DEPARTMENT OF MECHANICAL ENGINEERING

SECOND YEAR

SEMESTER - I		
Course Name & Code	**Course Outcomes**	**Bloom's Level**
Applied Thermodynamics (ME211)	Apply basic laws of thermodynamics to engineering applications.	BL3 Apply
	Make use of steam tables & mollier diagram for solving thermodynamic problems.	BL3 Apply
	Classify boilers and compare vapor powar cycles and find various performance parameters.	BL2 Understand
	Determine performance of steam nozzles and explain condensers with their construction & working.	BL3 Apply
	Classify steam turbines and calculate their performance parameters.	BL3 Apply
	Describe reciprocating air compressor and calculate its performance.	BL3 Apply
Mechanics of Materials (ME212)	Determine the stresses, strains and deformation under various axial, torsional and flexural loading.	BL5 Evaluate
	Determine strain energy in axially loaded members	BL5 Evaluate
	Calculate principal stresses & position planes in a member subjected to various types of stress system by analytical & graphical method.	BL5 Evaluate
	Calculate principal stresses & position planes in a member subjected to various types of stress system by analytical & graphical method.	BL5 Evaluate
	Determine torsional shear stress, angle of twist & design dimensions of shaft.	BL5 Evaluate
	Draw s.f.d, b.m.d and determine shear & bending stresses, slope and deflection in various types of beams & sections.	BL5 Evaluate
Manufacturing Processes (ME213)	Select appropriate manufacturing process for a given component.	BL3 Apply
	Understand performance of each process.	BL2 Understand
	Prepare manufacturing plan for the given component	BL3 Apply
	Explain the methods adopted for their performance improvement.	BL2 Understand

	Performance analysis different types of Manufacturing processes.	BL3 Apply
Machine Drawing & CAD (ME214)	Recall knowledge regarding basics of machine drawing and bis conventions	BL1 Remember
	Construct free hand sketching of machine components.	BL3 Apply
	Relate the significance of auxiliary view and draw auxiliary views.	BL2 Understand
	List the significance and identify problems based on limits, fits and tolerances.	BL1 Remember
	Construct assembly, details drawing and identify applications of same.	BL3 Apply
	Construct 3-d drawing by using isometric projection method.	BL3 Apply
Internal Combustion Engines (ME215)	Distinguish between the different types of engine constructions and their thermodynamic principles.	BL2 Understand
	Differentiate the working principles and constructional details of various fuel systems used in different types of i. C. Engines.	BL3 Apply
	Explain the methods adopted for their performance improvement.	BL3 Apply
	Correlate the difference in si and ci engine combustion processes with the design of combustion chambers used in these engines.	BL3 Apply
	Performance analysis different types of i. C. Engines.	BL4 Analyze
	Develop the understanding of alternative fuels for i. C. Engines and i.c. engines pollution.	BL3 Apply

SEMESTER - II		
Course Name & Code	**Course Outcomes**	**Bloom's Level**
Engineering Mathematics-III (ME221)	Student can solve partial differential equation of first order	BL3 Apply
	Student can express a function in terms of sine and cosine components so as to model	BL3 Apply
	Student can use numerical methods for evaluating definite integrals.	BL3 Apply
	Student can use numerical methods for solving linear and non-linear equations.	BL2 Understand
	Student can sketch and explain various probability distribution functions.	BL2 Understand
	Students can use correlation concept in dat to day life and estimate lines of regression	BL2 Understand
Manufacturing Technology (ME222)	Apply different mechanisms, accessories, attachments and operations of lathe machine.	BL3 Apply
	Understand and analyze frequency response of op amp	BL3 Apply
	Make use of reciprocating machine tools	BL3 Apply
	Experiments with different operations of milling machine and solve indexing problems..	BL3 Apply
	Make use of grinding machine tools.	BL3 Apply
	Explain and compare the concept of unconventional machining processes.	BL3 Apply
Fluid Mechanics & Fluid Machines (ME223)	Explain total pressure, center of pressure on plane and curved surfaces encountered in dam structures, and metacentric height of floating & submerged body in a static fluid.	BL2 Understand
	Identify types of fluid flow and calculate velocity, acceleration, stream function and velocity potential at any point in the fluid flow.	BL3 Apply
	Illustrate different flow measurement devices & energy lossess in a pipe network using darcy weis-batch and empirical formulae.	BL2 Understand
	Construct mathematical correlation for fluid flow phenomenon in terms of dimensionless parameters & find out forces on immersed bodies.	BL3 Apply
	Solve impulse & reaction turbine for its various design parameters.	BL3 Apply

