

Course Outcome (COs) of ME Department	
Department of Mechanical Engineering	
3ME-201	Advanced Engineering mathematics Year of study: 2018-19
CO1	Apply a range of mathematical theorems and methods to solve routine and complex analytic and applied problems
CO2	Analyze data necessary for the solution of engineering problems
CO3	Examine the effectiveness of proposed solutions to identified engineering problems.
3ME-102	Technical Communication Year of study: 2018-19
CO1	Demonstrate critical and innovative thinking.
CO2	Display competence in oral, written, and visual communication.
CO3	Show an understanding of opportunities in the field of communication.
CO4	Respond effectively to cultural communication differences.
CO5	Demonstrate positive group communication exchanges.
CO6	Communicate ethically.
3ME3-04	Engineering Mechanics Year of study: 2018-19
CO1	Determine the resultant force and moment for a given force system.
CO2	Determine the centroid and moment of area.
CO3	Apply fundamental concepts of kinematics and kinetics of particles to the analysis of simple, practical problems.
CO4	Apply basic knowledge of mathematics and physics to solve real-world problems
CO5	Use scalar and vector analytical techniques for analyzing forces in statically determinate structures.
3ME4-05	Engineering Thermodynamics Year of study: 2018-19
CO1	Explain the basic principles and applications of the thermodynamics to the various real life systems.
CO2	Describe fundamental laws of thermodynamics.
CO3	Apply the concepts such as Entropy, Energy Balance also the calculations of heat, work and other important thermodynamic properties for various ideal gas processes.
CO4	Estimate performance of various thermodynamic gas power cycles and gas refrigeration cycle and availability in each case.
3ME4-06	Material Science Engineering Year of study: 2018-19
CO1	Apply core concepts in Materials Science to solve engineering problems.
CO2	Interpret about material fundamental and material processing.
CO3	Distinguish the defects in crystal and its effect on crystal properties
CO4	Figure out the different mechanical properties of material by studying different destructive and non- destructive testing.
CO5	Articulate and utilize corrosion prevention strategies and estimate corrosion behavior of materials and components
CO6	Gain knowledge of Transformation diagrams, polymers, alloys, Ferrous , Non-ferrous metal etc
3ME4-07	Mechanics of Solids Year of study: 2018-19

CO1	Understand statically determinate and indeterminate problems.
CO2	Determine the resistance and deformation in member subjected to axial, flexural and torsional loads.
CO3	Evaluate principal stresses, strains and apply the concept of failure theories for design.
CO4	Analyze and design thin, thick cylinders and springs.
3ME4-21	Mechine Drawing Practice Year of study: 2018-19
CO1	Learn the basic concepts and to draw the views of section of solids, orthographic projections and threaded fasteners.
CO2	Create assembly and get the detailed drawing of machine components.
CO3	Represent tolerances and the levels of surface finish of machine elements.
CO4	Develop the ability to apply Limits, Fits, and Dimensional Tolerances, as well as Geometric Tolerances to components and assemblies on Engineering Drawings.
CO5	Develop an ability to create 2D drawings from 3D models.
3ME4-22	Material Testing Lab Year of study: 2018-19
CO1	Learn the principles of materials science and engineering through lab investigation.
CO2	Learn the basic skills required to properly use materials science Instrument.
CO3	Analyze mechanical properties of materials.
CO4	Perform Rockwell hardness tester for measurement of hardness.
CO5	Analyze impact test, fatigue test and bending test.
3ME4-23	Basic Mechanical Engineering Lab Year of study: 2018-19
CO1	Do hands on assembling and disassembling of SI & CI Engine.
CO2	Do hands on assembling and disassembling of bicycle & sewing machine.
CO3	Understand working principles & classification of boilers and their accessories.
CO4	Understand working principles & classification of pumps.
3ME4-24	MATLAB Year of study: 2018-19
CO1	Use MATLAB effectively to analyze and visualize data.
CO2	Apply numeric techniques and computer simulations to solve engineering-related problems.
