ARUNAI ENGINEERING COLLEGE, THIRUVANNAMALAI

Department of Mechanical Engineering

Course Outcomes (R-13)

Semester / Year, Branch : 01 – 08, II – IV, B.E. Mechanical Engineering

Regulations : 2013

I Year (ODD SEMESTER)

C101: HS6151 Technical English I, Year of study 2015-2016

C101.1	Explain clearly, confidently, comprehensibly, and communicate with one or many listeners using appropriate communicative strategies.
C101.2	Construct cohesively and coherently and flawlessly avoiding grammatical errors, using a wide vocabulary range, organizing their ideas logically on a topic.
C101.3	Organize different genres of texts adopting various reading strategies.
C101.4	Distinguish and comprehend different spoken discourses/excerpts in different accents.
C101.5	Improve listening to different accents, speeches and presentations.

C102: MA6151 Mathematics I, Year of study 2015-2016

C102.1	The students will be able to infer canonical form from quadratic form using the concepts of Eigen values and Eigen vectors.
C102.2	Students will be able to test the convergence of sequences and series.
C102.3	Students will be able to apply the techniques of differential calculus to find the evolute and envelope of curves.
C102.4	Students will be able to determine the maxima and minima of functions of two variables using partial derivatives.
C102.5	Students will be able to find the area enclosed by plane curves and volume of solids using multiple integrals

C103: PH6151 Engineering Physics I, Year of study 2015-2016

C103.1	Describe the crystal structures and various crystal growth techniques
C103.2	Analyze the elastic nature of materials and thermal behaviour of materials.
C103.3	Apply the knowledge of quantum mechanics and classical mechanics in addressing the problems related to science and technology.
C103.4	Apply the knowledge about designing an auditorium with good acoustical properties and make use of Ultrasonics and its applications in various fields.
C103.5	Illustrate the advantages of optical communication using LASER.

C104: CY6151 Engineering Chemistry I, Year of study 2015-2016

C104.1	Describe the methods of polymerization, types, properties and uses of polymers.
C104.2	Illustrate the concepts of basic thermodynamics and problem solving skills in various disciplines of Engineering.
C104.3	Discuss the laws of photochemistry in recognizing the interaction of light with matter and its applications in luminescence and spectroscopy.
C104.4	Review the use of phase rule in identifying its applications in metallurgy and alloys.
C104.5	Summarize the basic knowledge in Nanochemistry and distinguish the existing technology with nanotechnology.

C105: GE6151 - Computer Programming, Year of study 2015-2016

C105.1	Elaborate the organization of a digital computer and design the solution for simple computing problems using algorithm, flowchart and pseudo code
C105.2	Apply different looping structures to solve simple scientific and statistical problems
C105.3	Devise solutions for simple problems using array and strings
C105.4	Demonstrate the usage of Dynamic memory allocation and pointer variables
C105.5	Illustrate the concepts of structures and unions with example programs

C106: GE6152 Engineering Graphics, Year of study 2015-2016

C106.1	The students will be able to sketch the conic sections, special curves, and draw orthographic views from pictorial views and models.
C106.2	Students will be able to apply the principles of orthographic projections of points in all quadrants, lines and planes in first quadrant.
C106.3	Students will be able to sketch the projections of simple solids like prisms, pyramids, cylinder and cone and obtain the traces of plane figures.
C106.4	Students will be able to practice the sectional views of solids like cube, prisms, pyramids, cylinders & cones and extend its lateral surfaces.
C106.5	Students will be able to sketch the perspective projection of simple solids, truncated prisms, pyramids, cone and cylinders and sketch the isometric projection of simple machine parts.

C107: GE6161 Computer Programming Laboratory, Year of study 2015-2016

C107.1	Understand the usage of office automation tools.
C107.2	Apply good programming design methods for program development.
C107.3	Design and implement the C programs for simple applications.
C107.4	Develop and implement the recursive programs.
C107.5	Implement the c programs with the help of structures and unions.

