Course Outcomes (CO)

Course Name: Engineering Mathematics-I	Course Code: GE-2101
GE-2101 CO-1	Apply the knowledge of differentiation to develop the Mathematical equations and compute geometrical measures
GE-2101 CO-2	Determine the expansion and derivatives of functions of Multiple variables and use it to find extreme values of functions.
GE-2101 CO-3	Evaluate the integrals of single, multiple variables and use it to measure the dimensions of various geometrical figures.
GE-2101 CO-4	Discuss Calculus of Scalar and vector point function and use appropriate theorems to evaluate integrals of functions of single, multiple variables.

Course Name: Engineering Mathematics-II	Course Code: GE-2102
GE-2102 CO-1	Use appropriate Methods to solve first order and higher order differential equations and apply it to find solutions of engineering problems
GE-2102 CO-2	Analyse the functions of complex numbers and variables, prove Mathematical equations and evaluate the complex integrals
GE-2102 CO-3	Use Matrix method to solve linear equations , evaluate eigen values - eigen vectors and its applications.
GE-2102 CO-4	Measure the statistical parameters and derive the equations of best fit curves

Course Name: Communication Skill	Course Code: GE-2107
GE-2107 CO-1	Explain the basics of communication process as well as identify the barriers in communication.

GE-2107 CO-2	Classify and describe the different Speech Sounds of English Language.
GE-2107 CO-3	Apply different strategies and techniques of presentations, interviews and group communication.
GE-2107 CO-4	Drafting reports, memos and emails, considering the professional etiquettes and ethics with appropriate content and context.

Course Name: Social Science	Course Code: GE-2108
GE-2108 CO-1	Explain the basic concepts of Social Sciences.
GE-2108 CO-2	Describe the development of various Civilizations and their Culture.
GE-2108 CO-3	Analyze the Impact of Industrialization on society and discuss the Fundamental Concepts of Society.
GE-2108 CO-4	Explain Industrial Organization and Management.

Course Name: Engineering Physics Course Name: Engineering Physics (Lab.)	Course Code: GE-2105 and GE 2106
GE 2105 & GE2106 CO1	Examine the intensity variation of light due to interference, diffraction and its applications.
GE 2105 . CO2	Explain fundamentals of quantum mechanics and its application to problems dealing with quantum particle.
GE 2105 & GE2106 CO3	Develop ability to classify and analyze the characteristics of semiconductor materials in terms of crystal structures, charge carriers and energy bands for device applications.
GE 2105 & GE2106 CO4	Analyze the motion of charged particle in electric and magnetic fields and its applications to electron optic devices.
GE 2105 & GE2106 CO1	Illustrate working principle of lasers, ultrasonic waves and its properties for useful applications in the field of industry.

Course Name: Engineering Chemistry Course Name : Engineering Chemistry (Lab.)	Course Code: GE2103 and GE 2104
GE2103 and GE 2104 CO1	Assess qualitative and quantitative aspects of water as a conventional material for industrial and domestic applications.
GE2103 and GE 2104 CO2	Apply the knowledge of basic electrochemistry to understand battery technology, corrosion process and preventive techniques.
GE2103 and GE 2104 CO3	Know the basics and assess analytical aspects of industrial materials like fuels and lubricants for efficient utilization.
GE2103 and GE	Recognize the significance of cement and advanced engineering materials in technological applications.

2104 CO4	
GE2103 and GE 2104 CO5	Analyze and generate analytical and instrumental techniques.

Course Name: Engineering Mechanics Engineering Mechanics (Lab.)	Course Code: CV-2101 - CV2102
CV-2101- CO 1	An ability to apply the concept of applied mechanics and can solve problems on planar force system for friction as well as frictionless surfaces.
CV-2101- CO 2	An ability to analyze pin jointed truss frame structure and beam structure analytically and graphic
CV-2101- CO 3	An ability to understand centroid, moment of inertia, product of inertia and mass moment of inertia and can find properties of surfaces.
CV-210- 1CO 4	An ability to determine the dynamic variables of moving body, understand working principle of simple lifting machine.