	Make use of different operating parameters of centrifugal pump for finding its performance.	BL3 Apply
Kinematics & Theory of Machines (ME224)	Distinguish between the different mechanisms and draw velocity and acceleration diagram for different mechanisms.	BL2 Understand
	Predict cam profiles required for different motions of followers in different applications using graphical method.	BL3 Apply
	Examine different parameters of brake dynamics.	BL3 Apply
	Identify and evaluate gear trains used in different power transmission applications	BL3 Apply
	Illustrate use of control devices such as governor and gyroscope in various applications.	BL3 Apply
	Perform balancing of rotating and reciprocating masses.	BL3 Apply
Power Plant Engineering (ME225)	Get basic knowledge for effective use of available energy sources by suitable planning of power generation in thermal, hydro, gas & atomic power plant.	BL2 Understand
	Describe energy conversion on power plants &describe role of various organization of power plants	BL2 Understand
	Explain load curves and load factors.	BL3 Apply
	Explain calculation of fixed & operating cost.	BL3 Apply
	Study the classification of wind energy conversion systems (wecs).	BL2 Understand
	Explain duties & responsibilities of energy auditors.	BL2 Understand
Mechanical Workshop-I (ME226)	Operate Different Machines Such As Lathe, Drilling, Milling, Grinding, etc.	BL2 Understand
	Demonstrate the understanding of process of manufacturing the component as per drawing and specifications.	BL2 Understand
	Differentiate between metal machining and composite machining.	BL2 Understand
Electrical Technology (ME227)	Develop the capability to identify and select suitable dc motors / ac motors for given	BL1 Remember

	applications in mechanical engineering	
	Explain starting and determine speed-torque characteristics of electrical motors	BL2 Understand
	Describe and apply the concept of electrical heating and welding in manufacturing processe	BL2 Understand
	Discuss the concepts of digital circuits and use these concepts in digital design	BL3 Apply
	Apply the concept of signal conditioning and explain the various applications of operational amplifier.	BL3 Apply
	Explain the fundamentals of microcontroller 8051 and write its industrial applications.	BL1 Remember

THIRD YEAR

SEMESTER -I		
Machine Design –I (ME311)	Explain material Selection, Factor of safety, theories of failure and general design procedure.	BL4 Analyse
	Analysis of Design parameters of Simple Mechanical Parts under static and fluctuating loading conditions.	BL4 Analyse
	Select and design proper belt and spring for various applications.	BL3 Apply
	Apply design considerations for casting, forging, assembly, manufacturing, non-metals, and environment.	BL4 Analyse
	Analysis of Design parameters of shafts, keys and couplings.	BL4 Analyse
	Analysis of Design parameters of welded, riveted and bolted joint under various loading conditions.	BL4 Analyse
CAD-CAM & CAE (ME312)	Describe the concept of modern product cycle	BL2 Understand
	Apply knowledge of the fundamental mathematical theories for geometric transformation.	BL3 Apply
	Apply cae analysis tool for simulation of 1-d component.	BL3 Apply
	Explain the concept of gt, capp and fms	BL2 Understand
	Select appropriate tooling for cnc machine.	BL4 Anlyze
	Outline part programming to operate cnc milling & turning machine to manufacture a mechanical part.bl4 analyze	BL4 Anlyze
Metallurgy (ME313)	Demonstrate relevance of principles of physical metallurgy and its significance.	BL2 Understand
	Identify and make use of various ferrous materials for engineering applications.	BL3 Apply
	Identify and make use of nonferrous alloys & advanced materials for engineering applications.	BL3 Apply
	Apply the knowledge for selection of proper heat treatment process for obtaining desired properties.	BL3 Apply
	Make use of suitable destructive and non-destructive methods for material testing.	BL3 Apply