C108: EPL, Year of study 2015-2016

C108(L).1	Construct carpentry components and pipe connections including plumbing works
C108(L).2	Use welding equipment's to join the structures
C108(L).3	Illustrate the basic machining operations.
C108(L).4	Construct the models using sheet metal works.
C108(L).5	Describe centrifugal pump, Air conditioner, operations of smithy, foundry and fittings.
C108(L).5	Construct the basic electrical and electronic circuits.
C108(L).5	Examine the different types of electronic circuits and components.
C108(L).5	Explain the electrical safety rules, grounding, general house wiring.
C108(L).5	Perform soldering in various electronic circuits.
C108(L).5	Illustrate the basic operation of domestic electrical appliances.

C109: GE6163 Physics and Chemistry Laboratory – I, Year of study 2015-2016

C107(L).1	The hands on exercises undergone by the students will help them to apply physics principles of optics and thermal physics to evaluate engineering properties of materials.

C107(L).2	Perform the quantitative chemical analysis of chloride and dissolved oxygen.
C107(L).3	Determine the amount of acids by using the instruments of conductivity meter and pH meter.

I Year (EVEN SEMESTER)

C110: HS6251 Technical English II, Year of study 2015-2016

C110.1	Speak convincingly, express their opinions clearly, initiate a discussion, negotiate, argue using appropriate communicative strategies.
C110.2	Write effectively and persuasively and produce different types of writing such as narration, description, exposition and argument as well as creative, critical, analyticaland evaluative writing.
C110.3	Read different genres of texts, infer implied meanings and critically analyse and evaluate them for ideas as well as for method of presentation.
C110.4	Listen/view and comprehend different spoken excerpts critically and infer unspoken and implied meanings.
C110.5	Become accomplished, active readers and will be able to write effectively for a variety of professional and social settings.

C111: MA6251 Mathematics II, Year of study 2015-2016

C111.1	Students will be able to apply the knowledge of vector calculus in engineering disciplines
C111.2	Students will be able to solve ordinary differential equations that model the engineering problems
C111.3	Students will be able to find the Laplace transform of functions and solve the ordinary differential equations using Laplace transform
C111.4	Students will be able to construct analytic functions and apply the knowledge of conformal mappings in engineering disciplines
C111.5	Students will be able to evaluate contour integration and apply it in engineering problems

C112: PH6251 Engineering Physics II, Year of study 2015-2016

C112.1	Describe the conducting materials and their properties.
C112.2	Analyze the semiconductors and able to differentiate various types of semiconductors.
C112.3	Apply the knowledge of magnetic and superconducting materials for modern day to day applications.
C112.4	Explain the properties and applications of dielectrics.
C112.5	Apply the knowledge about the modern engineering materials for various applications.

C113: CY6251 Engineering Chemistry II, Year of study 2015-2016

C113.1	Describe water technology in the purification of water in domestic and industrial applications.
C113.2	Explain the principles of electrochemistry, the factors affecting corrosion and the prevention of corrosion.
C113.3	Classify the different alternative sources of energy and the generation processes.
C113.4	Enumerate the different types of engineering materials and their applications.
C113.5	Discuss the industrial techniques of petroleum processing and the determination of calorific values and combustion parameters.

C114: GE6252 Basic Electrical and Electronics Engineering, Year of study 2015-2016

C114.1	Apply the basic concepts of electric circuits and measuring instruments.
C114.2	Demonstrate the construction and working of various electrical machines.
C114.3	Illustrate the characteristics of various electronic devices.

C114.4	Explore the basics concepts in design of digital circuits.
C114.5	Explain the basics of different communication systems.

C115: GE8292 Engineering Mechanics, Year of study 2015-2016

C115.1	Determine the magnitude of force in rigid bodies under equilibrium conditions.
C115.2	Determine the resultant of the forces and moments of rigid body system under equilibrium conditions.
C115.3	Calculate the center of gravity, centroid and moment of inertia of surfaces and solids.
C115.4	Explain the differential principles apply to solve engineering problem dealing with force, displacement, velocity and acceleration.
C115.5	Solve the elements of rigid body dynamics subjected to frictional forces and dynamic forces.

C116:, CADM Year of study 2015-2016

C116(L).1	Design different parts of mechanical equipment's.
C116(L).2	Apply skills in various designing and manufacturing industries
C116(L).3	Create 2D and 3D models using modeling software's.
C116(L).4	Make appropriate selection of CAD functionality to use as tools in the design process.
C116(L).5	Communicate effectively the geometry and intent of design features.

