

SIES Graduate School of Technology, Nerul
Department of Mechanical Engineering

Course Outcomes (CBCS)

Second Year: Sem-III

Subject: Applied Mathematics-III

- MEC301.1 Find Laplace Transform and Inverse Laplace Transform of functions using the properties and properties
- MEC301.2 Find Inverse Laplace Transform using Convolution Theorem and apply Laplace Transform to find solution of Ordinary Differential Equation
- MEC301.3 Expand periodic functions using Fourier series and Complex form of Fourier series and understand the concept of Half range sine and cosine series, orthogonal and orthonormal functions
- MEC301.4 Understand the concept of complex variable, analytic functions, harmonic functions, Residues and conformal mapping. Expand complex function using Taylors and Laurent series
- MEC301.5 Solve partial differential equation using Fourier series and find numerical solution of partial differential equation
- MEC301.6 Apply the concept of Correlation and Regression to find correlation coefficient, Rank correlation and Regression lines

Subject: Thermodynamics

- MEC302.1 Demonstrate application of the laws of thermodynamics to wide range of systems.
- MEC302.2 Derive steady flow energy equation for various flow and non-flow thermodynamic systems
- MEC302.3 Compute heat and work interactions in thermodynamics systems
- MEC302.4 Demonstrate the interrelations between thermodynamic functions to solve practical problems.
- MEC302.5 Use steam table and mollier chart to compute thermodynamics interactions
- MEC302.6 Compute efficiencies of heat engines and power cycles

Subject: Strength of Materials

- MEC303.1 Demonstrate fundamental knowledge about various types of loading and stresses..
- MEC303.2 Analyze the SFD & BMD for different types of loads and support conditions.
- MEC303.3 Analyze the stresses induced in basic mechanical components.
- MEC303.4 Estimate the strain energy in beams.
- MEC303.5 Analyze the deflection in beams.
- MEC303.6 Analyze buckling and bending phenomena in column, struts and beams

Subject: Production Process-I

- MEC304.1 Demonstrate understanding of casting and special casting processes.
- MEC304.2 Demonstrate understanding of various types of joining processes and their applications.
- MEC304.3 Illustrate various forming processes and their principles.
- MEC304.4 Illustrate the concept of producing polymer components and ceramic components.
- MEC304.5 Differentiate machine tools, and understand their selection and applications.
- MEC304.6 Distinguish between the conventional and modern machine tools.

Subject: Material Technology

- MEC305.1 Identify various crystal imperfections, deformation mechanisms, and strengthening mechanisms.
- MEC305.2 Demonstrate various failure mechanisms of materials.
- MEC305.3 Interpret iron-iron carbide phase diagram, and different phases in microstructures of materials at different conditions.
- MEC305.4 Recommend specific heat treatment process for different applications.
- MEC305.5 Identify effect of alloying elements on properties of steels.
- MEC305.6 Illustrate basics of composite materials, nano- materials and smart materials.

Subject: Computer Aided Machine Drawing

- MEL301.1 Visualize and prepare detail drawing of a given object.
- MEL301.2 Read and interpret the drawing
- MEL301.3 Draw details and assembly of different mechanical systems.
- MEL301.4 Convert detailed drawing into assembly drawing using modelling software
- MEL301.5 Convert assembly drawing into detailed drawing using modelling software
- MEL301.6 Prepare detailed drawing of any given physical object/machine element with actual measurements

Subject: Strength of Material

- MEL302.1 Analyse the stress - strain behaviour of materials
- MEL302.2 Measure ultimate tensile/compression strength of material
- MEL302.3 Measure torsional strength of material
- MEL302.4 Perform 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

Subject: Material Technology

- 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

Subject: Machine Shop Practice-I

- MEL304.1 Operate various machines like lathe, shaper etc.
- MEL304.2 Perform plain turning, taper turning, and screw cutting etc. on lathe machine.
- MEL304.3 Perform machining operations on shaper
- MEL304.4 Demonstrate metal joining process like compressive welding
- MEL304.5 Perform forging operations
- MEL304.6 Perform shaping operations