CO3	Apply a top-down, modular, and systematic approach to design, write, test, and debug sequential MATLAB programs to achieve computational objectives.
CO4	Design and document computer programs and analyses in a careful and complete manner so as to effectively communicate results, to facilitate evaluation.
CO5	Create and control simple plot and user-interface graphics objects in MATLAB.
4ME2-01	Data Analytics Year of study: 2018-19
CO1	Apply Univariate & Multivariate statistics for data analysis
CO2	Perform Linear, Multiple & Logistic Regression
CO3	Demonstrate an understanding of dimensionality reduction techniques & Time Series analysis as well as its applications for data analytics

4ME1-03	Managerial Economics and Financial Accounting Year of study: 2018-19
CO1	Understand the roles of managers in firms
CO2	Understand the internal and external decisions to be made by managers
CO3	Analyze the demand and supply conditions and assess the position of a company
CO4	Design competition strategies, including costing, pricing, product differentiation, and market environment according to the natures of products and the structures of the markets.
CO5	Analyze real-world business problems with a systematic theoretical framework.
CO6	Make optimal business decisions by integrating the concepts of economics, mathematics and statistics.
4ME3-04	Digital Electronics Year of study: 2018-19
CO1	Have a thorough understanding of the fundamental concepts and techniques used in digital electronics.
CO2	Understand and examine the structure of various number systems and its application in digital design.
CO3	Understand, analyze and design various combinational and sequential circuits.
CO4	Identify basic requirements for a design application and propose a cost effective solution.
CO5	Identify and prevent various hazards and timing problems in a digital design.
CO6	Develop skill to build, and troubleshoot digital circuits
4ME4-05	Fluid Mechanics & Machines Year of study: 2018-19
CO1	Understand basic knowledge of the definition and the fundamental concepts of fluid mechanics including continuum, velocity field, surface tension, flow visualization etc.
CO2	Apply the basic equation of fluid statics to determine forces on planer and curved surfaces that are submerged in a static fluid.
CO3	Use conservation laws in integral form and apply them to determine forces and moments on surfaces of various shapes and simple machines
CO4	Use Eule's and Bernoulli's equations and the conservation of mass to determine velocities, pressures, and accelerations for incompressible and in viscid fluids
CO5	Design simple pipe systems to deliver fluids under specified conditions and also the loosed during the flow of the fluid.
CO6	Understand the mechanics of viscous flow about immersed boundaries, as it relates to flow separation, profile drag, drag coefficients and the determination of drag forces.
4ME4-06	Manufacturing Processes Year of study: 2018-19
CO1	Select materials, types and allowances of patterns used in casting and analyze the components of moulds.
CO2	Design core, core print and gating system in metal casting processes
CO3	Understand arc, gas, solid state and resistance welding processes.
CO4	Develop process-maps for metal forming processes using plasticity principles
CO5	Identify the effect of process variables to manufacture defect free products.

4ME4-07	Theory of Machines Year of study: 2018-19
CO1	Understand the principles of kinematic pairs, chains and their classification, DOF, inversions, equivalent chains and planar mechanisms.
CO2	Analyze the planar mechanisms for position, velocity and acceleration.
CO3	Synthesize planar four bar and slider crank mechanisms for specified kinematic conditions.
CO4	Evaluate gear tooth geometry and select appropriate gears for the required applications.
CO5	Design cams and followers for specified motion profiles.
4ME3-21	Digital Electronics Lab Year of study: 2018-19
CO1	Distinguish between analog and digital systems.
CO2	Identify the various digital ICs and understand their operation.
CO3	Apply Boolean laws and K-map to simplify the digital circuits.
CO4	Understand the function of elementary digital circuits under real and simulated environment.
4ME4-22	Fluid Mechanics Lab Year of study: 2018-19
CO1	Conduct experiments for a given purpose.
CO2	Analyze experimental data and develop empirical equations.
CO3	Verify the basic principles and equations of fluid mechanics.