C117: GE6262 Physics and Chemistry Laboratory – II, Year of study 2015-2016

C117(L).1	The students will have the ability to test materials by using their knowledge of applied physics principles in optics and properties of matter.
C117(L).2	Determine the hardness, alkalinity and metal ion content in the water samples by volumetric titration.
C117(L).3	Estimate the water quality parameters by potentiometer, conductometer and flame photometer.

II Year (ODD SEMESTER)

C201: MA6351 Transforms and Partial Differential Equations, Year of study 2016-2017

C201.1	Solve the Partial Differential Equations.
C202.2	Determine the Fourier series expansion of functions and hence evaluate the value of infinite series.
C203.3	Apply the method of separation of variables to solve one dimensional wave equation, one dimensional heat equation and two dimensional heat equation
C204.4	Find the Fourier transform of functions and also evaluate definite integrals using Fourier transform.
C205.5	Calculate the Z-transform of discrete time systems and solve the difference equation susing Z-transform.

C202 : CE6306 Strength of Materials, Year of study 2016-2017

C202.1	Describe the mechanical behavior of materials under stress with axial load, thermal load and compute the principal stress and principal strain by Mohr's circle.
C202.2	Calculate the shear force and bending moment for the different types of beams with various types of loading condition
C202.3	Use the concept of deflection of beams by various methods
C202.4	Explain the concept of torsional behaviour of materials with various configuration and also combine the deflection and torsional behavior of helical springs, carriage springs
C202.5	Apply the biaxial state of stress concept on thin and thick cylinders

C203 : ME6301 Engineering Thermodynamics, Year of study 2016-2017

C203.1	Explain the basic concept and first law of thermodynamics and apply it in closed and open systems
C203.2	Calculate irreversibilities associated with a thermodynamics process
C203.3	Determine the efficiency of Rankine, Binary and Combined process
C203.4	Differentiate the behaviour of ideal gas and real gas
C203.5	Calculate the psychometric properties of air-vapour mixtures by using psychometric chart and expressions

C204: CE6451 Fluid Mechanics and Machinery, Year of study 2016-2017

C204.1	Apply mathematical knowledge to predict the properties and characteristics of a fluid.
C204.2	Analyse and calculate major and minor losses associated with pipe flow in piping networks.
C204.3	Mathematically predict the nature of physical quantities
C204.4	Critically analyse the performance of pumps
C204.5	Critically analyse the performance of turbines

C205 : ME6302 Manufacturing Technology I, Year of study 2016-2017

C205.1	Describe special casting processes and sand testing methods

C205.2	Student will be able to differentiate the various welding process and its application
C205.3	Classify the hot working and cold working operation and its rolling defect
C205.4	Explain sheet metal characteristics and various special forming processes
C205.5	Compare thermoplastic and thermosetting plastic and its manufacturing methods

C206: EE6351 Electrical Drives and Control, Year of study 2016-2017

C206.1	Describe special casting processes and sand testing methods
C206.2	Student will be able to differentiate the various welding process and its application
C206.3	Classify the hot working and cold working operation and its rolling defect
C206.4	Explain sheet metal characteristics and various special forming processes
C206.5	Compare thermoplastic and thermosetting plastic and its manufacturing methods

C207(L): ME6311Manufacturing Technology Laboratory – I, Year of study 2016-2017

C207(L).1	Describe special casting processes and sand testing methods
C207(L).2	Differentiate the various welding process and its application
C207(L).3	Classify the hot working and cold working operation and its rolling defect
C207(L).4	Explain sheet metal characteristics and various special forming processes
C207(L).5	Compare thermoplastic and thermosetting plastic and its manufacturing methods

C208(L): CE6461 Fluid Mechanics and Machinery Laboratory, Year of study 2016-2017

C208(L).1	Measure the discharge of fluid flow in a pipe by using different flow measurement devices
C208(L).2	Calculate the energy losses of friction in a pipe flow for various flow conditions
C208(L).3	Perform the characteristics of positive displacement and dynamic pumps
C208(L).4	Determine the efficiency of impulse and reaction turbine in various load conditions
C208(L).5	Compare the performance characteristics of pumps and turbines