Second Year: Sem-IV

Subject: Applied Mathematics-IV

- MEC401.1 Find Eigen values and eigenvectors of a matrix to diagonalize the Square matrix.
- MEC401.2 Evaluate surface/ volume integral using Stokes and Gauss Divergence theorem.
- MEC401.3 Use Binomial, Poisson and Normal distribution to solve statistical probability
- MEC401.4 To analyze the problem by using Large and Small Sampling theory
- MEC401.5 Find the regression lines using method of least squares and correlation coefficients.
- MEC401.6 Optimize the solution of NLPP

Subject: Fluid Mechanics

- MEC402.1 Classificify and evaluate various properties of fluids
- MEC402.2 Explain of fluid motion and types of flow lines
- MEC402.3 Apply Bernoulli's equation to non compressible fluid systems
- MEC402.4 Calculate resistance to flow of incompressible fluids through closed conduits and over surfaces
- MEC402.5 Evaluate the boundary layer flows and flow separation
- MEC402.6 Apply fundamentals of compressible fluid flows to relevant systems

Subject: Industrial Electronics

- MEC403.1 Illustrate construction, working principles and applications of power electronic switches
- MEC403.2 Identify rectifiers and inverters for dc and ac motor speed control
- MEC403.3 Develop circuits using OPAMP and timer IC555
- MEC403.4 Identify digital circuits for industrial applications
- MEC403.5 Illustrate the knowledge of basic functioning of microcontroller
- MEC403.6 Analyse speed-torque characteristics of electrical machines for speed control

Subject: Production Process-II

- MEC404.1 Demonstrate understanding of metal cutting principles and mechanism.
- MEC404.2 Identify cutting tool geometry of single point and multipoint cutting tool.
- MEC404.3 Demonstrate various concepts of sheet metal forming operations.
- MEC404.4 Demonstrate concepts and use of jigs and fixtures.
- MEC404.5 Illustrate various non-traditional machining techniques.
- MEC404.6 Illustrate concepts and applications of additive manufacturing.

Subject: Kinematics of Machinery

- MEC405.1 Describe various types of mechanisms
- MEC405.2 Develop mechanisms to provide specific motions
- MEC405.3 Draw Velocity and acceleration diagram for mechanism upto 6 link
- MEC405.4 Draw cam profile for specific motion of followers
- MEC405.5 Identify varoius types of gears and gear trains

MEC405.6 Select appropriate power transmission for specific applications

Subject: Data Base and Information Retrieval

- MEL401.1 Identify data models and schemes in DBMS
- MEL401.2 Demonstrate the features of database management systems and Relational database
- MEL401.3 Use SQL- the standard language of relational databases
- 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

Subject: Fluid Mechanics

- MEL402.1 Verify the Archimedes Principle
- MEL402.2 Verify the Bernoulli's Principle
- MEL402.3 Calibrate Venturimeter, Orificemeter and Pitot tube
- MEL402.4 Determine minor losses and Darcy's friction factor for flow through pipes (pipe fittings)
- MEL402.5 Determine Reynolds number for different types of flow.
- MEL402.6 Calibration of Pressure Gauges

Subject: Industrial Electronics

- MEL403.1 Demonstrate characteristics of various electrical and electronics components
- MEL403.2 Develop simple applications built around these components
- MEL403.3 Identify use of different basic gates
- MEL403.4 Identify and use digital circuits for industrial applications
- MEL403.5 Built and demonstrate basic parameter measurement using microcontroller
- MEL403.6 Test and Analyse speed-torque characteristics of electrical machines for speed control.

Subject: Kinematics of Machinery

- 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
- MEL404.5 Plot displacement-time, velocity-time, acceleration-time cam profiles
- MEL404.6 Develop and build mechanisms to provide specific motion

Subject:	Machine Shop Practice-II
MEL405.1	Operate lathe machine,
MEL405.2	Perform shaping operations
MEL405.3	Perform finishing operations on grinding machine
MEL405.4	Perform milling operations.
MEL405.5	Perform precision turning
MEL405.6	Perform drilling and threading operations.