4ME4-23	Production practice-I Year of study: 2018-19
CO1	Learn about material removal in various modern manufacturing processes.
CO2	Gaining knowledge of Foundry and Welding, etc.
CO3	Analyze the processes and evaluate the role of each process parameter during machining of various advanced materials.
CO4	Solve the various problems for the given profiles to be imparted on the work specimens.
4ME4-24	Theory of Machine Lab Year of study: 2018-19
CO1	Get the practical knowledge about various mechanisms.
CO2	Learn about applications of various mechanisms.
CO3	Go through and observe the various experiments/working of different mechanism like cam-follower mechanism, four bar chain, steering mechanism etc.
5ME1A	Heat Transfer Year of study: 2018-19
CO1	Understand the basic laws of heat transfer.
CO2	Account for the consequence of heat transfer in thermal analyses of engineering systems.
CO3	Analyze problems involving steady state heat conduction in simple geometries.
CO4	Develop solutions for transient heat conduction in simple geometries.
CO5	Understand the fundamentals of convective heat transfer process. I.e. Natural, forced and mixed convection in various type of flow. i.e. internal and external flow.
CO6	Analyze heat exchanger performance by using the method of log mean temperature difference and heat exchanger performance by using the method of heat exchanger effectiveness.

CO7	Calculate radiation heat transfer between surfaces.
CO8	To solve complex problems where heat and mass transfer processes are combined with chemical reactions, as in combustion.
5ME2A	Dynamics of Machine Year of study: 2018-19
CO1	Understand the functioning of governor with detailed classifications.
CO2	Understand the gyroscopic effects in ships, aero planes and road vehicles.
CO3	Analyze balancing problems in rotating and reciprocating machinery.
CO4	Understand gear nomenclature with gear train concept.
5ME3A	Measurement & Metrology Year of study: 2018-19
CO1	Perform Linear and Angular measurements.
CO2	Understand the concept of Slip gauges.
CO3	Perform tests to measures gear tooth profiles and screw threads.
CO4	To measure flatness and surface defects in the given test specimen
CO5	Force measurements during turning, drilling and milling operations.
5ME4A	Quality Assurance & Reliability Year of study: 2018-19
CO1	Attain the basic techniques of quality improvement, fundamental knowledge of statistics and probability
CO2	Understand techniques to assess and improve process and/or product quality and reliability.
CO3	Use control charts to analyze for improving the process quality
CO4	Describe different sampling plans
CO5	Acquire basic knowledge of total quality management
CO6	Understand the concepts of reliability and maintainability
5ME5A	SFEE Year of study: 2018-19
CO1	Understand individual, interpersonal and group processes that influence behavior within teams and organizations.
CO2	Identify and apply sociological concepts and theories to understand social phenomena.
CO3	Apply knowledge of mathematics, economics, and engineering principles to solve engineering problems
CO4	Understand the major capabilities and limitations of cash flow analysis for evaluating proposed capital investments.
CO5	Recognize, formulate, analyse and solve cash flow models in practical situations. Understand the assumptions underlying these models, and the effects on the modelling process when these assumptions do not hold.
CO6	Develop the ability to account for time value of money using engineering economy factors and formulas, as well as the implications and importance of considering taxes, depreciation, and inflation.
CO7	Apply engineering economic techniques on solving engineering problems by using computer tools such as spreadsheets.
5ME6.1A	CAD & Graphics Year of study: 2018-19
CO1	Familiar with computer graphics and coordinate systems.
CO2	Understand parametric representation of space & surface curves like spline curve, Bezier curve, B Spline curves.
CO3	Understand the concept of 2-Dimensional & 3-Dimensional transformation.

5ME6.2A	Automobile Engineering Year of study: 2018-19
CO1	Understand the Construction, working and other details about Internal Combustion Engines used in automobiles
CO2	Identify Construction, working, preventive maintenance, trouble shooting and diagnosis of various Automobile Systems.