C209(L): EE6365 Electrical Engineering Laboratory, Year of study 2016-2017

C209(L).1	Determine the load characteristics of various DC motors and Generators
C209(L).2	Draw the equivalent circuit of transformer
C209(L).3	Predetermine the voltage regulation of an alternator
C209(L).4	Sketch the characteristics of three phase synchronous and induction motors
C209(L).5	Differentiate various types of D.C. and A.C. motor starters

II Year (EVEN SEMESTER)

C210:MA6452 Statistics and Numerical Methods, Year of study 2016-2017

C210.1	Test the Hypothesis in various decision making problems.
C210.2	Apply the design of experiments techniques in various engineering problems.
C210.3	Apply the numerical techniques to find approximate solution of linear system of equations and to find dominant Eigen value.
C210.4	Interpret the data and find the approximate value of the Integrals using different numerical techniques.
C210.5	Find numerical solutions of initial value problems of ordinary differential equations.

C211:ME6401 Kinematics of Machinery, Year of study 2016-2017

C211.1	Apply the fundamental principle of kinematics in various parts of the machine.
C211.2	Determine the velocity and acceleration of simple and complex mechanisms.
C211.3	Draw the cam profile layouts and determine velocity and acceleration of cams.
C211.4	Identify the types of gears and determine the nomenclature of various gear and gear trains.
C211.5	Compute the fundamentals of friction and solve the problems in belt drive, brakes, clutch, bearings and screw jacks.

C212:ME6402 Manufacturing Technology– II, Year of study 2016-2017

C212.1	Explain the theory of metal cutting processes.
C212.2	Describe the different types of turning machines used for metal cutting.
C212.3	Discuss the construction and working principle of shaper, milling and gear cutting machines.
C212.4	Explain different types of broaching machines and grinding machines.
C212.5	Demonstrate the programming in CNC lathe and CNC milling machines.

C213:ME6403 Engineering Materials and Metallurgy, Year of study 2016-2017

C213.1	Discuss about the Iron-Carbon Equilibrium Phase Diagram for understanding different Phases
C213.2	Apply the various heat treatment process in order improve the mechanical properties.
C213.3	Explain the various types of steel, cast iron and Strengthening Mechanisms.
C213.4	Classify the various types of Non-Metallic materials with application.
C213.5	Explain the various Mechanical testing methods for a Metallic and Non-metallic materials.

C214:GE6351 Environmental Science and Engineering, Year of study 2016-2017

C214.1	Understand the importance of public awareness on environment and nature of biodiversity.
C214.2	Know about the various causes, effect and control measures of environmental pollution.
C214.3	Comprehend the human development that leads to environmental disasters, the value of natural resources and their conservation.
C214.4	Recognize the value of public participation in environmental protection, Environmental Management and Legislation Acts and sustainable development.
C214.5	Learn the problems related to population and their remedial measures.

C215:ME6404 Thermal Engineering, Year of study 2016-2017

C215.1	Compare the performance characteristics of various gas power cycles under same working limits.
C215.2	Demonstrate the working principle of internal combustion engine and its components for the optimum performance
C215.3	Calculate the performance parameters of steam nozzle and turbine under various working conditions
C215.4	Determine the various efficiencies of positive displacement compressors at constant pressure ratio
C215.5	Describe the thermodynamic cycles involved in refrigeration and processes of air conditioning system

C216(L): ME6411 Manufacturing Technology Laboratory–II, Year of study 2016-2017

C216(L).1	Explain the theory of metal cutting processes.
C216(L).2	Describe the different types of turning machines used for metal cutting.
C216(L).3	Discuss the construction and working principle of shaper, milling and gear cutting machines.
C216(L).4	Explain different types of broaching machines and grinding machines.
C216(L).5	Demonstrate the programing in CNC lathe and CNC milling machines.

C217(L):ME6412 Thermal Engineering Laboratory - I, Year of study 2016-2017

C217(L).1	Determine the flash and fire point of different fuel and lubricants
C217(L).2	Draw the valve timing and port timing diagram for a given four stroke and two stroke engine.
C217(L).3	Compare the performance of single cylinder Diesel Engine with different loading conditions
C217(L).4	Calculate the Indicated thermal efficiency by conducting Morse test on multi-cylinder petrol engine
C217(L).5	Evaluate the performance of steam generator and steam turbine at different load Conditions.

