



Department of Mechanical Engineering

S.E. Sem III (R2016): Course Outcomes

MEC301- APPLIED MATHEMATICS

Learners will be able to:	
MEC301.1	Demonstrate the ability of using Laplace Transform and Fourier Series in solving the Ordinary Differential Equations and Partial Differential Equations.
MEC301.2	Identify the analytic function, harmonic function, orthogonal trajectories and to apply bilinear transformations and conformal mappings,
MEC301.3	Applicability of theorems and evaluate the contour integrals.
MEC301.4	Follow Fourier series expansion and apply engineering problem like RMS value
MEC301.5	Learn Bender-Schmidt, Explicit Method, Implicit method(Crank- Nicolson method) Successive over relaxation method to solve Partial Differential equation

MEC302 – THERMODYNAMICS

Learners will be able to:	
MEC302.1	Explain different types of thermodynamic processes and find heat and work interactions
MEC302.2	Apply first law of thermodynamics to processes, thermodynamic cycles, flow and non-flow systems.
MEC302.3	Explain second law of thermodynamics, entropy and find entropy changes for various processes.
MEC302.4	Write different thermodynamic relations and apply concept of availability to flow and non-flow processes.
MEC302.5	Explain working of reciprocating air compressor, rotary air compressor and compute work, power in single stage and multi-stage compressors.
MEC302.6	Analyse gas power cycles and vapour power cycles.

MEC303- Strength of Materials

Learners will be able to:	
MEC303.1	Demonstrate fundamental knowledge about types of loading, stresses and properties of mechanical components such as moment of inertia
MEC303.2	Draw SFD and BMD for different types of loads and support conditions.



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MEC303.3	Compute deformation and analyse stresses induced in basic mechanical components.
MEC303.4	Analyze buckling and bending phenomenon in columns and beams respectively.
MEC303.5	Compute torsional shear stresses , and strain energy in mechanical components
MEC303.6	Compute deflection, and slope in beams and analyse thin walled pressure vessels

MEC304- Production Process- I

Learners will be able to:	
MEC304.1	Identify the metal casting processes and illustrate casting parameters.
MEC304.2	Explain different types of forming processes.
MEC304.3	Demonstrate the concept and working of different welding and joining processes.
MEC304.4	Explain the processes involved in powder metallurgy.
MEC304.5	Demonstrate the Principles of Moulding with polymers and moulding with ceramics.
MEC304.6	Illustrate the fundamentals of non-destructive testing.

MEC305 - Material Technology

Learners will be able to:	
MEC305.1	Demonstrate fundamental knowledge about various types of materials and crystal defects as well as deformation in metals
MEC305.2	Different types of failure mechanism in fracture creep and fatigue.
MEC305.3	Interpret Iron-Iron carbide diagram, TTT diagram& their significance.
MEC305.4	Select appropriate heat treatment process for specific requirements.
MEC305.5	Understand the effect of alloying elements on properties.
MEC305.6	To understand advance engineering materials, their properties, applications & selection

MEL301 - Computer Aided M/c Drawing

Learners will be able to:	
MEL301.1	Read and interpret a given drawing.
MEL301.2	Draw details and assembly of
MEL301.3	Prepare detail drawing of a given object.
MEL301.4	Create 2-D and 3-D models using any standard CAD software



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MEL302-Strength of Materials

Learners will be able to:	
MEL302.1	Analyse the stress strain behaviour of materials
MEL302.2	Measure ultimate tensile/ compressive strength of material
MEL302.3	Measure torsional strength of material
MEL302.4	Performance impact test using Izod and Charpy method
MEL302.5	Measure the hardness of materials
MEL302.6	Perform flexural test with central and three point loading conditions

MEL303-Materials Technology

Learners will be able to:	
MEL303.1	Demonstrate the understanding of the procedure to prepare samples for studying microstructure using microscope (metallography)
MEL303.2	Interpret different phases present in different plain carbon steels and cast irons.
MEL303.3	Perform different heat treatment processes for a steel and observe microstructures in these conditions
MEL303.4	Identify effects of Annealing, Normalizing and Hardening on microstructure of medium carbon steel
MEL303.5	Determine hardenability of steel using Jominy end Quench test
MEL303.6	Determine S-N curve by Fatigue Test.