	Utilize the powder metallurgy process for manufacturing of products.	BL3 Apply
Industrial Engineering and Operation Research (ME314)	Analyse and measure productivity.	BL4 Anlyze
	Perform method study and work measurement.	BL3 Apply
	Describe optimization process and OR models.	BL2 Understand
	Apply and develop various optimization techniques and prepare project plan for industrial applications.	BL3 Apply
Non-Conventional Machining (ME315) (Professional Elective-III)	Summarize different non-conventional machining processes.	BL 2 Understand
	Select the suitable non-conventional machining process based on mechanical energy source for suitable materials.	BL 4 Analyse
	Examine the Electric Discharge Machining (EDM) and Wire cut EDM processes and their applications.	BL 3 Apply
	Explain working principle, process parameters and applications of Chemical machining, Electro-Chemical machining, and Photochemical Machining.	BL 2 Understand
	Categorize different non-conventional processes based on thermal energy source and their applications.	BL 4 Analyse
	Discuss different coating methods like Metal Spraying, Metallic coating, Plasma flame spraying.	BL 2 Understand

SEMESTER –II		
Machine Design –II (ME321)	Calculate design parameters of spur gear and helical gear under different loading condition.	BL3 Apply
	Apply the design principles for pressure vessel design.	BL3 Apply
	To undestand basic terms related to statistical considerations in design.	BL2 Understand
	To deisgn the bevel gear.	BL3 Apply
	To deisgn the worm gear.	BL3 Apply
	To select bearing from manufacturer's catalogue.	BL3 Apply
Instrumentation & Control (ME322)	Students will understand the design & construction of measuring instruments.	BL2 Understand
	Students will setup the Instruments & accessories for measurement of properties by avoiding	BL3 Apply
	Students will calibrate the simple instruments using more accurate standards.	BL3 Apply
	Describe construction, functioning and application of various measuring instruments	BL4 Analyse
	Design control systems and draw block diagrams	BL3 Apply
	Analyze root locus diagram, Bode plot and discuss stability of mechanical system.	BL4 Analyse
Heat Transfer (ME323)	Apply 1-D heat conduction equations to solve wall, Cylinder, Sphere Problems.	BL3 Apply
	Analyze Heat transfer rate, Effectiveness & Efficiency in various cases of the fins.	BL4 Anlyze
	Apply different laws related to radiation for calculation of heat transfer rate.	BL3 Apply
	Determine heat transfer coefficient associated with different geometries by considering natural and forced convection**.**	BL3 Apply
	Explain the boiling Curves and Types of Condensation.	BL2 Understand
	Analyze heat exchanger with the help of LMTD and NTU method.	BL4 Anlyze
Industrial & Quality Management (ME324)	Outline the different aspects of management for betterment of organization.	BL4 Anlyze
	Illustrate the concept of Planning, organizing & staffing.	BL3 Apply
	Illustrate the concept of leading and controlling.	BL3 Apply
	Summarize the elements of quality along with its specifications.	BL2 Understand