Course Name: Basic Electronics	Course Code: EE 2101
EE 2101 CO1	Characterize Number systems, semiconductors, diodes, transistors and operational amplifiers.
EE 2101 CO2	Design simple analog circuits
EE 2101 CO3	Design simple combinational and sequential logic circuits
EE 2101 CO4	Identify functions of digital multimeter, Bridges and transducers in the measurement of physical variables

Course Name: Introduction to Computer Programming Introduction to Computer Programming (Lab.)	Course Code: IT2101 Course Code: IT-2102
IT2101, IT2102 CO1	Understand computer system, basics of algorithm & flowchart, and demonstrate straight line program using basic 'C' programming language constructs.
IT2101 IT2102 CO2	Design & Develop programs using different loop control structures, user defined functions, and Pointers.
IT2101 IT2102 CO3	Analyze and apply concepts of different dimensional Arrays as a data structure & development of programs using the same.
IT2101 IT2102 CO4	Design and develop programs using basics of Strings, Structures, union and Files in 'C' language.

Course Name:Electrical	Course Code: EL 2101 EL-2102 (Lab.)

Engineering Elect. Eng. Lab	
EL 2101 & EL 2102- CO-1	Reproduce fundamentals of dc circuits, single phase, and three phase ac circuits.
EL 2101 & EL 2102- CO-2	Analyse dc circuits, single phase and three phase ac circuits for basic electrical quantities such as current, voltage, power etc.
EL 2101 & EL 2102- CO-3	Explain construction, working, testing, and applications of various electrical machines.
EL 2101 & EL 2102- CO-4	Analyse performance of various electrical machines.
EL 2101 & EL 2102- CO-5	Perform laboratory experiments and demonstrate competency in collecting, interpreting, analysing data, communicate and present effectively through laboratory journals.

Course Name: Engineering Graphics Engineering Graphics Lab.	**Course Code: ME2101 ME-2102**
ME2101 ME-2102 CO1	Transform orthographic projections into isometric projections and vice versa.
ME2101 ME-2102 CO2	Evaluate Projections of various One Dimensional, Two dimensional, Three dimensional objects.
ME2101 ME-2102 CO3	Built the development of lateral surfaces of various solids and their cut section.
ME2101 ME-2102 CO4	Predict the intersections and intersections of various solid objects.
ME2101 ME-210 2CO5	Justify the use of software tools used for Two dimensional drawings.

Course Name: Workshop Practice	**Course Code: ME 2103**
CO1	Understand the carpentry tools, joints, machineries and its applications
CO2	Understand the fitting tools, measuring instruments, machineries and its applications
CO3	Understand the smithy tools furnaces and hand and power forging equipment's
CO4	Understand Gas and Electric welding processes, utility, tools and its applications

Course Name: Engineering Mathematics III	**Course Code:** GE2201
CO1	Estimate the Calculus of Numerical Function.
CO2	Determine transforms and inverse transforms of various functions of variables and use it to solve Mathematical equations.

CO3	Discuss the nature of periodic function and express it in terms of series.
CO4	Use appropriate method/s to solve partial differential equations

Course Name: Material Science and Metallurgy	Course Code:ME2201
CO1	Student will be able to distinguish microstructure and analyse the effect of Crystalline nature of metals
CO2	Student will be able to construct Iron-Iron carbide equilibrium diagram and analyse microstructure, general properties and heat treatment practices of commercial steels and Cast Iron.
CO3	Student will be able to analyse and implement suitable heat treatment processes
CO4	Student will be able to perceive the basics of powder Metallurgy for powder metallurgical components

Course Name: Material Science and Metallurgy LAB	Course Code:ME2202
CO1	Students will be able to create specimen for metallographic examination
CO2	Students will be able to analyze the microstructure and investigate various properties of ferrous and non-ferrous Materials
CO3	Students will be able to test different Engineering Materials