MEL304-Machine Shop Practice- I

Learners will be able to:	
MEL304.1	Practice safety associated with machine shop and operate various machines with this safety practices.
MEL304.2	Perform plain turning, taper turning, and screw cutting on lathe machine
MEL304.3	Perform various machining operations on shaping machine.
MEL304.4	Perform Forging of Cutting Tools used on Lathe Machine
MEL304.5	Demonstrate metal joining process like compressive welding.



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S.E. Sem IV (R2016): Course Outcomes

MEC401- APPLIED MATHEMATICS

Learners will be able to:	
MEL401.1	Use matrix algebra with its specific rules to solve the functions of square matrix and system of linear equation.
MEL401.2	Understand vector differentiation, integration and apply these concepts for irrotational and solenoidal force fields
MEL401.3	Understand Discrete, continuous random variable and some standard distributions.
MEL401.4	Understand and apply the methods to solve Non-Linear programming Problem
MEL401.5	Understand and apply the concept of sampling theory to engineering problems.
MEL401.6	Understand the relation between Bivariate Data.

MEC402-Fluid Mechanics

Learners will be able to:	
MEC402.1	Understand the basic fluid properties and basic laws.
MEC402.2	Understand the mathematical significance of kinematical equations and fundamentals.
MEC402.3	Apply mathematical equations to dynamics of fluid flow.
MEC402.4	Apply the knowledge of viscous and turbulent flow.
MEC402.5	Use concept of boundary layer for laminar and turbulent flows to analyse problems.
MEC402.6	Apply the fundamentals of compressible fluid flows to relevant systems

MEC403-Industrial Electronics

Learners will be able to:	
MEC403.1	Understand the applications of power electronic devices and various converters.
MEC403.2	Understand concept of OPAMP and opamp based linear and nonlinear applications with circuits.
MEC403.3	Demonstrate the knowledge of basic functioning of digital circuits and microcontrollers.
MEC403.4	Understand speed-torque characteristics of electrical machines for implementation of speed and torque control methods using electrical drives.



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MEC404-Production Process- II

Learners will be able to:	
MEC404.1	Understand different operations on Conventional Machines.
MEC404.2	Write APT program and understand the construction and working of CNC machine.
MEC404.3	Understand the concept of mechanics of Machining and economics of machining, able to calculate forces involved in machining and cost associated to machining.
MEC404.4	Understand the development of cutting tool, importance of cutting parameters and functions of cutting fluid.
MEC404.5	Design different cutting tool like form tool, broach, single point cutting tool etc.

MEC405-Kinematics of Machinery

Learners will be able to:	
MEC405.1	Analyse kinetics of rigid bodies
MEC405.2	Analyse working of various mechanisms and machines.
MEC405.3	Evaluate velocity and acceleration of various mechanisms.
MEC405.4	Construct CAM profile and analyse the follower motion.
MEC405.5	Select appropriate power transmission mechanism.

MEL401-Data Base & Information Retrieval System

Learners will be able to:	
MEL401.1	Identify data models and schemes in DBMS
MEL401.2	Use SQL- the standard language of relational databases
MEL401.3	Demonstrate the features of database management systems and Relational database
MEL401.4	Demonstrate understanding of functional dependencies and design of the database
MEL401.5	Design graphical user Interface for specific application
MEL401.6	Create visual software entities



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MEL402-Fluid Mechanics

Learners will be able to:	
MEL402.1	Verify Archimides principle
MEL402.2	Verify Bernoulli's theorem
MEL402.3	Determine coefficient of discharge of Venturimeter and Orificemeter
MEL402.4	Determine major and minor losses in pipe fittings
MEL402.5	Determine type of flow using Reynolds apparatus
MEL402.6	Design/ fabricate/ assemble a unit or software based simulation to demonstrate any principle in fluid mechanics.

MEL403-Industrial Electronics

Learners will be able to:	
MEL403.1	Demonstrate working of power devices and applications of power electronic devices
MEL403.2	Demonstrate working of OPAMP and demonstrate opamp based linear and nonlinear applications with circuits.
MEL403.3	Demonstrate the knowledge of basic functioning of digital circuits and microcontrollers.
MEL403.4	Demonstrate speed-torque characteristics of electrical machines (DC and 1 phase AC motor) for implementation of speed and torque control methods using electrical drives.