C218(L):CE6315 Strength of Materials Laboratory, Year of study 2016-2017

C218(L).1	Perform different destructive testing.
C218(L).2	Compare Characteristics of material.
C218(L).3	Utilize appropriate materials in design considering engineering properties, sustainability, cost and weight.
C218(L).4	Perform engineering work in accordance with ethical and economic constraints related to the design of structures and machine parts.
C218(L).5	Analyze and design structural members subjected to tension, compression, torsion, bending and combined stresses using the fundamental concepts of stress, strain and elastic behavior of materials.

III Year (ODD SEMESTER)

C301: ME6501 Computer Aided Design, Year of study 2017-2018

C301.1	Illustrate the various transformation techniques in computer graphics.
C301.2	Elaborate the operational features of geometric modeling.
C301.3	Explain various algorithms in visual realism.
C301.4	Describe the mechanism simulation in assembly of parts.
C301.5	Discuss the importance of graphics and computing standards.

C302: ME6502 Heat and Mass Transfer, Year of study 2017-2018

C302.1	Solve steady and unsteady state heat conduction problems in one- dimensional heat transfer condition.
C302.2	Calculate heat transfer coefficients for natural and forced convection of flow over exterior surfaces and inside the tubes using empirical equations.
C302.3	Perform basic calculation of phase change heat transfer and heat exchangers to determine relevant design parameters.
C302.4	Predict the properties of surfaces and heat transfer rate in radiation mode.
C302.5	Illustrate concepts of mass transfer principles and its correlations.

C303: ME6503 Design of Machine Elements, Year of study 2017-2018

C303.1	Determine the safe design parameters using appropriate failure theories involved in designing process
C303.2	Estimate the safe design parameters of the Shafts and Couplings
C303.3	Design the safe design parameters of Temporary and Permanent joints
C303.4	Determine the safe design parameters of the Energy Storing Elements and Engine Components
C303.5	Find the safe design parameters of Bearings

C304: ME6504 Metrology and Measurements, Year of study 2017-2018

C304.1	Discuss the errors in measurements with types of control and its standards
C304.2	Describe the principle of various measuring instruments used for linear and angular measurements
C304.3	Explain the working of advanced measuring instruments in metrology
C304.4	Illustrate the principle and methods of form measurements
C304.5	Detail the principle of instruments used in measurements of power, flow and temperature

C305: ME6505 Dynamics of Machines, Year of study 2017-2018

C305.1	Describe concepts considered in the force analysis
C305.2	Acquire the procedure of balancing of rotating masses and reciprocating masses
C305.3	Discuss the features of vibratory system under single degree of freedom

C305.4	Explain the concept of transmissibility and vibration isolation
C305.5	Determine the various factors and effects considered in governors and gyroscopes

C306(L) : GE6075 Professional Ethics in Engineering, Year of study 2017-2018

C306.1	Describe the importance of human values from perspective of engineers.
C306.2	Explain different theories on moral development.
C306.3	Discuss the codes of ethics for engineers and roles of engineers as experimenters.
C306.4	Describe about safety, risk and to recognize the different responsibilities and rights of engineers.
C306.5	Interpret the different roles of engineers with regards to present global scenario.

C307(L): ME6511 Dynamics Laboratory, Year of study 2017-2018

C307(L).1	Analyze the kinematics of two-dimensional (planar) rigid-body motion
C307(L).2	Use concepts of angular displacement, angular velocity and angular acceleration
C307(L).3	Gear mechanism classification and gear train analysis, and familiarity with gear standardization and specification in design
C307(L).4	Determine the natural frequency of various vibratory systems and whirling speed of shaft
C307(L).5	Compare the performance characteristics of various governors

C308(L): ME6512 Thermal Engineering Laboratory-I, Year of study 2017-2018

C308(L).1	Determine the thermal conductivity of insulating material, insulating powder and composite wall
C308(L).2	Evaluate the convective heat transfer coefficient of air under natural and forced convective heat transfer
C308(L).3	Calculate efficiency of fluidized bed cooling tower and reciprocating air compressor
C308(L).4	Compare the effectiveness and efficiency of counter flow and parallel flow heat exchanger
C308(L).5	Evaluate the psychrometric properties of air-vapour mixtures in various processes associated with air conditioning system and refrigeration system