CO3	Understand importance and features of different systems like axle, differential, brakes, steering, suspension, and balancing etc.
CO4	Identify Modern technology and safety measures used in Automotive Vehicles
5ME6.3A	Statistics for Decision Making Year of study: 2018-19
CO1	Express real life problems in statistical terms
CO2	Deal with numerical and quantitative issues in business
CO3	Enable the use of statistical, graphical and algebraic techniques wherever relevant
CO4	Calculate and interpret the components of a time series and economic index numbers
CO5	Familiar with Simple regression analysis and probability model with multiple linear regression.
5ME7A	Heat Transfer Lab Year of study: 2018-19
CO1	Understand the basic laws of heat transfer.
CO2	Account for the consequence of heat transfer in thermal analyses of engineering systems.
CO3	Analyze problems involving steady state heat conduction in simple geometries.
CO4	Develop solutions for transient heat conduction in simple geometries.
CO5	Understand the fundamentals of convective heat transfer process. I.e. Natural, forced and mixed convection in various type of flow. i.e. internal and external flow.
CO6	Analyze heat exchanger performance by using the method of log mean temperature difference and heat exchanger performance by using the method of heat exchanger effectiveness.
CO7	Calculate radiation heat transfer between surfaces.
CO8	To solve complex problems where heat and mass transfer processes are combined with chemical reactions, as in combustion.
5ME8A	Dynamics of Machine Lab Year of study: 2018-19
CO1	Understand Roll, Pitch and Yaw motions.
CO2	Understand functioning of various governing systems.
CO3	Perform static and dynamic wheel balancing of an automobile.
CO4	Differentiate between sliding mesh, constant mesh and synchro mesh gear boxes.
5ME9A	Production Engineering Lab Year of study: 2018-19
CO1	Perform Linear and Angular measurements.
CO2	Understand the concept of Slip gauges.
CO3	Perform tests to measures gear tooth profiles and screw threads.
CO4	To measure flatness and surface defects in the given test specimen
CO5	Force measurements during turning, drilling and milling operations.

5ME10A	PEDM Year of study: 2018-19
CO1	Determine what a profession is and how it differs from work in general
CO2	Determine what characterizes a professional and distinguishes one from a nonprofessional
CO3	Understand what morality is and how it connects to professional ethics
CO4	Understand the features of moral reasoning, moral explanations and the role of moral theories
6ME1A	Design of Machine Element-II Year of study: 2018-19
CO1	Understand and apply principles of gear design to spur gears and industrial spur gear boxes
CO2	Become proficient in Design of Helical and Bevel Gear
CO3	Develop capability to analyze Rolling contact bearing and its selection from manufacturer's Catalogue
CO4	Become proficient in Design of Spring and IC Engine components.
CO5	Achieve an expertise in design of Sliding contact bearing in industrial applications.
6ME2A	Newer Machining Methods Year of study: 2018-19
CO1	Aware about all non-conventional manufacturing processes
CO2	Dealt with details about the mechanism of material removal, sources of energy used for material removal, working principle, the set up or equipment and relative advantages and disadvantages.
CO3	Get exposure on Micro and Nano Machining.
6ME3A	Mechatronics Year of study: 2018-19
CO1	Understand the concept of key elements of mechatronics system.
CO2	Create representation of mechatronics system into block diagram & concept of transfer function, reduction and analysis
CO3	Understand Principle of Sensors, its characteristics & identification of Interfacing of Sensors /Actuators to DAQ micro-controller
CO4	Understand PLC Programming & implement in real life system
CO5	Perform the job of an automation engineer and consultant to help the industries.
6ME4A	Vibration Engineering Year of study: 2018-19
CO1	Construct the equations of motion for free-body diagrams.
CO2	Solve for the motion and the natural frequency of (a) a freely vibrating single degree of freedom undamped motion and (b) a freely vibrating single degree of freedom damped motion
CO3	Construct the governing differential equation and its solution for a vibrating mass subjected to an arbitrary force.