MEL404 - Kinematics of Machinery

Learners will be able to:	
MEL404.1	Draw velocity diagram by instantaneous center method
MEL404.2	Draw velocity and acceleration diagrams for four bar mechanism by relative method.
MEL404.3	Draw velocity and acceleration diagrams for Slider crank mechanism by relative method
MEL404.4	Draw Cam profile for the specific follower motion and Plot displacement-time, velocity-time, acceleration-time cam profiles
MEL404.5	Develop and build mechanisms to provide specific motion

MEL405-Machine Shop Practice- II

Learners will be able to:	
MEL405.1	Perform precision turning, screw cutting, and boring operation on the Lathe machine
MEL405.2	Operate various machines like shaping, milling and grinding machine.



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T.E. Sem V (R2016): Course Outcomes

MEC501-Internal Combustion Engines

Learners will be able to:	
MEC501.1	Describe the basics of internal combustion engines, cycles of operation and advances.
MEC501.2	Discuss various systems in spark ignition engines and the combustion processes involved
MEC501.3	Discuss various systems in compression ignition engines and the combustion processes involved
MEC501.4	Discuss engine cooling, lubrication and super-charging & turbo-charging systems
MEC501.5	Analyze engine performance and discuss alternative fuels and ECM controls

MEC502-Mechanical Measurements and Control

Learners will be able to:	
MEC502.1	Classify various types of measuring instruments, describe their static characteristics and identify various types of errors occurring during measurement process.
MEC502.2	Classify and select proper measuring instrument for measurement of strain, displacement, acceleration, pressure and temperature.
MEC502.3	Mathematically model various types of control systems.
MEC502.4	Analyse first and second order systems using transient and steady state responses.
MEC502.5	Analyse the stability of the given system.

MEC503-Heat Transfer

Learners will be able to:	
MEC505.1	Identify and explain the problems on heat conduction
MEC505.2	Describe the mechanism of heat convection and analyze the heat convection problems.
MEC505.3	Explain the mechanism of radiation heat transfer and analyze the problems on radiation
MEC505.4	Design and analyse different heat exchangers.



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MEC504-Dynamics of Machinery

Learners will be able to:	
MEC504.1	Analyse governors and gyroscope and its effects on the mechanical systems.
MEC504.2	Demonstrate static and dynamic force analysis in slider crank mechanism and dynamically equivalent system.
MEC504.3	Develop mathematical model for dynamic system and determine the natural frequency of mechanical system/ element.
MEC504.4	Analyze vibration response of mechanical system/ element.
MEC504.5	Estimate the parameters to design vibration isolation system.
MEC504.6	Demonstrate basic concepts of balancing of forces and couples of multi rotor system & reciprocating masses in In-line engines, V- engines.

MEDLO5011-Press Tool Design

Learners will be able to:	
MEDLO5011.1	Demonstrate various press working operations for mass production of sheet metal parts.
MEDLO5011.2	Identify press tool requirements to build concepts pertaining to design of press tool.
MEDLO5011.3	Prepare working drawings and setup for economic production of sheet metal components.
MEDLO5011.4	Select suitable materials for different elements of press tool.
MEDLO5011.5	Illustrate the principles and blank development in bent and drawn components.
MEDLO5011.6	Elaborate failure mechanisms of pressed components, safety aspects and automation in press working.

MEDLO5012-Machining Sciences and Tool Design

Learners will be able to:	
MEDLO5012.1	Calculate the values of various forces involved in the machining operations.
MEDLO5012.2	Analyse heat generation in machining operation and effectiveness of coolant application.
MEDLO5012.3	Select an appropriate tool material for a particular machining application.
MEDLO5012.4	Understand the underlying principles of machining economics and calculate optimum cutting speed for minimum production cost as well as for maximum production rate.
MEDLO5012.5	Design various single and multipoint cutting tools.