C309(L): ME6513 Metrology and Measurements Laboratory, Year of study 2017-2018

C309(L).1	Discuss the errors in measurements with types of control and its standards.
C309(L).2	Describe the principle of various measuring instruments used for linear and angular measurements
C309(L).3	Explain the working of advanced measuring instruments in metrology
C309(L).4	Illustrate the principle and methods of form measurements
C309(L).5	Detail the principle of instruments used in measurements of power, flow and temperature

III Year (EVEN SEMESTER)

C310: ME6601 Design of Transmission Systems, Year of study 2018-2019

C310.1	Solve the problems on power transmission by selecting suitable Flat belts and 'V' belts, Chains and Ropes.
C310.2	Design the power transmission systems operated by spur and helical gears.
C310.3	Determine the various parameters of bevel and worm gears for different transmission systems.
C310.4	Construct the Ray diagram and Kinematic diagram for various types of gear boxes.
C310.5	Design of Cams, Clutches and various types of brakes.

C311: MG6851 Principles of Management, Year of study 2018-2019

C311.1	Discuss the evolution of management, functions and roles of managers
C311.2	Explain the different types of planning process and tools used for planning
C311.3	Elaborate different organization structures and functions of human resources manager
C311.4	Illustrate the different theories of motivation and leadership
C311.5	Describe the control techniques and the role of technology in management

C312: ME6602 Automobile Engineering, Year of study 2018-2019

C312.1	Identify the different parts of vehicle structure and components of automobile engine.
C312.2	Explain the working principle of various parts of engine auxiliary systems.
C312.3	Describe the operation of various devices in transmission systems.
C312.4	Discuss the working principle of steering, brakes and suspension systems.
C312.5	Compare the performance and emission characteristics of various alternative sources for automotive.

C313: ME6603 Finite Element Analysis, Year of study 2018-2019

C313.1	Summarize the basics of finite element formulation.
C313.2	Apply finite element formulations to solve one dimensional Problems.
C313.3	Apply finite element techniques to formulate and solve structural, fluid, and thermal problems using finite element methodology.
C313.4	Select appropriate space (planar (plane stress or strain), axisymmetric, or spatial), idealization (type of element), and modeling techniques
C313.5	Use finite element methods for solving time-dependent and/or non-linear problems.

C314: ME6604 Gas Dynamics and Jet Propulsion, Year of study 2018-2019

C313.1	Understand the numerical methods involved in Finite Element Theory
C313.2	Formulate simple problems into finite elements.
C313.3	Apply finite element techniques to formulate and solve structural, fluid, and thermal problems using finite element methodology.
C313.4	Select appropriate space (planar (plane stress or strain), axisymmetric, or spatial), idealization (type of element), and modeling techniques
C313.5	Use finite element methods for solving time-dependent and/or non-linear problems.

C315: ME6003 Renewable Source of Energy, Year of study 2018-2019

C315.1	Discuss the importance of non-conventional energy sources and its environmental aspects.
C315.2	Explain the various technologies for utilization of solar energy.
C315.3	Describe the working principle of wind energy systems.
C315.4	Explain the principles of operations of biogas plant with its applications.
C315.5	Explain the principle and working of other renewable energy sources.

C316: ME6004 Unconventional Machining Process, Year of study 2018-2019

C316.1	Explain various unconventional machining processes.
C316.2	Express the influence of difference process parameters on the performance and their applications of AJM, WJM, AWJM and USM.
C316.3	Discuss the principle construction and working of EDM with process parameters and applications
C316.4	Elaborate the principle, construction and working of Electrochemical machining, Electrochemical grinding and Electrochemical honing with their process parameters and applications.
C316.5	Describe process principle, equipment and working of laser beam, plasma beam and electron beam machining.

C317(L): C.A.D. / C.A.M. Laboratory, Year of study 2018-2019

C317(L).1	Design different parts of mechanical equipment's
C317(L).2	Apply skills in various designing and manufacturing industries
C317(L).3	Create 2D and 3D models using modeling software's
C317(L).4	Make appropriate selection of CAD functionality to use as tools in the design process
C317(L).5	Communicate effectively the geometry and intent of design features
C317(L).6	Develop CNC programs to manufacture industrial components

C318(L): Design and Fabrication Project, Year of study 2018-2019

C318(L).1	Use the design principles and develop conceptual & engineering design of any components.
C318(L).2	Fabricate any components using different manufacturing tools.