Course Name: Fluid Mechanics Fluid Mechanics LAB	Course Code: ME-1205 ME 1206
ME-1205 ME 1206 CO1	The student will be able to evaluate various fluid properties and analyze hydrostatic forces acting on submerged flat bodies
ME-1205 ME 1206 CO2	The students will be able to classify and analyze the various flow pattern, and will be able to evaluate velocity and acceleration using fluid kinematics.
ME-1205 ME 1206 CO3	The students will be able to analyze and solve ideal flow and real flow problems by applying bernoulli's equations and momentum equations. The students will also be able to describe and analyze the fluid flow over bodies.
ME-1205 ME 1206 CO4	The students will be able to analayze the flow, through pipes. The students will be able to evaluate head losses, discharge, power lost etc for the flow through pipes with and without fittings
Course Name: Machining process Machining process Lab	Course Code:ME2203 ME2204
ME 2203 ME 2204 CO1	Distinguish among various cutting tool materials and tool geometries.
ME 2203 ME 2204 CO2	Examine the different processes and machine tools for cylindrical surface machining.
ME 2203 ME 2204 CO3	Differentiate various machining processes and conditions for flat surface machining using SPCT.
ME 2203 ME 2204 CO4	Justify machining processes for flat surfaces marching using MPCT.

Course Name:Mechanics of Materials Mechanics of Materials LAB	Course Code: ME2205 ME2206
ME2205 ME2206 CO1	Describe the basic concepts of stress, strain and their variations under different types of loading
ME2205	Apply the basic concepts involved in mechanics of materials,

ME2206 CO2	bending moment, shear force, stresses in beams to solve complex problems
ME2205 ME2206 CO3	Analyze strain, impact loading and crippling load
ME2205 ME2206 CO4	Evaluate the torsional shear stress in shaft and solve the problem on Slope and deflection in beams under different loading and support conditions.

Course Name:KINEMATICS OF MACHINERY	Course Code:ME2207
CO1	Students should be able to understand the mechanical system, mechanism its components, relative motion between them.
CO2	Students should be able to determine the velocity & Acceleration of a kinematic link of a given mechanism and various forces coming on links in static condition.
CO3	Students should be able to identify the motion as per the application & draw the profile of a camfollowers mechanism.
CO4	Students should be able to understand the kinematics of gears and gear train. They should be able to select an appropriate gear system.

<mark>Second Year: Semester IV:</mark>

Course Name: – Advanced Mathematical Techniques	Course Code:ME2204
CO1	Utilize numerical techniques to obtain approximate solutions of mathematical equations
CO2	Measure the Statistical parameters for random variables
CO3	Explain the basic concept of fuzzy sets, Relations and fuzzy logic
CO4	Design and determine the solution of linear programming problems

Course Name:Engineering Thermodynamics	Course Code:ME2212
CO1	Apply the laws of thermodynamics for the analysis of thermodynamic systems to evaluate energy interactionin various processes s.
CO2	Evaluate the performance of cyclic devices, change in the entropy and availability in various processes applying the laws of thermodynamics.
CO3	Examine various thermodynamic parameters in the processes with phase change using steam tables, charts and relations applying the laws of thermodynamics.
CO4	Apply the laws of thermodynamics for the analysis of thermodynamic cycles.

Course Name:Design of machine elements	Course Code:ME 2251
CO1	Student will be able to apply the knowledge of design principal in machine components.
CO2	Student will be able to Design and analyze various joints i.e., Welded joints, Bolted joints and Riveted joints.

CO3	Student will be able to Learn the design principals of power screw, springs, clutches and brakes.
CO4	Student will be able to Apply principal of design of pressure vessel and power transmission shafts.

Course Name: Machine Drawing	Course Code: ME 2253
CO1	Apply standards practices and conventions in machine drawing
CO2	Draw a Orthographic and Isometric drawing
CO3	Preparing and visualizing detailed drawing of various machine components
CO4	Create a 2D and 3D using CAD software with due manufacturing consideration.