CO4	Obtain the complete solution for the motion of one, two and three degrees of freedom vibratory systems (damped or undamped) that is subjected to non-periodic forcing functions.
CO5	Solve vibration problems that contain multiple degrees of freedom.
6ME5A	Steam Engineering Year of study: 2018-19

CO1	Describe the power generation scenario, the layout components of thermal power plant and analyze the improved Rankin cycle, Cogeneration cycle
CO2	Analyze the steam condensers, recognize the an environmental impacts of thermal power plant and method to control the same
CO3	Understand the concepts of pressure and velocity compounding.
6ME6.1 A	Non Destructive Techniques Year of study: 2018-19
CO1	List and define different defects that occur in welding shown through Non-Destructive Examination/Destructive Testing
CO2	Identify the types of equipment used for each Non-Destructive and Destructive Examination
CO3	Eexplain the purpose of the Equipment, Application, and standard techniques required to perform major non-destructive and destructive examinations of welds
CO4	Go to specific Code, Standard, or Specification related to each testing method
CO5	Have the knowledge and essential skills to identify strengths and weaknesses in materials used in fabrication.
6ME6.2 A	Design and Manufacturing of Plastic Products Year of study: 2018-19
CO1	Understand basic designing and manufacturing of plastic products.
CO2	Aware of various available plastic materials and their properties.
CO3	Get familiar with injection molding process.
CO4	Understand post processing machining operations of plastic products.
6ME6.3 A	Maintenance MAnagement Year of study: 2018-19
CO1	Maintenance management skill
CO2	Need of safety devices
CO3	Increase the productivity of the plant at minimal cost
CO4	Failure analysis of plant machineries
CO5	Concept of tribology, conditioning monitoring
CO6	Concept of maintainability and availability of mechanical components and systems
6ME7A	Machine Design Practice-II Year of study: 2018-19
CO1	Design mechanical components under fatigue loading.
CO2	Design helical compression, tension and torsional springs.
CO3	Design of bolts subjected to variable stresses.
CO4	Design of spur, bevel and helical gears.
6ME8A	Industrial Engineering Lab-I Year of study: 2018-19
CO1	Draw OC Curves and differentiate between producer's and consumer's risk.
CO2	Understand techniques to assess and improve process and/or product quality and reliability.
CO3	Use control charts to analyze for improving the process quality.
6ME9A	Mechatronics Year of study: 2018-19

CO1	Study of analog & digital multimeter, signal generator.
CO2	Do displacement and speed measurements using capacitive, inductive and magnetic pick up.
CO3	Perform load measurement using load cell and temperature using thermocouple, thermistor & RTD.
CO4	Develop an understanding of PLC ladder diagram related to industrial automation systems and measure its performance.
6ME10A	Vibration Engineering Lab Year of study: 2018-19
CO1	Design an experiment to measure the periodic time of free-vibrations of single degree and multi degree of freedom system
CO2	Analyze the mechanical vibrations to determine the material properties of mechanical elements used
CO3	Understand the fundamental of vibration measurement in the real world.
7ME1A	Finite Element Method Year of study: 2018-19
CO1	Recognize the significance and importance of finite element methods to the professional design engineer.
CO2	Provide a theoretical understanding on the fundamentals of finite element methods for small displacement linear elastic analysis
CO3	Provide experience on how to develop good models and how to interpret the numerical results in design.
7ME2A	Refrigeration and Air Conditioning Year of study: 2018-19
CO1	Understand various refrigeration cycles and evaluate performance using Mollier charts and/ or refrigerant property tables.
CO2	Illustrate the fundamental principles and applications of refrigeration and air conditioning system
CO3	Obtain cooling capacity and coefficient of performance by conducting test on vapor compression refrigeration systems
CO4	Present the properties, applications and environmental issues of different refrigerants
CO5	Estimate the condition of steam and performance of vapour power cycle and vapour compression cycle.