C319(L): Communication and Soft Skills-Laboratory Based, Year of study 2018-2019

C319(L).1	Listen and interpret visuals, involve in formal and informal conversations, make presentations, and participate in GD.
C319(L).2	Solve reading comprehension passages of higher levels, draft Resume, cover letter, reports, emails, and write blogs.
C319(L).3	Possess knowledge about IELTS, TOEFL, GRE, and placement oriented verbal ability.
C319(L).4	Perform well in a job interview with the non-verbal and paralinguistic skills acquired.
C319(L).5	Exhibit leadership traits, team skills and essential soft skills and efficiency to excel as a professional.

IV Year (ODD SEMESTER)

C401: ME6701 Power Plant Engineering, Year of study 2019-2020

C401.1	Describe the various systems of coal based thermal power plant
C401.2	Explain the various cycles and systems in Diesel, gas and combined cycle power plant
C401.3	Describe the working of nuclear reactors in nuclear power plant
C401.4	Explain the principle/ construction and working of hydroelectric and various non-conventional power plants.
C401.5	Examine energy, economic and environmental issues of power plant.

C402: ME6701 Mechatronics, Year of study 2019-2020

C402.1	Apply the fundamental concepts of sensors in various applications.
C402.2	Describe the functions of 8085 Microprocessor and their interface.
C402.3	Explain the various features of Programmable Peripheral Interface in general applications.
C402.4	Develop the structure and programming of PLC to control the actuation systems.
C402.5	Discuss the concepts of Mechatronics design approach into various domestic applications.

C403: ME6702 Computer Integrated Manufacturing Systems, Year of study 2019-2020

C403.1	Explain the basic concepts of CAD, CAM and computer integrated manufacturing systems.
C403.2	Summarize the production planning and control and computerized process planning.
C403.3	Differentiate the different coding systems used in group technology.
C403.4	Explain the concepts of flexible manufacturing system (FMS) and automated guided vehicle (AGV) system.
C403.5	Classification of robots used in industrial applications.

C404: GE6757 Total Quality Management, Year of study 2019-2020

C404.1	Discuss the contributions of Quality Guru.
C404.2	Explain the principles of TQM.
C404.3	Apply the tools and techniques of quality management to manufacturing and service processes.
C404.4	Describe TQM tools and techniques such as Control Charts, QFD and TPM.
C404.5	Discuss the elements of Quality system standards

C405: ME6005 Process Planning and Cost Estimation, Year of study 2019-2020

C405.1	Recall the steps involved in process planning
C405.2	Summarize the procedure and parameters required for process planning activities
C405.3	Explain the importance of costing and estimation procedures
C405.4	Estimate the cost for various shops
C405.5	Estimate the machining time required for drilling, boring, milling, planning and grinding etc.

C406: ME6008 Welding Technology, Year of study 2019-2020

C406.1	Explain the working of various Gas and Arc Welding techniques and its applications
C406.2	Describe the construction and working of different resistance welding processes and its applications
C406.3	Discuss the principle and characteristics of Solid state welding processes and its applications
C406.4	Explain the advanced welding techniques and welding automation
C406.5	Discuss the typical design of weld joints, weldability of Aluminium, copper, stainless steel and testing of weldments

C407: ME6009 Energy Conservation and Management, Year of study 2019-2020

C407.1	Explain energy auditing methodology
C407.2	Illustrate possible economic measures in electrical systems
C407.3	Discuss possible economic measures in thermal systems
C407.4	Describe various energy saving opportunities in major utilities
C407.5	Analyze the payback period for energy conservation opportunities

C408: ME6012 Maintenance Engineering, Year of study 2019-2020

C408.1	Describe the basic principles in maintenance
C408.2	Able to identify the role of preventive maintenance
C408.3	Summarize the various processes involved in condition monitoring
C408.4	Explain the influence of failure analysis in basic machine elements
C408.5	The students will be able to compute the principles of material handling equipment and the use of computers in maintenance.