Course Name: Manufacturing process II Manufacturing process II LAB	Course Code: ME2254 2255
ME2254 2255 CO1	The student will be able to illustrate the basics of moulding practices and various casting process .
ME2254 2255 CO2	The student will be able to illustrate CUPOLA and other furnaces.
ME2254 2255 CO3	The student will be able to Elaborate and classify different welding processes.
ME2254 2255 CO4	The student will be able to discuss various SMW processes

Course Name: Mechanical Measurement and Metrology Mechanical Measurement and Metrology LAB	Course Code:ME2256 ME2257
ME2256 ME2257 CO1	The student will be able to Demonstrate the basic knowledge of measuring Instruments and evaluate various characteristics.
ME2256 ME2257 CO2	The student will be able to Select proper measuring instruments and use it for measuring various parameters
ME2256 ME2257 CO3	The student will be able to design limit gauges & tolerance charts.
ME2256 ME2257 CO4	The student will be able to Evaluate statistical process control and acceptance sampling procedures to improve quality of process.

Third Year: Semester V:

Course Name: Fundamental of Management	Course Code:GE2311
CO1	Explain the Legal provision and Functions of Management.
CO2	Analyze the role of Human Resource and Financial Management in the organization.
CO3	Analyze the project life cycles.
CO4	Identify tools and techniques for the marketing of goods and services

Course Name: HEAT TRANSFEFR HEAT TRANSFEFR lAB	Course Code:ME2301 ME2302
ME2301 ME2302 CO1	Analyze and solve the problems of unidirectional steady state heat conduction systems.
ME2301 ME2302 CO2	Investigate and apply the empirical correlations in convection and phase change processes to estimate the heat transfer coefficient.
ME2301 ME2302 CO3	Design & analyze the heat exchangers with LMTD & ϵ-NTU methods
ME2301 ME2302 CO4	Examine and evaluate the net thermal radiation exchange between surfaces and estimate radiation view factors using tables, graphs and the view factor relationships

Course Name: Operation Research Techniques	Course Code: ME2315
CO1	Apply basic operations research techniques to formulate given situation as LLP and solving by graphical & simplex method.
CO2	To Solve transportation and Assignment Models and analyse the concept of dynamic programming to Solve problems of discreet and continuous variables.
CO3	Analyze projects for minimum total cost and smooth level of resources.
CO4	Evaluation of different replacement policies and its application in operation research and analyse of the application of simulation, inventory control model and waiting line mode.

Course Name: Applied Thermodynamics	Course Code: ME- 2307
CO1	Students shall be able to describe and analyze the basic principles of compressible fluid flow and apply those principles to its applications.
CO2	Students should illustrate and analyze Steam nozzle, steam turbine and condenser used in thermal power plants.
CO3	Students should able to illustrate and evaluate gas turbine cycle, its classification, and its application in power plant.
CO4	Students should able to evaluate gas turbine cycle, and its application to jet propulsion.

Course Name: OE-1: Automobile Engineering	Course Code: ME-1317
CO1	Student will be able to analyze various systems of Engine, its function including fuel supply, cooling and lubrication system in vehicle.
CO2	Student will be able to describevarious power transmission systems from clutch to wheel in vehicle.
CO3	Student will be able to evaluate and describecontrol systems like steering and brakes in vehicle.
CO4	Student will be able to illustrate and describe the necessary electrical and luxurious systems and safety system in vehicle.

Course Name:DYNAMICS OF MACHINERY	Course Code:ME1323
CO1	Students should be able to understand the mechanical system, mechanism its components, relative between them.
CO2	Students should be able to determine the relative velocity & Acceleration of a kinematic link of a given mechanism and various forces coming on links in static condition.
CO3	Students should be able to identify the motion as per the application & draw the profile of a camfollowers mechanism.
CO4	Students should be able to understand various types of Gears used in Machine terminologies and concepts of velocity ratios in gear trains.

Course Name: DYNAMICS OF MACHINERY LAB	Course Code: ME1324
CO1	Students will be able to: Differentiate static and dynamic forces on different machines and mechanisms.
CO2	Analyze the unbalanced in rotating & reciprocating machines and corrections required to balance the same.
CO3	identify the vibrations in different machines.
CO4	Evaluate and justify vibrations.