CO6	Calculate cooling load for air conditioning systems used for various applications
CO7	Use Psychometric charts and estimate various essential properties related to Psychrometry and processes.
CO8	Operate and analyze the refrigeration and air conditioning systems.
7ME3A	Operation ResearchYear of study: 2018-19
CO1	Apply and analyze mathematical optimization functions to various applications
CO2	Recognize the importance and value of Operations Research and mathematical modeling in solving practical problems in industry by Linear programming problems
CO3	Understand the mathematical tools that are needed to formulate & solve transportation problems for optimization
CO4	Formulate & analyze a managerial decision problem into a mathematical model using game theory & investment analysis
CO5	Use mathematical models to solve the inventory & replacement problems.
CO6	Understand queuing & sequencing models and apply them to real-life problems.
CO7	Use network models and techniques for effective decisions-making.
CO8	Apply the knowledge & tools of operation research in various industries like marketing, material handling etc.
7ME4A	Turbomachine Year of study: 2018-19
CO1	Explain the working principles of turbomachines and apply it to various types of machines
CO2	Determine the velocity triangles in turbomachinery stages operating at design and offdesign conditions

CO3	Perform the preliminary design of turbomachines (pumps, compressors, turbines) on a 1- D basis
CO4	Determine the off-design behavior of turbines and compressors and relate it to changes in the velocity triangles
CO5	Recognize relations between choices made early in the turbomachinery design process and the final components and operability
7ME5A	Operation Management Year of study: 2018-19
CO1	Demonstrate an understanding of fundamental operations concepts, key principles of its management, and relevant analysis approaches
CO2	Demonstrate the ability to understand a real-world unstructured problem, and gather necessary information and data to formulate into a structured problem
CO3	Demonstrate ability to develop quantitative and qualitative analysis framework and solution methods, and appropriately implement them to obtain meaningful solutions
CO4	Demonstrate ability to identify strengths and weaknesses of alternative solutions and obtain relevant managerial insights.
7ME6.1 A	Micro and Nano Manufacturing Year of study: 2018-19
CO1	Acquire the baseline knowledge about the theory and methods of various microfabrication techniques based on photolithography, and the ability to apply for developing the MEMS/NEMS devices
CO2	Design the basic level of MEMS/NEMS devices
CO3	Do evaluation of subsurface damage in nano and micromachining
7ME6.2 A	Robotics Year of study: 2018-19
CO1	Design automatic manufacturing cells with robotic control using the principle behind robotic drive system, end effectors, sensor, machine vision robot kinematics and programming.
CO2	Explain the basic concepts of working of robot analyze the function of sensors in the robot
CO3	Write program to use a robot for a typical application
CO4	Use Robots in different applications
7ME6.3 A	CNC Machines & Programming Year of study: 2018-19
CO1	Familiar with historical development of NC machining, NC hardware and software systems.
CO2	Write the program in APT language.
CO3	Understand the concept of CAPP system and their industrial application.
7ME7 A	Thermal Engineering -II Year of study: 2018-19
CO1	Conduct constant speed and variable speed tests on IC engines and interpret their performance.
CO2	Estimate energy distribution by conducting heat balance test on IC engines
CO3	Evaluate performance parameters of steam power plant
CO4	Determine performance parameters of refrigeration and air-conditioning systems
CO5	Evaluate the performance of turbomachines.
7ME8 A	Finite Element Method Lab Year of study: 2018-19

CO1	Apply finite element method to solve problems in solid mechanics, fluid mechanics and heat transfer.
CO2	Formulate and solve problems in one dimensional structures including trusses, beams and frames.
CO3	Formulate FE characteristic equations for two dimensional elements and analyze plain stress, plain strain, axi-symmetric and plate bending problems.
CO4	Implement <i>and</i> solve the finite element formulations using MATLAB
8ME1A	Computer Integrated Manufacturing Year of study: 2018-19
CO1	Describe various types of automation and production concepts
CO2	Create basic and advanced CNC programs from imported CAD data using several CAM systems
CO3	Use effectively CAD / CAM systems in order to produce the final NC code for the manufacturing of various mechanical parts and carry out exchange of data between CAD and CAM systems
CO4	Understand GT system with part classification and coding system.