	Select different quality control tools.	BL4 Anlyze
	Select different charts to check the quality of new products.	BL4 Anlyze
Plastic Engineering (ME325) (Professional Elective-IV)	Select the plastic materials for particular end user applications.	BL 3 Apply
	Suggest the suitable plastic molding process and welding technique for the end user application.	BL 3 Apply
	Design simple plastic components for end use application.	BL 3 Apply
	Design simple compression mold.	BL 3 Apply
	Design simple injection mold and gating system.	BL 3 Apply
	Calculate heat dissipated, mass flow rate of cooling medium and cooling time required.	BL 3 Apply
Mini Project (ME326)	To identify potential problems in engineering.	BL 2 Understand
	To provide a solution for the problem identified.	BL 3 Apply
	To express technical ideas, strategies and methodologies in written form.	BL 3 Apply
Metrology (ME327)	To illustrate the theoretical concepts taught in Mechanical Measurements & Metrology through experiments.	BL 3 Apply
	To illustrate the use of various measuring tools measuring techniques.	BL 3 Apply
	To understand calibration techniques of various measuring devices.	BL 3 Apply
Mechanical Workshop –III (ME328)	To set the manufacturing set up of different machining operations and study the corresponding set up parameters while working on actual machine tools.	BL 3 Apply
	To select appropriate and proper process parameter for obtaining desired requirement on work piece.	BL 3 Apply
	To identify the operational / processing problems and suggest remedial solution for adopted manufacturing processes.	BL 3 Apply

FOURTH YEAR

SEMESTER -I		
Automatic Control Engineering (ME411)	Formulate mathematical model for different types of control systems.	BL2 Understand
	Compare the systems with the help of block diagram reduction rules to obtain closed loop transfer function.	BL3 Apply
	Examine the modes of control in accordance with output of control system.	BL3 Apply
	Analyze transient response of the systems, steady state conditions and characteristics of a system when it is in equilibrium state.	BL4 Anlyze
	Analyze root locus diagram, bode plot and discuss stability of mechanical system.	BL4 Anlyze
	Evaluate state space techniques for representing control systems.	BL5 Evaluate
Refrigeration and Air Conditioning (ME412)	Analyze various types of refrigeration systems such as vapour compression, air refrigeration, multi compression & multi-evaporative.	BL4 Anlyze
	Select refrigerants for different refrigeration systems.	BL3 Apply
	Explain various types of vapour absorption refrigeration systems.	BL2 Understand
	Explain various psychrometric terms, psychrometric processes & factors forming load on air conditioning systems	BL2 Understand
	Make use of knowledge of human comfort & duct design while designing of air conditioning systems.	BL3 Apply
	Apply knowledge of contemporary issues in the area of refrigeration & air conditioning	BL3 Apply
Operation Research (ME413)	Choose operations research models & solve linear programming problems.	BL3 Apply
	Apply the optimization principles to solve assignment and transportation problems.	BL3 Apply
	Analyze the strategies of operations research to solve games & sequencing problems	BL4 Anlyze
	Build replacement model for getting life of machine	BL3 Apply
	Choose appropriate tools to solve the industrial problems related to inventory analysis.	BL3 Apply

	Analyze operations research models for scheduling the projects.	BL4 Anlyze
Automobile Engineering (ME414-1)	Compare the different vehicle layouts and body styles.	BL2 Understand
	Calculate the performance parameters of the vehicle such as resistance to vehicle, gear box ratio, acceleration etc.	BL4 Anlyze
	Select and explain the different transmission system components for efficient power transmission.	BL3 Apply
	Explain the working of different electrical and electronic systems and their use in modern automobiles.	BL3 Apply
	Analyze the different parameters influencing the automobile control systems such as steering and braking system	BL3 Apply
	Explain the different suspension systems used in automobiles.	BL2 Understand
Production and Operational Management (ME-414-2)	Explain the various types of the production systems, scope and need of production and operation management.	BL2 Understand
	Illustrate the needs and types of forecasting methods and determine the future demands using different forecasting methods.	BL3 Apply
	Discuss the concept of capacity planning, and its elements, importance and measures.	BL2 Understand
	Examine the production planning & control and inventory control in production process and its elements.	BL3 Apply
	Categorize different phases of plant maintenance.	BL4 Anlyze
	Describe the modern elements of production systems like value engineering, value analysis, six sigma, kanban, and computer aided production management. Etc.	BL2 Understand
	Select financial institutions for establishing new enterprise.	BL3 Apply
Project Work-I (ME416)	Identify, interpret, and solve problems in mechanical engineering.	BL2 Understand
	Analyze and predict the systems using design tools and techniques.	BL3 Apply
	Categorize the impact of engineering solutions in a global, economic, environmental, and societal context	BL4 Anlyze