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MEL501- Internal Combustion Engines

Learners will be able to:	
MEL501.1	Disassemble and assemble engine components
MEL501.2	Analyse performance of SI engine
MEL501.3	Analyse performance of CI engine
MEL501.4	Analyse the engine performance by heat balance

MEL502-Mechanical Measurements and Control

Learners will be able to:	
MEL502.1	Calibrate displacement sensors
MEL502.2	Calibrate pressure and vacuum gauges
MEL502.3	Measure torque using strain gauges
MEL502.4	Identify system/process characteristics for standard input responses
MEL502.5	Identify various types of control systems and time domain specifications
MEL502.6	Analyse the problems associated with stability

MEL503-Heat Transfer

Learners will be able to:	
MEL503.1	Estimate thermal conductivity of solids/liquids
MEL503.2	Compute heat transfer coefficient in natural as well forced convection
MEL503.3	Measure emissivity of grey body
MEL503.4	Quantify fin effectiveness/efficiency
MEL503.5	Analyse heat exchanger performance

MEL504-Dynamics of Machinery

Learners will be able to:	
MEL504.1	Plot and analyse governor characteristics
MEL504.2	Analyse gyroscopic effect on laboratory model
MEL504.3	Estimate natural frequency of mechanical systems
MEL504.4	Analyse vibration response of mechanical systems
MEL504.5	Determine damping coefficient of a system



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MEL505-Manufacturing Sciences Lab

Learners will be able to:	
MEL505.1	Identify and select location and clamping faces/points on jobs.
MEL505.2	Design and develop simple productive and cost-effective jigs and fixtures.
MEL505.3	Identify press tool requirements to build concepts pertaining to design of press tools.
MEL505.4	Select a proper force measurement method for the required machining operation.
MEL505.5	Illustrate the principles and blank development in bent and drawn components.

MEL506-Business Communication and Ethics

Learners will be able to:	
MEL506.1	Prepare a project report by assimilating, analysing, organizing and formatting data in the prescribed format.
MEL506.2	Prepare a technical proposal according to the prescribed format.
MEL506.3	Understand the various interpersonal skills and their function in an everyday business environment. Prepare an inventory of interpersonal skills based on self-assessment. Prepare notice agenda and minutes of a meeting and plan and conduct an effective meeting
MEL506.4	Prepare notice agenda and minutes of a meeting and plan and conduct an effective meeting
MEL506.5	Understand the concept and application of corporate ethics / soft skills in real life situations
MEL506.6	Participate in group discussions and interviews and write a cover letter and resume. Apply presentation techniques to deliver power point presentations in the latest formats



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T.E. Sem VI (R2016): Course Outcomes

MEC601-Metrology and Quality Engineering

Learners will be able to:	
MEC601.1	Design different types of inspection gauges
MEC601.2	Illustrate working principle of measuring instruments and calibration methodology.
MEC601.3	Explain the basic concepts of quality control.
MEC601.4	Apply different statistical methods for solving problems concerning Quality of the product.
MEC601.5	Apply proper non-destructive testing technique for testing of various physical attributes of the product.

MEC602- Machine Design I

Learners will be able to:	
MEC602.1	Demonstrate understanding of various design considerations
MEC602.2	Illustrate principles of machine design
MEC602.3	Design machine elements for static as well as dynamic loading
MEC602.4	Design machine elements on the basis of strength/ rigidity concepts
MEC602.5	Use design data books in designing various components

MEC603- Finite Element Analysis

Learners will be able to:	
MEC603.1	Summarize basic concepts of Finite element method.
MEC603.2	Solve differential equations using weighted residual methods.
MEC603.3	Apply the basic finite element formulation techniques to solve engineering problems by using one dimensional elements.
MEC603.4	Apply the basic finite element formulation techniques to solve engineering problems by using two dimensional elements.
MEC603.5	Apply the basic finite element formulation techniques to find natural frequency of single degree of vibration system.
MEC603.6	Apply finite element formulation for dynamics field problems.



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MEC604-Refrigeration and Air Conditioning

Learners will be able to:	
MEC604.1	Discuss the basics of refrigeration systems.
MEC604.2	Analyze vapour compression refrigeration systems.
MEC604.3	Discuss different non-conventional refrigeration systems.
MEC604.4	Design air-conditioning systems using cooling load calculations.
MEC604.5	Discuss the applications and controls of refrigeration and air-conditioning systems.
MEC604.1	Discuss the basics of refrigeration systems.