Third Year: Sem-V

Subject: Internal Combustion Engines

- MEC501.1 Describe types, basic parts, their material and working cycles and classification of internal combustion engine and difference between air standard and fuel cycle and actual cycles.
- MEC501.2 Explain the working of different systems and processes of SI engines.
- MEC501.3 Explain working of different systems and processes of C.I. engines
- MEC501.4 Describe the working of lubrication, cooling and supercharging systems and evaluate parameters of supercharged or turbocharged engine.
- MEC501.5 Analyse engine performance and illustrate emission norms and emission control
- MEC501.6 Explain the different technological advances such as electronic control in engines and alternate fuels

Subject: Mechanical Measurements and Control

- MEC502.1 Comprehend architecture of the measurement system
- MEC502.2 Describe working principle of mechanical measurement system
- MEC502.3 Analyse mathematical modelling of the control system
- MEC502.4 Analyse the transient and steady state of first and second order system
- MEC502.5 Solve problems in control system under different time domain
- MEC502.6 Analyse stability of the control system

Subject: Heat Transfer

- MEC503.1 Identify the modes of heat transfer conduction, convection and radiation
- MEC503.2 Develop mathematical model for each mode of heat transfer
- MEC503.3 Develop mathematical model for fin and transient heat transfer
- MEC503.4 Estimate convective heat transfer coefficient in forced and free convection
- MEC503.5 Analyse different heat exchangers and quantify their performance
- MEC503.6 Apply concept of radiation to solve real life problem

Subject: Dynamics of Machinery

- MEC504.1 Demonstrate working Principles of different types of governors and Gyroscopic effects on the mechanical systems
- MEC504.2 Calculate basic of static and dynamic forces in the mechanisms
- MEC504.3 Determine natural frequency of free undamped element/system
- MEC504.4 Determine vibration response of free damped mechanical elements / systems
- MEC504.5 Analyze the vibration isolation, transmissibility, measuring instrument system under forced single degree of freedom vibratory system
- MEC504.6 Calculate critical speed of shaft and analyze static and dynamic balancing of rotating and reciprocating masses.

Subject: Press Tool Design

- 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 tools
- MEDLO5011.3 Prepare working drawings and setup for economic production of sheet metal components
- MEDLO5011.4 Select suitable materials for different elements of press tools
- MEDLO5011.5 Illustrate the principles and blank development in bent & drawn components
- MEDLO5011.6 Elaborate failure mechanisms of pressed components, safety aspects and automation in press working

Subject: Machining Sciences and Tool Design

- MEDLO5012.1 Illustrate the theory of metal cutting and calculate the values of various forces involved in the machining operations.
- MEDLO5012.2 Analyse heat generation in machining operation and cutting fluids/coolant operations.
- MEDLO5012.3 Illustrate the properties of various cutting tool materials and hence select an appropriate tool material.
- MEDLO5012.4 Analyze tool life and economics of machining operations.
- MEDLO5012.5 Illustrate tool nomenclatures and design single point cutting tools.
- MEDLO5012.6 Design multipoint cutting tools.

Subject: Internal Combustion Engines

- MEL501.1 Dismantle engine assembly
- MEL501.2 Overhaul and assemble engine components
- MEL501.3 Perform load test/speed test on engine setup
- MEL501.4 Calculate performance of multi cylinder engine
- MEL501.5 Analyse engine performance and draw heat balance sheet
- MEL501.6 Perform exhaust gas analysis

Subject: Mechanical Measurements and Control

- MEL502.1 Describe the architecture of the measurement system
- MEL502.2 Describe the working principle of mechanical measurement system
- MEL502.3 Analyse mathematical modelling of the control system
- MEL502.4 Analysis of the Transient and steady state of first and second order system
- MEL502.5 Analysis of the control system under different time domain
- MEL502.6 Analysis of the stability of control system.

Subject: Heat Transfer

- MEL503.1 Estimate thermal conductivity of metals/non metals/liquids
- MEL503.2 Compute heat transfer coefficient in natural as well forced convection

- MEL503.3 Determine effect of area on heat transfer
- MEL503.4 Measure emissivity of grey body
- MEL503.5 Quantify fin effectiveness/efficiency
- MEL503.6 Analyse heat exchanger performance

Subject: Dynamics of Machinery

- 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
- MEL504.6 Estimate critical speed of the shaft

Subject: Manufacturing Sciences Lab

- MEL505.1 Design and develop simple productive and cost effective jigs and fixtures.
- MEL505.2 Identify press tool requirements to build concepts pertaining to design of press tools.
- MEL505.3 Design multipoint cutting tool.
- MEL505.4 Select a proper force measurement method for the required machining operation.
- MEL505.5 Select a proper temperature measurement method for the required machining operation.
- MEL505.6 Analyze tool life and economics of machining.

