows.

20	C204	ME8351	Manufacturing Technology - I	C204.1	identify various types and defects in metal casting process
				C204.2	Compare different metal joining processes.
				C204.3	Summarize the various hot working and cold working process.
				C204.4	Explain various sheet metal making processes.
				C204.5	Distinguish the various manufacturing process for plastic components.
				C204.6	fabricate different types of components using the machine tools
21	C205	EE8353	Electrical Drives and Controls	C205.1	Explain the basic of electrical motors
				C205.2	Analyze the drive motor characteristic and performances
				C205.3	Choose the starting methods for different motors
				C205.4	Explain the solid state speed control for DC motors
				C205.5	Explain the solid state speed control for AC motors
				C205.6	Compare different types of electrical machines and their performance
22	C206	ME8361	Manufacturing Technology Laboratory I	C206.1	Demonstrate the safety precautions exercised in the mechanical workshop
				C206.2	Make the workpiece as per given shape and size using Lathe.
				C206.3	Perform the thread cutting operations in the given workpiece.
				C206.4	Make use of knurling tool to prepare model as per the given size.
				C206.5	Perform the machining operations using milling and shaping machine tools.
				C206.6	fabricate different types of mechanical components using the machine tools
23	C207	ME8381	Computer Aided Machine Drawing Laboratory	C207.1	Explain the concepts of limits, fits and tolerances pertaining to machine components.
				C207.2	Construct 2D views of valves and bearings.
				C207.3	Draw the assembly view of different types of couplings and joints using 3D modelling software
				C207.4	Draw the assembly view of IC engine parts
				C207.5	Construct the assembly drawings of various machine components in sketcher mode.
				C207.6	Prepare assembly drawings of mechanical components using 3D modelling software
24	C208	EE6365	Electrical Engineering Laboratory	C208.1	Demonstrate the load test, OCC, load characteristics and speed control of DC shunt and DC series motor
				C208.2	Experiment with load test, OC and SC test on a single phase transformer
				C208.3	Explain the regulation of an alternator by EMF and MMF methods
				C208.4	Perform load test, speed control on various phase of induction motor
				C208.5	Interpret the DC and AC starters
				C208.6	Construct the V curves and inverted V curves of synchronous Motor

25	C209	HS8381	Interpersonal Skills / Listening & Speaking	C209.1	Listen to informal conversation and respond effectively
				C209.2	Communicate with one or more listener using appropriate communicative strategy
				C209.3	Write coherently and flawlessly their ideas logically on a topic
				C209.4	Read different genres of text adopting various reading strategies
				C209.5	Able to listen to different spoken discourses in different accents
				C209.6	Participate in the placement activities group discussion, interview skill and presentation
26	C210	MA8452	Statistics and Numerical Methods	C210.1	Apply the concept of testing of hypothesis for small and large samples in real life problems.
				C210.2	Apply the basic concepts of classifications of design of experiments in the field of mechanical Engineering
				C210.3	distinguish between numerical differentiation and numerical integration
				C210.4	distinguish between numerical differentiation and numerical integration.
				C210.5	Solve the partial and ordinary differential equations with initial and boundary conditions for various engineering applications
				C210.6	Determine the solutions for the problems drawn from the mechanical engineering industry using statistical and numerical techniques.
27	C211	ME8492	Kinematics of Machinery	C211.1	Explain the fundamental concepts of machines, mechanisms and related terminologies.
				C211.2	Calculate velocity and acceleration of various linkage mechanisms.
				C211.3	Develop cam profile for specified output motions
				C211.4	Solve problems on gears and gear trains.
				C211.5	Evaluate the friction in motion transmission and machine components.
				C211.6	Utilize analytical, mathematical and graphical aspects of kinematics of Machines for optimum design.
28	C212	ME8451	Manufacturing Technology– II	C212.1	Explain the mechanism of material removal processes
				C212.2	Describe the constructional and operational features of centre lathe and other special purpose lathes.
				C212.3	Describe the constructional and operational features of shaper, milling and gear cutting machines.
				C212.4	Explain the types of grinding and other super finishing processes
				C212.5	Summarize numerical control of machine tools and write a part program
				C212.6	Compare the functions and applications of different metal cutting tools