CO5	Demonstrate various modern computer aided material handling systems.
8ME2A	Laws for Engineers Year of study: 2018-19
CO1	Aware themselves to constitutional laws along with technical knowledge.
CO2	Aware about laws related to human rights and labour laws.
CO3	Aware about laws related to intellectual property and law relating to copyright in India.
8ME3A	Power Generation Year of study: 2018-19
CO1	Describe sources of energy and types of power plants.
CO2	Analyze different types of steam cycles and it's efficiencies in a steam power plant.
CO3	Describe basic working principles of gas turbine and diesel engine power plants. Define the performance characteristics and components of such power plants.
CO4	List types, principles of operations, components and applications of steam turbines, steam generators, condensers, feed water and circulating water systems.
CO5	Estimate different efficiencies associated with power plant systems.
8ME4.1A	Product Development and Launching Year of study: 2018-19
CO1	Identify and analyse the strategic elements of product development processes.
CO2	Develop a product innovation charter.
CO3	Apply idea generation techniques
CO4	Assess the challenges and opportunities associated with the launch of new products
CO5	Propose a framework suitable for the management of a new product development process.
8ME4.2A	Computational Fluid Dynamics Year of study: 2018-19
CO1	Demonstrate the ability to use modern CFD software tools to build flow geometries, generate an adequate mesh for an accurate solution, select appropriate solvers to obtain a flow solution, and visualize the resulting flow field.

CO2	Demonstrate the ability to analyze a flow field to determine various quantities of interest, such as flow rates, heat fluxes, pressure drops, losses, etc., using flow visualization and analysis tools.
CO3	Demonstrate the ability to simplify a real fluid-flow system into a simplified model problem, to select the proper governing equations for the physics involved in the system, to solve for the flow, to investigate the fluid-flow behavior, and to understand the results.
8ME4.3A	Total Quality Management Year of study: 2018-19
CO1	Develop an understanding on quality management philosophies and frameworks
CO2	Adopt TQM methodologies for continuous improvement of quality.
CO3	Measure the cost of poor quality, process effectiveness and efficiency to identify areas for improvement.
CO4	Apply benchmarking and business process reengineering to improve management processes.
CO5	Determine the set of indicators to evaluate performance excellence of an organization
8ME5A	CAM Lab Year of study: 2018-19
CO1	Create the G-code program (with a standard computer post processor) of a work-piece on a standard numerically controlled machine tool with CNC controls.
CO2	Create basic and advanced CNC programs from imported CAD data using several CAM systems.
CO3	Use effectively CAD / CAM systems in order to produce the final NC code for the manufacturing of various mechanical parts and carry out exchange of data between CAD and CAM systems
CO4	Compare the operation and programming of CNC machine tool using manual programming
CO5	Compare the operation and programming of CNC machine tool using CAM systems
8ME6A	CAD Lab Year of study: 2018-19
CO1	Become proficient in a feature-based, parametric CAD software package such as Pro/ENGINEER. The student is able to use sketcher and part modules for computer aided design and drafting of engineering components.
CO2	Write programs for transformation of objects for display and for design of curves and surfaces.
CO3	Know the different techniques of graphical representation for simple parts and assemblies: sketching, dihedral system, topographic maps, axonometric and cavalier perspective and CAD.
8ME7A	Industrial Engineering Lab-II Year of study: 2018-19
CO1	Apply industrial engineering concept in industrial environment.
CO2	Understand different concepts regarding Organization and Productivity in industries.
CO3	Manage and implement different concepts involved in work and method study and understanding of work contents in different situations.
CO4	Undertake small case study based project works regarding work measurement and time study.
CO5	Develop capacities in integrating knowledge of design along with other aspects of value addition in the conceptualization and manufacturing stage of various products.