Subject: Business Communication and Ethics

- MEL506.1 Design a technical document using precise language, suitable vocabulary and apt style.
- MEL506.2 Develop the life skills/ interpersonal skills to progress professionally by building stronger relationships.
- MEL506.3 Demonstrate awareness of contemporary issues knowledge of professional and ethical responsibilities.
- MEL506.4 Apply the traits of a suitable candidate for a job/higher education, upon being trained in the techniques of holding a group discussion, facing interviews and writing resume/SOP.
- MEL506.5 Deliver formal presentations effectively implementing the verbal and non-verbal skills
- MEL506.6 Demonstrate awareness on intellectual property rights and responsible use of social media.

Third Year: Sem-VI

Subject: Metrology and Quality Engineering

- MEC601.1 Measure Linear and angular dimensions.
- MEC601.2 Measure surface roughness
- MEC601.3 Measure various parameters of gear tooth profile.
- MEC601.4 Use optical profile projector for measurement.
- MEC601.5 Use various instruments for measurement of screw threads.
- MEC601.6 Measure flatness by Interferometer method.

Subject: Machine Design-I

- MEC602.1 Demonstrate understanding of various design considerations
- MEC602.2 Apply basic principles of machine design
- MEC602.3 Design machine elements for static as well as dynamic loading
- MEC602.4 Design of components subjected to fluctuating loads
- MEC602.5 Design machine elements on the basis of strength/ rigidity concepts
- MEC602.6 Analyse and design mechanical spring

Subject: Finite Element Analysis

- MEC603.1 Analyze Approximation techniques using FEM approach
- MEC603.2 Analyze various problems using weak formulation techniques using RR Method
- MEC603.3 Analyze one dimensional domain problems using FEM approach
- MEC603.4 Analyze two dimensional domain problems using FEM approach
- MEC603.5 Analyze two dimensional vector problems using FEA.
- MEC603.6 Apply numerical techniques for dynamics problems and validate same using FEA approach

Subject: Refrigeration and Air Conditioning

- MEC604.1 Demonstrate fundamental principles of refrigeration and air conditioning
- MEC604.2 Identify and locate various important components of the refrigeration and air conditioning system
- MEC604.3 Illustrate various refrigeration and air conditioning processes using psychometric chart
- MEC604.4 Design Air Conditioning system using cooling load calculations.
- MEC604.5 Estimate air conditioning system parameters
- MEC604.6 Demonstrate understanding of duct design concepts

Subject: Mechatronics

- MEDLO6021.1 Identify the suitable sensor and actuator for a mechatronics system
- MEDLO6021.2 Select suitable logic controls
- MEDLO6021.3 Analyse continuous control logics for standard input conditions
- MEDLO6021.4 Develop ladder logic programming

- MEDLO6021.5 Design hydraulic/pneumatic circuits
 MEDLO6021.6 Design a mechatronic system such as simple mechanical applications

Subject: Robotics

- MEDLO6022.1 Demonstrate the basic functioning and components of robot
 MEDLO6022.2 Carryout direct, inverse kinematic analysis of fixed robot mobile robot
 MEDLO6022.3 Carryout workspace analysis and trajectory planning of various robot
 MEDLO6022.4 Identify and select suitable sensors and actuators
 MEDLO6022.5 Identify and select suitable robot for inspection and material handling
 MEDLO6022.6 Explain various aspects/features of robot as humanoids with applications and case studies

Subject: Metrology and Quality Engineering

- MEL601.1 Measure linear and angular dimensions
 MEL601.2 Measure surface roughness
 MEL601.3 Measure various parameters of gear tooth profile
 MEL601.4 Use optical profile projector for measurement
 MEL601.5 Use various instruments for measurement of screw threads
 MEL601.6 Measure flatness by Autocollimator / Interferometry method