29	C213	ME8491	Engineering Metallurgy	C213.1	explain the phase diagrams and iron carbon equilibrium diagram
				C213.2	categorize the various heat treatment processes and cooling curves
				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 mechanical properties of different materials.
				C213.6	apply the different materials, their processing, heat treatments in suitable application in mechanical engineering fields
30	C214	CE8395	Strength of Materials for Mechanical Engineers	C214.1	Determine the deformation behaviour of simple structures
				C214.2	construct the shear force and bending moment diagram under various load conditions
				C214.3	Examine the stresses in Circular Shafts and springs.
				C214.4	Analyze different types of loads and its consequent deflections of structures
				C214.5	Solve for various stresses in thin and thick cylinders.
				C214.6	assess the concepts of strength of materials to obtain solutions to real time engineering problems
31	C215	ME8493	Thermal Engineering I	C215.1	Apply thermodynamic concepts to different air standard cycles.
				C215.2	Calculate the performance parameters of air compressors
				C215.3	Explain the functioning and features of IC engines, components and auxiliaries.
				C215.4	Calculate the performance parameters of IC engines
				C215.5	Analyze the performance of Gas turbines
				C215.6	apply the thermodynamic concepts into various thermal application like IC engines, air compressors and gas turbines
u	C216	ME8462	Manufacturing Technology Laboratory-II	C216.1	Describe various machining operations in special purpose machines.
				C216.2	Demonstrate various special purpose machines such as vertical and horizontal milling, grinding and gear hobbing machines.
				C216.3	Make use of different machine tools for manufacturing gears
				C216.4	Employ different machine tools for finishing operations.
				C216.5	Develop CNC part programming
				C216.6	Equip with the practical knowledge required in the core industries special purpose machines

33	C217	CE8381	Strength of Materials and Fluid Mechanics and Machinery Laboratory	C217.1	Calculate the coefficient of discharge for Orifice meter and Venturimeter
				C217.2	Determine the friction factor for flow through pipes
				C217.3	Estimate the performance characteristics of centrifugal pump and submergible pump
				C217.4	Construct the performance characteristics curves for reciprocating pump and gear pump.
				C217.5	Identify the performance characteristics of turbines
				C217.6	Predict the properties and characteristics of a fluid.
34	C218	HS8461	Advanced Reading and Writing	C218.1	Demonstrate the reading skills
				C218.2	Write different types of essays
				C218.3	Write winning job applications
				C218.4	Evaluate texts critically
				C218.5	Display critical thinking in various professional contexts
				C218.6	Demonstrate their project and proposal writing skills.
35	C301	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
				C301.3	calculate performance parameters of steam turbines .
				C301.4	Summarize the concept of Cogeneration, Working features of Heat pumps and Heat exchangers
				C301.5	Solve problems using refrigerant table and psychrometric charts
				C301.6	Apply the thermodynamic concepts for Nozzles, Boilers, Turbines, and Refrigeration & Air Conditioning Systems
36	C302	ME8593	Design of Machine Elements	C302.1	Explain the influence of stress and variable stresses in machine component design
				C302.2	Design the components for transmission like shafts and coupling couplings.
				C302.3	Apply the concept of design to temporary and permanent joints
				C302.4	Apply the concept of design to energy storing elements and engine components
				C302.5	Select suitable bearings for various Engineering applications.
				C302.6	Apply the concept of design for evaluating the shape and dimensions of machine components