MEDLO6021-Mechatronics

Learners will be able to:	
MEDLO6021.1	Represent Mechatronics system in block diagrams
MEDLO6021.2	Identify the suitable sensor and actuator for a given mechatronics system
MEDLO6021.3	Distinguish and analyse various circuits for signal conditioning and their interfacing with microcontrollers
MEDLO6021.4	Design hydraulic/pneumatic circuits
MEDLO6021.5	Analyse continuous control logics (P, PI, PD and PID) for standard input conditions
MEDLO6021.6	Develop ladder logic programming

MEDLO6023-Industrial Automation

Learners will be able to:	
MEDLO6023.1	Explain basics of industrial automation
MEDLO6023.2	Identify various types of automation
MEDLO6023.3	Design hydraulic/pneumatic circuits
MEDLO6023.4	Identify the suitable sensor and actuator for a given mechatronics system
MEDLO6023.5	Develop ladder logic programming
MEDLO6023.6	Explain the basic functioning of a robot



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MEL601- Metrology and Quality Engineering

Learners will be able to:	
MEL601.1	Measure linear and angular dimensions
MEL601.2	Measure various parameters of gear tooth profile
MEL601.3	Measure various parameters of screw thread
MEL601.4	Use of Tool Makers Microscope and Profile Projector for measurement
MEL601.5	Use of Mechanical Comparator
MEL601.6	Prepare control charts and derive the conclusion.

MEL602-Machine Design I

Learners will be able to:	
MEL602.1	Design shaft under various conditions
MEL602.2	Design Knuckle Joint / cotter joint
MEL602.3	Design Screw Jack/C-clamp along with frame
MEL602.4	Design Flexible flange couplings/ Leaf spring
MEL602.5	Convert design dimensions into working/manufacturing drawing
MEL602.6	Use design data book/standard codes to standardise the designed dimensions

MEL603-Finite Element Analysis

Learners will be able to:	
MEL 603.1	Apply basic aspects of FEA to solve engineering problems.
MEL 603.2	Select appropriate element for given problem.
MEL 603.3	Select suitable meshing and perform convergence test.
MEL 603.4	Select appropriate solver for given problem.
MEL 603.5	Interpret the result.
MEL 603.5	Validate FEA solution.



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MEL604-Refrigeration and Air Conditioning

Learners will be able to:	
MEL604.1	Identify and describe components of the refrigeration and air conditioning systems.
MEL604.2	Discuss various refrigeration and air conditioning processes.
MEL604.3	Analyze various refrigeration and air conditioning processes.

MEL605-Mechatronics Lab

Learners will be able to:	
MEL605.1	Demonstrate implementation of interfacing sensors and actuators using microcontrollers
MEL605.2	Design and develop a control system for specific use
MEL605.3	Develop hydraulic/pneumatic circuits and Implement program using PLC system for specific system



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B.E. Sem VII (R2012): Course Outcomes

MEC701.1- Machine Design –II

Learners will be able to:	
MEC701.1	Design gears for power transmission on basis of load and speed.
MEC701.2	Select bearing for given application from manufacturer's catalogue.
MEC701.3	Select and/or design belts and chain drive
MEC701.4	Design cam and follower
MEC701.5	Design single plate, multi plate, and cone clutch.

MEC702-CAD/CAM/CAE

Learners will be able to:	
MEC702.1	Identify proper computer graphics techniques for geometric modelling
MEC702.2	Transform, manipulate objects and store and manage data
MEC702.3	Prepare part programming applicable to CNC machines
MEC702.4	Identify proper technology driven practices for CAM
MEC702.5	Identify the tools for Analysis of a complex engineering component
MEC702.6	Interpret rapid prototyping and tooling concepts in any real life applications

MEC703-Mechanical Utility Systems

Learners will be able to:	
MEC703.1	Explain operating principles of compressors and pumps
MEC703.2	Analyse performance of reciprocating/rotary compressors
MEC703.3	Illustrate and analyse performance of centrifugal pumps
MEC703.4	Explain possibilities of energy conservation in pumping and compressed air systems

MEC704-Production Planning and Control

Learners will be able to:	
MEC704.1	Understand the functions of Production Planning and Control and input data required for planning documents.
MEC704.2	Calculate and Understand the significance and various parameters in inventory management.