C418: ME6010 Robotics, Year of study 2019-2020

C418.1	Explain the concepts of industrial robots, classification, specifications and coordinate systems. Also summarize the need and application of robots in different sectors.
C418.2	Illustrate the different types of robot drive systems as well as robot end effectors.
C418.3	Apply the different sensors and image processing techniques in robotics to improve the ability of robots.
C418.4	Develop robotic programs for different tasks and familiarize with the kinematics motions of robot.
C418.5	Examine the implementation of robots in various industrial sectors and interpolate the economic analysis of robots.

C409(L): ME6711 Simulation and Analysis Laboratory, Year of study 2019-2020

C409.1	Demonstrate the engineering design problem that involves interaction between heat, stress and to generate the model using a proper element type, and then solve the problem
C409.2	Discretize, apply load and constrains for the given model
C409.3	Display the results such as Von Mises stress, displacement, temperature, pressure, and velocity etc. obtained from analysis
C409.4	Model, analyse and simulate experiments under real time environment and evaluate the performance
C409.5	Demonstrate the use of MATLAB software for multi-physic type of problems

C410(L): ME6712 Mechatronics Laboratory, Year of study 2019-2020

C410(L).1	Summaries how mechatronics integrates knowledge from different disciplines in order to realize engineering and consumer products that are useful in everyday life

C410(L).2	Design the mechatronics circuits for suitable applications
C410(L).3	Demonstrate the functions of 8051 microcontroller and their interface
C410(L).4	Simulate the various pneumatic and hydraulic circuits for real time applications
C410(L).5	Select suitable actuators and sensors and integrate them for suitable applications

C411(L): ME6713 Comprehension, Year of study 2019-2020

C411(L).1	Comprehend any given problem related to mechanical engineering field.
C411(L).2	Apply knowledge of mathematics, science, and mechanical engineering.
C411(L).3	Solve the problems in the field for thermal sciences
C411(L).4	Improve the knowledge in field for manufacturing technology.
C411(L).5	Utilize the skills learned in the design domain

IV Year (EVEN SEMESTER)

C412: MG6863 Engineering Economics, Year of study 2019-2020

C412.1	Apply the fundamental concepts of sensors in various applications.
C412.2	Apply the fundamental concepts of sensors in various applications.
C412.3	Explain the various features of Programmable Peripheral Interface in general applications.
C412.4	Develop the structure and programming of PLC to control the actuation systems.
C412.5	Discuss the concepts of Mechatronics design approach into various domestic applications.

C413: IE6605 Production Planning and Control, Year of study 2019-2020

C413.1	Enumerate the activities involved in the Production Planning and Control function
C413.2	Explain the significance and applications of work study techniques
C413.3	Describe the process planning activities with reference to production control
C413.4	Discuss the concepts of production scheduling
C413.5	Explain different types of costs in inventory system

C414: MG6071 Entrepreneurship Development, Year of study 2019-2020

C414.1	Illustrate the role of entrepreneurship in economic growth.
C414.2	Discuss the importance of motivation and Entrepreneurship Development Programme in business.
C414.3	Develop a business plan for a start-up.
C414.4	Explain the concept of capital structure and identify the factors determining it.
C414.5	Explore various corrective measures to overcome the sickness in small business.

C415: ME6019 Non Destructive Testing and Materials, Year of study 2019-2020

C415.1	Discuss the concept of NDT and materials
C415.2	Explain the various processes involved in surface NDE
C415.3	Describe the role of eddy current and thermography testing in NDT
C415.4	Compare the principles of ultrasonic and acoustic testing
C415.5	Explain the influence of radiography testing in NDT

C416: ME6016 Advanced I.C Engines, Year of study 2019-2020

C416.1	Describe the different stages of combustion in spark ignition engine and the phenomenon of knocking
C416.2	Explain the different stages of combustion in compression ignition engine and the fuel spray behavior during injection
C416.3	Explain the chemistry behind the formation of pollutants in internal combustion engines
C416.4	Identify the suitability of different alternate fuels for spark and compression ignition engines
C416.5	Discuss the recent developments in

C417(P): ME6811 Project Work, Year of study 2019-2020

C417(P).1	Take up any challenging practical problems and find solution by formulating proper methodology.