37	C303	ME8501	Metrology and Measurements	C303.1	Describe the concept of measurements in various metrological instruments
				C303.2	Outline the principles of linear and angular measurement tools used for industrial application
				C303.3	Explain the procedure for conducting computer aided inspection
				C303.4	Demonstrate the techniques of form measurements used for industrial components
				C303.5	Discuss various measuring techniques of mechanical properties in industrial applications
				C303.6	Demonstrate different measurement technologies and its application in industries
38	C304	ME8594	Dynamics of Machines	C304.1	Solve certain common dynamical problems developed in the machines / engines due to dynamic forces.
				C304.2	Identify the undesirable effects of unbalances resulting from any mechanical systems.
				C304.3	calculate the effects of Dynamics of undesirable free vibrations.
				C304.4	Analyze the forces in mechanical systems and evaluate the dynamics of forced vibrations.
				C304.5	Calculate the speed and stability control in mechanical systems using the principles of governor and gyroscope.
				C304.6	Interpret the computed results in machine dynamics to improve the design of a mechanism.
39	C305	ORO551	Renewable Energy Sources	C305.1	Explain the principles of solar radiation
				C305.2	classify the solar energy collectors and methodologies of storing solar energy.
				C305.3	Outline the various applications in solar energy
				C305.4	Describe the economic aspects of wind energy and biomass.
				C305.5	Compare geothermal energy with other energy sources.
				C305.6	Describe the environmental aspects of non-conventional energy resources.
40	C306	ME8511	Kinematics and Dynamics Laboratory	C306.1	Check the various types of gears, gear trains, kinematic mechanisms, and universal joints
				C306.2	Calculate the mass moment of inertia of axisymmetric objects using Turn table apparatus, bi-filar suspension, compound pendulum and natural frequency for single and double rotor systems, equivalent spring mass system and transverse
				C306.3	Check the critical speed of shaft under the given load conditions and the gyroscopic effect and couple on motorized gyroscope
				C306.4	Sketch the characteristic curves of Watt, Porter, Proell and Hartnell governors and motion curves for the given cam follower setup
				C306.5	Check the balancing of rotating masses in dynamic balancing machine
				C306.6	Demonstrate the principles of kinematics and dynamics of machinery

41	C307	ME8512	Thermal Engineering Laboratory	C307.1	Determine thermal conductivity of various engineering materials
				C307.2	Calculate heat transfer rate in free and forced convection environment
				C307.3	Calculate emissivity of grey surface
				C307.4	Appraise the effectiveness of parallel and counter flow heat exchanger
				C307.5	Calculate COP of refrigeration and air conditioning system and performance of air compressor and fluidized bed cooling tower
				C307.6	Describe the Effectiveness of Parallel / counter flow heat exchanger.
42	C308	ME8513	Metrology and Measurements Laboratory	C308.1	Check the dimensions and the dimensional deviations of given parts
				C308.2	Check the dimensions, angularity and parallelism of a given component.
				C308.3	Construct the torque characteristic curves to various loads at various distances
				C308.4	Appraise the straightness of surfaces and determine size of irregularities on a machined surface
				C308.5	Calculate the vertical distances or height of objects, taper angle of slope for a given component, various parameters of threads and gear wheel.
				C308.6	Calculate Bore diameter measurement using telescope gauge and micrometer
43	C309	ME8651	Design of Transmission Systems	C309.1	Apply the concepts of design to belts, chains and rope drives
				C309.2	Apply the concept of design tool spur and helical gears
				C309.3	Evaluate the design concept of bevel, worm and cross helical gears
				C309.4	Identify the correct progressive ratio to design the gear box
				C309.5	Apply the concept of design tool cams, brakes and clutches
				C309.6	Apply the standard procedures to design the transmission components used in engine and machines
44	310	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
				C310.6	Apply CAD/CAM concepts to product design and manufacturing