	Analyse the needs to meet desired within realistic multiple constraints	BL4 Anlyze
	Demonstrate the ability to work on multidisciplinary level.	BL3 Apply
	Demonstrate the leadership ability to communicate effectively in team	BL3 Apply
Industrial Training (ME417)	To understand industrial culture & organizational setup.	BL2 Understand
	To understand technical report writing and presentation.	BL2 Understand
	To apply theoretical knowledge with the actual in industry	BL3 Apply
	To understand responsibility and role of engineer in industry	BL2 Understand

SEMESTER – II		
Industrial Engineering (ME421)	Introduce industrial engineering. Analyze and evaluate the productivity	BL4 Anlyze
	Make use method study to reduce down time in the production using different recording techniques.	BL3 Apply
	Explain ergonomics concepts for industrial safety	BL5 Evaluate
	Determine the standard time required for a job	BL5 Evaluate
	Recommendation of types layout need for particular production	BL5 Evaluate
	Evaluate the job merit rating and valuation of job	BL5 Evaluate
Industrial & Quality Management (ME422)	Outline the different aspects of management for betterment of organization.	BL4 Anlyze
	Illustrate the concept of organizing, staffing, leading and controlling.	BL4 Anlyze
	Break down the functions of various basic departments in organization	BL4 Anlyze
	Summarize the elements of quality along with its specifications	BL2 Understand
	Select different quality control tools and charts to check the quality of new products	BL4 Anlyze
	Outline the aspects of iso 9000, iso 14000 and requirements of iso 9001.	BL4 Anlyze

Non-Conventional Machining (ME-423-A)	Summarize different non-conventional machining processes.	BL2 Understand
	Select the suitable non-conventional machining process based on mechanical energy source for suitable materials.	BL4 Anlyze
	Examine the electric discharge machining (edm) and wire cut edm processes and their applications.	BL3 Apply
	Explain working principle, process parameters and applications of chemical machining, electro-chemical machining, and photo-chemical machining.	BL2 Understand
	Categorize different non-conventional processes based on thermal energy source and their applications.	BL4 Anlyze
	Discuss different coating methods like metal spraying, metallic coating, plasma flame spraying.	BL2 Understand
Marketing Management (ME-424)	To familiarize with marketing, marketing management, the marketing environment and marketing planning process.	BL2 Understand
	To get acquainted with new marketing trends, market segmentation and consumer behavior.	BL2 Understand
	To study the components of the marketing mix; identify how the firms marketing strategy, product and price mix evolve and adapt to match consumer behavior and perceptions of the product.	BL3 Apply
	To study the components of the place and promotion mix; identify how the firms marketing strategy, place and promotion mix evolve and adapt to match consumer behavior and perceptions of the product	BL3 Apply
Project Work-II (ME425)	Analyze & summarize the collected information in the form of literature review.	BL4 Anlyze
	Analyze, design and synthesize systems/ processes to solve societal, environmental & public health problems.	BL4 Anlyze
	Select and use modern tools to understand impact of professional engineering solutions in a global, economical, environmental contexts, etc.	BL4 Anlyze
	Perform effectively as an individual or in a team by following professional ethics.	BL5 Evaluate
	Develop the ability to communicate effectively to comprehend and write professional documents such as research paper, project reports, etc.	BL6 Create
	Integrate engineering & management principles to manage projects and to engage in life long learning as per the need of change in technology.	BL6 Create