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MEC704.3	Prepare Plan for product and process and determine demand forecast.
MEC704.4	Understand optimization techniques used in Production Planning and Control
MEC704.5	Use tools of Project Scheduling and Prepare schedule for given project.

MEE7014-Supply Chain Management

Learners will be able to:	
MEE7014.1	Explain the role & functions of supply chain management and its processes.
MEE7014.2	Explain alternative ways to design supply chain network.
MEE7014.3	Explain managing and planning of material flow activities.
MEE7014.4	Explain major logistics functions and activities.
MEE7014.5	Explain warehouse processes and transportation related policies.
MEE7014.6	Explain how technology has and continues to change logistics and supply chain management.

MEE7019-Operations Research

Learners will be able to:	
MEE7019.1	Develop LP model and analyse the same.
MEE7019.2	Determine optimum solution to Transportation, Sequencing and Assignment problems in LPP.
MEE7019.3	Apply Replacement and Queuing Models for real time problems.
MEE7019.4	Solve the Game theory.
MEE7019.5	Apply Inventory Models in real time scenario.
MEE7019.6	Demonstrate the concepts of Dynamic Programming and Simulation technique.

MEP701-Project- I

Learners will be able to:	
MEP701.1	Apply basic engineering fundamentals in the domain of practical applications.
MEP701.2	Identify the engineering problems based on literature review.
MEP701.3	Attempt a problem solution with right approach and ethics.
MEP701.4	Develop the habit of working in a team, and communicate efficiently with engineering community and society.
MEP701.5	Apply the principles of project management and financial aspects in multidisciplinary environments.
MEP701.6	Recognize the need for lifelong learning activities to cope up with technological changes.



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B.E. Sem VIII (R2012): Course Outcomes

MEC801-Design of Mechanical Systems

Learners will be able to:	
MEC801.1	Design material handling systems such as hoisting mechanism of EOT Crane, belt conveyors.
MEC801.2	Design engine components such as cylinder, piston, connecting rod and crankshaft from system design point of view.
MEC801.3	Design pumps for the given applications.
MEC801.4	Design gear boxes for machine tool applications

MEC802-Industrial Engineering and Management

Learners will be able to:	
MEC802.1	Summarize objectives of industrial engineering
MEC802.2	Familiarizes and distinguish between value engineering & value analysis.
MEC802.3	apply work study, and Principles of motion economy.
MEC802.4	Summarize the aspects of principles of work system design.
MEC802.5	Discover Principles of facility design.
MEC802.6	Principles of cost accounting and Financial Management.

MEC803-Refrigeration and Air Conditioning

Learners will be able to:	
MEC803.1	Discuss the basics of air refrigeration and aircraft refrigeration systems.
MEC803.2	Analyse simple and 2 stage vapour compression refrigeration systems
MEC803.3	Discuss different vapour absorption refrigeration systems.
MEC803.4	Define different psychrometric properties and analyse air-conditioning systems
MEC803.5	Design air-conditioning ducts using duct design methods



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MEE8023-Project Management

Learners will be able to:	
MEE8023.1	Understand the basics of project management and to identify roles of a project manager
MEE8023.2	Select an appropriate project from different options and to understand the dynamics of project team
MEE8023.3	Make project plan
MEE8023.4	Determine the status of a project using earned value technique and to understand the basics of team management
MEE8023.5	Review a project and document them for future reference

MEP802-Project- II

Learners will be able to:	
MEP802.1	Apply basic engineering fundamental in the domain of practical applications.
MEP802.2	Identify, formulate and analyse the engineering problems based on literature review.
MEP802.3	Attempt a problem solution with right approach and ethics.
MEP802.4	Correlate the theoretical and experimental / simulations results and draw the proper inferences
MEP802.5	Develop the habit of working in a team and communicate efficiently with engineering community and society.
MEP802.6	Recognize the need for lifelong learning activities to cope up with technological changes.