45	C311	ME8693	Heat and Mass Transfer	C311.1	Interpret the mechanisms of heat transfer under steady and transient conditions.
				C311.2	Interpret the concepts of heat transfer through extended surfaces.
				C311.3	Explain the phase change heat transfer and heat exchanger
				C311.4	Describe the block body radiation and grey body radiation
				C311.5	Apply the Fick's Law of Diffusion and evaluate the convective mass transfer
				C311.6	Apply different heat and mass transfer principles of different applications
46	C312	ME8692	Finite Element Analysis	C312.1	Solve problems by applying standard finite element techniques.
				C312.2	Construct stiffness matrix for one dimensional finite elements
				C312.3	Examine 2-D finite element continuum for structural applications.
				C312.4	Solve 1-D and 2-D heat transfer problems using finite element approach.
				C312.5	Apply axisymmetric formulation for specific applications and Make use of finite element principles in isoparametric applications.
				C312.6	Apply the concepts of finite element principles in iso parametric applications
47	C313	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
				C313.3	Explain the different types of Hydraulic circuits and systems
				C313.4	Develop pneumatic circuits for industrial applications
				C313.5	Summarize the various trouble shooting methods and applications of hydraulic and pneumatic systems.
				C313.6	Apply Fluid power principles in process, construction and manufacturing Industries.
48	C314	ME8091	Automobile Engineering	C314.1	Describe basic construction and working principle of various parts of an automobile.
				C314.2	Explain the assembling and dismantling of engine parts and transmission system
				C314.3	Describe the Steering geometry and types of steering gear box
				C314.4	Explain Engine emission control by three way catalytic converter system and Electronic ignition system
				C314.5	Explain the Combustion and Emission Characteristics of SI and CI engines with these alternate fuels
				C314.6	Describe the Antilock Braking System Electronic brake force distribution systems

49	C315	ME8681	CAD / CAM 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.
				C315.6	Develop the Drilling and Tapping operation using CNC machine.
50	316	ME8682	Design and Fabrication Project	C316.1	choose their desired field to initiate their design and fabrication project
				C316.2	explain their concept of their design and develop their prototype of their design and fabrication project.
				C316.3	examine their design and fabrication project with some references.
				C316.4	conclude their design and fabrication project is advanced and improved in recent technology.
				C316.5	design and fabricate which will be hands on training at their budding stage.
				C316.6	Develop innovative design into prototype
51	C317	HS8581	Professional Communication	C318.1	Make effective presentations
				C318.2	Communicate with one or more listner using appropriate communicative stratgy
				C318.3	Participate confidently in Group Discussions.
				C318.4	Develop adequate Soft Skills required for the workplace
				C318.5	Listen different spolen discourses in different accent
				C318.6	Participate in the placement activities group discussion, interview skill and presentation
52	C401	ME8792	Power Plant Engineering	C401.1	Describe the knowledge about the various subsystems of coal power plant
				C401.2	Recognize the merits & demerits of diesel and gas turbin power plant.
				C401.3	Explain the constrcution and working of components inside nuclear power plant.
				C401.4	Discuss layout and components associated with renewable energy power plant
				C401.5	Apply the knowledge to power economics and environmental hazards
				C401.6	Discuss the different types of power plants, its functions and their issuesrelated to them
53	C402	ME8793	Process Planning and Cost Estimation	C402.1	Explain the procedure and steps involved in process, equipment and tooling selection
				C402.2	Describe the Process parameters calculation for various production processes
				C402.3	Calculate the labour cost, material cost and depreciation cost in foundry shop
				C402.4	Calculate the different cost in welding shop and forging shop
				C402.5	Calculate the Machining Time for Different Lathe Operations like Drilling and Boring
				C402.6	Assess process planning concepts to make cost estimation for production process.