Course Name: OE-II: Power Generation Engineering	Course Code:ME1333
CO1	Student will be able to describe basics of power generations systems.
CO2	Student will be able to analyze various conventional & non-conventional power plants.
CO3	Student will be able to analyze and examine combined operations of different power plants.
CO4	Student will be able to evaluate and describeHydroelectric power plant nuclear power plant

Course Name: Energy Conversion	Course Code:ME1310
CO1	The student will be able to describe and analyze the working of compressors.
CO2	The student will be able to describe and analyze the working of I.C.Engines
CO3	The student will be able to describe and analyze the working of Refrigeration systems
CO4	The student will be able to define evaluate Psychromatic properties and; describe and analyze the air conditioning processes

Course Name: COMPUTER AIDED DESIGN	Course Code:ME1312
CO1	Distinguish the various CAD CAM tools and also evaluate criteria for CAD CAM systems
CO2	Design 2D and 3D Transformation matrices
CO3	Calculate and analyse the parametric equations for wire frame. surface and solid modeling entities
CO4	Design the applications of modeling and evaluate data exchange formats

Course Name:COMPUTER AIDED DESIGN LAB	Course Code:ME1312
CO1	Execute transformation through C++ prgramming language
CO2	Apply appraches of sketcher modeling for developing CAD Model
CO3	Apply appraches of part modeling for developing CAD Model

Course Name: TOTAL QUALITY MANAGEMENT	Course Code:ME1331
CO1	Develop an understanding on quality management philosophies and frameworks.
CO2	Develop in-depth knowledge on various tools and techniques of quality management.
CO3	To Evaluate the applications of quality tools and techniques in both manufacturing and service industry
CO4	Ability to use quality management methods analyzing and solving problems of organization.

Course Name: Production Management	Course Code: ME1447
CO1	Ability to estimate and evaluate manage production system using work study.
CO2	Ability to design and evaluate plant layouts
CO3	Ability to predict and evaluate future demand using forecasting.
CO4	Ability to estimate production costing and apply by judging production planning and control.

Course Name: (PE-1) REFRIGERATION AND CRYOGENICS	Course Code:ME1469
CO1	The student will be able to describe, analyze and evaluate Vapour Compression Refrigeration System.
CO2	The student will be able to describe and analyze other refrigeration system such as Vapour Absorption Refrigeration System, Electrolux refrigeration system, steam jet refrigeration systems, thermoelectric refrigeration and vortex tube refrigeration
CO3	The student will be able to describe, analyze and evaluate Air Cycle Refrigeration Systems.
CO4	The student will be able to describe and analyzeCryogenic Systems.

Course Name: (PE-2) Renewable Energy System	Course Code:ME1410
CO1	Students will be able to apply the use of solar energy for the benefit of the society.
CO2	Students will be able to understand the better awareness of potential of Biogas and gasifiers also its use for the society.
CO3	Students will be able to understand the better awareness of potential of wind energy. Geothermal energy .
CO4	Students will be able to understand the better awareness of potential of ocean wave energy and tidal energy, MHD generation

Course Name: (PE-3)I.C.Engines	Course Code: ME-1419
CO1	Student should able to analyze basic working cycles, construction and and systems of I.C. Engines.
CO2	Student should able to analyze fuels, combustion process, pollution and its control of engines.
CO3	Student should able conduct a trial for Engine performance evaluation.

Course Name: Advanced Manufacturing Techniques	Course Code: ME 1456
CO1	Distinguish the various nontraditional manufacturing process based on energy sources.
CO2	Evaluate various advanced manufacturing process for new materials and the requirements of complex features on the basis of various parameters.
CO3	Justify the various advanced welding and bonding techniques as per the applications.
CO4	Evaluate the application of various advanced manufacturing techniques in industries

Course Name: Management Information Systems	Course Code: ME1443
CO1	Differentiate the nature, scope and the role of MIS in an organization.
CO2	Examining the system for processing the information.
CO3	Compose the DSS to solve the managerial problems.
CO4	Justify the application using MIS tools.

Course Name: Management Information Systems LAB	Course Code: ME1444
CO1	Differentiate the nature, scope and the role of MIS in an organization.
CO2	Examining the system for processing the information.
CO3	Apply the MIS tools for various application

Course Name: ENGINEERING OF PLASTICS	Course Code:ME1404
CO1	Students will be able to select the suitable plastic material for given application.
CO2	Students will be able to select suitable plastic processing technique.

CO3	Students will be able to select suitable machining and joining process for plastic components.
CO4	Student will be able to implement suitable processes for manufacturing various composite products.

Course Name: DESIGN OF MECHANICAL DRIVES	Course Code:ME1448
CO1	Describe the design process, material selection & calculations of stresses in flat belt, V belt, chain drive and rope drive, and finding its failure criteria.
CO2	Design the various gear drive such as spur, helical, worm & worm wheel and bevel gears, and finding its failure criteria.
CO3	Summarize the knowledge on shafts, coupling and flywheel and finding its failure criteria.
CO4	Evaluate the radial and thrust load for journal bearings, antifriction bearings and finding its failure criteria.

Course Name:PE-I:Tool Design	Course Code: ME1401
CO1	Student will be able to explain the fundamentals of Tool Design
CO2	Design various cutting tools, dies, Jigs & Fixtures and Forging dies
CO3	Evaluate the failure modes of tools and cost estimation
CO4	Compose planning for manufacturing of tools for various parts

Course Name: EL I: Material Handling System	Course Code: ME 1402
CO1	Explain the various typs of Material handling systems.
CO2	Design the various rope and chain assisted material handling systems
CO3	Explin various attachments, drives and safety components of material handling system
CO4	Analyze and select various material handling systems for different material handling situations

Course Name: EL III: Machine Tool Design	Course Code:ME1476
CO1	Explain the drives and mechanisms of machine tools
CO2	Design Gear boxes of machine tools
CO3	Design machine tool structures, guide ways and power screws, spindles and supports of machine tools.
CO4	Test the machine tools and examine the control system of machine tools.
Course Name: EL III: Machine Tool Design LAB	Course Code:ME1477
CO1	describe the drives and mechanisms of machine tools
CO2	design Gear boxes of machine tools
CO3	design machine tool structures, guide ways and power screws, spindles and supports of machine tools
CO4	describe testing and control system of machine tools

Course Name:FEM	Course Code:ME1406

CO1	Evaluate the fundamentals of Finite Elements Method.
CO2	Analyze the mechanical engineering problems.
CO3	Evaluate the stresses, strains and deformation in simple machine elements and design solutions for simple problems.
CO4	Build the solutions using the commercial softwares for simple machine elements.

Course Name: FEM LAB	Course Code:ME1406
CO1	Study, analyse and develop the fundamentals of Finite Elements Method for mechanical engineering problems
CO2	Evaluate the stresses, strains and deformation in simple machine elements and design solutions for simple problems.
CO3	Build the solutions using the commercial software's for simple machine elements.

Course Name: VIBRATION VIBRATION LAB	Course Code:ME1415 ME1416
ME1415 ME1416 CO1	Analyze the various types of vibrations
ME1415 ME1416 CO2	Evaluate vibrations and carry out its analysis
ME1415 ME1416CO3	Predict/judge vibration parameters and evaluate through different approaches for multidegree freedom system
ME1415 ME1416CO4	Form and work on transformation of matrices for vibration for evaluating frequencies

Course Name:CIM	Course Code:ME1417
CO1	The Students will have ability to design and evaluate experimentation on CNC machines.
CO2	Desiging of GT cell layouts for transforming into flexible manufacturing system.
CO3	The students will be able to compose and transform robot programs various industrial applications.
CO4	The students will have ability to justify CAPP and CAQC to design computer integrated manufacturing

Course Name: project phase I	Course Code: ME1433
CO1	Concept and Objective of Project
CO2	Preliminary Approach & Literature Survey
CO3	Innovativeness,Technical Skills
CO4	Presentation & Reasoning Skills

Course Name: Automation in Production	**Course Code:ME1435**
CO1	The students will have ability to design and evaluate product layout using line balancing
CO2	The students will be able to compose and evaluate CNC Programs.
CO3	The students will be able to examine use of robot and automated material to design automated systems
CO4	The students will be able to design GT cells to build FMS.