54	C403	ME8791	Mechatronics	C402.1	Explain the specifications of sensors and choose the suitable sensors for real time applications
				C402.2	Discuss the architecture of microprocessor and micro controller
				C402.3	Explain programmable peripheral interface and various device interfacing
				C402.4	Describe architecture, programming and application of programmable logic controller
				C402.5	Discuss various actuators and mechatronics systems for the given case studies
				C402.6	Circuits.
55	C404	OML751	Testing of Materials	C403.1	Explain the classification and importance of material testing.
				C403.2	Explain the different techniques of mechanical testing of materials
				C403.3	Summarize different Non Destructive Techniques for material testing
				C403.4	Explain different material characterization testing techniques
				C403.5	Describe thermal and chemical testing techniques.
				C403.6	Identify suitable testing technique to inspect industrial component
56	C405	ME8073	Unconventional Machining Processes	C405.1	Defend the needs of unconventional machining processes.
				C405.2	influence on their performance.
				C405.3	Differentiate between Electric discharge machining and Wire cut Electric discharge machining
				C405.4	Compare the chemical machining process with electro-chemical machining process
				C405.5	Explain the working principles of thermal energy based processes.
				C405.6	Demonstrate different unconventional machining processes
57	C406	ME8097	Non Destructive Testing and Evaluation	C406.1	Explain the fundamental concepts of NDT.
				C406.2	Discuss the different methods of NDE.
				C406.3	Explain the concept of Thermography and Eddy current testing
				C406.4	Explain the concept of Ultrasonic Testing and Acoustic Emission
				C406.5	Explain the concept of Radiography
				C406.6	Select suitable Non Destructive Testing technique to inspect industrial component
58	C407	ME8711	Simulation and Analysis Laboratory	C407.1	Develop MATLAB programs for analyzing Engineering Problems
				C407.2	formulate Simulation using Multibody Dynamic software.
				C407.3	analyze the stresses and strains induced in plates, brackets and beams
				C407.4	examine thermal stress and heat transfer analysis of plates, cylindrical shells
				C407.5	calculate the natural frequency and mode shape analysis of 2D components and beams
				C407.6	Analyze real time engineering problems using simulation and analysis tools

59	C408	ME8781	Mechatronics Laboratory	C408.1	Create the program for arithmetic functions and the program for sorting, code conversion functions
				C408.2	Formulate the program codes to interface with traffic light controller and stepper motor.
				C408.3	Compare the set speed with actual speed of DC motor by interfacing suitable speed sensors
				C408.4	Integrate all the hydraulic, pneumatic and electro pneumatic circuits by using simulation software.
				C408.5	Analyze the real images and template images based on image processing techniques
				C408.6	Design mechatronics system with the help of Microprocessor, PLC and other electrical and Electronics Circuits.
60	C409	ME8712	Technical Seminar	C409.1	Survey research papers for understanding of a new field, in the absence of a textbook, to summarise and review them.
				C409.2	Identify promising new directions of various cutting edge technologies
				C409.3	Explain the topic and defend the panel question.
				C409.4	Impart skills in preparing detailed report describing the seminar topic.
				C409.5	Communicate Effectively by making an oral presentation before an evaluation committee
				C409.6	Deliver well-organised technical presentations at conferences and other symposia.
61	C410	MG8591	Principles of Management	C410.1	Explain the purpose of management & managerial roles in local and global organization
				C410.2	Prescribe the decision making model under different conditions
				C410.3	Explain the process of staff selection and career development
				C410.4	Demonstrate creativity and innovation, and explain the motivational theories
				C410.5	Explain the process of different types of control, and planning operations in management
				C410.6	Explain the System and process of controlling
62	C411	ME8094	Computer Integrated Manufacturing Systems	C411.1	Explain the basic concepts of CAD,CAM and CIM
				C411.2	Summarize the production planning and process planning techniques
				C411.3	Apply different coding techniques in cellular manufacturing
				C411.4	Discuss different FMS layouts and automated guided vehicle system
				C411.5	Classify robots for industrial application
				C411.6	Make use of computer applications in various aspect of manufacturing
63	C412	ME8811	Project Work	C412.1	Make comprehensive use of the technical knowledge gained from Literature review.
				C412.2	Formulate the possible methodologies for the problem statements.
				C412.3	Organize the project activity with the constraints required to implement it.
				C412.4	Design the working model and test its functioning.
				C412.5	Communicate effectively to a diverse audience and develop technical reports and publications.
				C412.6	Work as a team member/leader to manage projects in a multidisciplinary environment.