Course Name: EL V:PRODUCT DESIGN AND DEVELOPMENT	**Course Code:** ME 1455
CO1	Student will be able to Evaluate the product life cycle
CO2	Student will be able to Analyze and select the materials and manufacturing processes for designed product
CO3	Student will be able to Evaluate the product for different design criteria like robust design, benchmarking, DFX,etc and estimate the product costing
CO4	Student will be able to Explain the various prototyping methods and its economics

Course Name: (PE-4) Industrial Fluid Power	**Course Code:** ME-1437
CO1	To investigate the hydraulic fluids and apply the fluid power laws and principals for analysis of simple fluid power system.
CO2	To identify, analyze, and justify selection of suitable components of fluid power system for specific applications based on its function, performance and working characteristics.
CO3	To design and examine the fluid power system and to compose and interpret its circuit diagrams using standard symbols.
CO4	To examine the fluid piping and fittings, safety measures, maintenance, and trouble shooting for fluid power systems.

Course Name: (PE-4) Vehicle Engineering	**Course Code:** ME-1441
CO1	Student will be able to analyze various systems of Engine, its function including fuel supply, cooling and lubrication system in vehicle.
CO2	Student will be able to describevarious power transmission systems from clutch to wheel in vehicle.
CO3	Student will be able to evaluate and describecontrol systems like steering and brakes in vehicle.
CO4	Student will be able to illustrate and describe the necessary electrical and luxurious systems and safety system in vehicle.

Course Name: Advance Welding Techniques	**Course Code:** ME1460
CO1	Student can be able to Justify the concept of advance welding processes applicable to industry.
CO2	Student can be able to examine the parameters needed for welding to increase the durability of product.

CO3	Student can be able to differentiate the concept of soldering and brazing and cutting process through welding.
CO4	Student can be able to evaluate welding defect through welding testing method.

Course Name: OPTIMISATION TECHNIQUES	Course Code: ME1475
CO1	Apply basic operations research techniques to formulate given situation as LLP and solving by graphical & simplex method.
CO2	To Solve transportation and Assignment Models and analyse the concept of dynamic programming to Solve problems of discreet and continuous variables.
CO3	Analyze projects for minimum total cost and smooth level of resources.
CO4	Evaluation of different replacement policies and its application in operation research and analyse of the application of simulation, inventory control model and waiting line mode.

Course Name: EL IV: CNC & Robotics CNC & Robotics LAB	Course Code: ME 1439 ME1440
CO1	Explain the structure of NC,CNC and DNC
CO2	Design the tooling of CNC and compose the program for CNC
CO3	Explain the structure and kinematics of Robot
CO4	Explain the various grippers and sensors, Design the applications and Compose the programe for Robot

Course Name:EL V: Value Engineering	Course Code:ME 1453
CO1	Explain the various typs of Values and functions
CO2	Evaluate the product life cycle.
CO3	Analyze the project selection and estimate life cycle costs.
CO4	Evaluate and improve value of product/system by designing and critically analyzing the VE job plans and othe VE/VA techniques.

Course Name:(PE-5) Power Plant Engineering	Course Code:ME1457
CO1	Student will be able to understand the various Thermal power plant characters.
CO2	Student will be able to understand arrangement of power generation systems and components used in Hydraulic power plants.
CO3	Student will be able to undertake power load analysis & Economic analysis of power generations systems.
CO4	Student will be able to understand the Nuclear, Combine cycles and nonconventional power plants.

Course Name:PE-V : Air Conditioning	Course Code:ME1480
CO1	Student will be able to evaluate various psychrometric properties
CO2	student will be able to evaluate and analysePsychrometric process
CO3	The student will be able to describe human comfort parameter and evaluate various air conditioning load as per the human comfort and

	Industrial requirement .
CO4	The students will be able to describe various Air conditioning accessories, components, air distribution

Course Name: DESIGN OF EXPERIMENTS BY TAGUCHI METHOD	Course Code: ME1452
CO1	Calculate and represent Frequency Distribution, Histograms and Probability distribution
CO2	Design the experiments
CO3	Distinguish and analyze the different optimization techniques.
CO4	Analyze the variance in observation data.