Subject: Machine Design-I

- MEL602.1 Apply basic knowledge of failure to design simple elements
 MEL602.2 Design joints subjected to static loading.
 MEL602.3 Use design data book/standard codes to standardise the designed dimensions
 MEL602.4 Design of components subjected to fluctuating loads
 MEL602.5 Design machine elements on the basis of strength/ rigidity concepts
 MEL602.6 Design dimensions into working/manufacturing drawing

Subject: Finite Element Analysis

- MEL603.1 Select appropriate element for given problem to solve 1D problem
 MEL603.2 Select suitable meshing and perform convergence test to validate problem using analytical method
 MEL603.3 Select appropriate solver for given problem to validate results using analytical method
 MEL603.4 Interpret the result and conclude the accuracy of the solution
 MEL603.5 Apply basic aspects of FEA to solve engineering problems
 MEL603.6 Analyze CFD technique to solve numerical on flow through pipe.

Subject: Refrigeration and Air Conditioning

- MEL604.1 Demonstrate fundamental principles of refrigeration and air conditioning
 MEL604.2 Identify and locate various important components of the refrigeration and air

- conditioning system
- MEL604.3 Represent various refrigeration and air conditioning processes using psychometric chart
- MEL604.4 Operate and maintain refrigeration system
- MEL604.5 Operate and maintain air conditioning system
- MEL604.6 Simulate VCRS

Subject: Mechatronics Lab

- MEL605.1 Demonstrate implementation of interfacing sensors and actuators using microcontrollers
- MEL605.2 Visualization of DH parameter of a mechanism
- MEL605.3 Demonstrate discrete control system using PLC microcontroller
- MEL605.4 Design and develop a control system for specific use
- MEL605.5 Implement program to PLC system and demonstrate its application
- MEL605.6 Develop pneumatic circuits for a specific system

Final Year: Sem-VII

Subject: Machine Design-II

- MEC701.1 Design appropriate gears for power transmission on the basis of given load and speed
- MEC701.2 Design bearings for given application from the manufacturing catalogue
- MEC701.3 Design hydro dynamic bearings for given application from the manufacturing catalogue
- MEC701.4 Design Cam follower and clutches for the given application
- MEC701.5 Design belts for the given applications
- MEC701.6 Design clutches based on uniform pressure theory and uniform wear theory consideration

Subject: CAD/CAM/CAE

- MEC702.1 Identify proper computer graphics techniques for geometric modelling.
- MEC702.2 Apply Transformation, manipulation techniques to different objects
- MEC702.3 Prepare part programming applicable to CNC machines
- MEC702.4 Use rapid prototyping and tooling concepts in any real life applications
- MEC702.5 Identify the tools for Analysis of a complex engineering component
- MEC702.6 Recognise the need of CIM systems, Socio -techno- economic aspects of CIM

Subject: Production Planning and Control

- MEC703.1 Illustrate production planning functions and manage manufacturing functions in a better way
- MEC703.2 Develop competency in scheduling and sequencing of manufacturing operations
- MEC703.3 Forecast the demand of the product and prepare an aggregate plan
- MEC703.4 Develop the skills of Inventory Management and cost effectiveness
- MEC703.5 Create a logical approach to Line Balancing in various production systems
- MEC703.6 Implement techniques of manufacturing planning and control

Subject: Automobile Engineering

- MEDLO7032.1 Illustrate the types and working of clutch and transmission system.
- MEDLO7032.2 Demonstrate the working of different types of final drives, steering gears and braking systems
- MEDLO7032.3 Illustrate the constructional features of wheels, tyres and suspension systems
- MEDLO7032.4 Describe the understanding of types of storage, charging and starting systems
- MEDLO7032.5 Identify and explain the type of body and chassis of an automobile
- MEDLO7032.6 Comprehend the different technological advances in automobile

Subject: Pumps, Compressore and Fans

- MEDLO7033.1 Comprehend Construction and working different types of pumps
- MEDLO7033.2 Evaluate performance of centrifugal pumps and analyse characteristic curves of

pumps

- MEDLO7033.3 Evaluate the performance of reciprocating Pump
- MEDLO7033.4 Describe different types of compressors
- MEDLO7033.5 Evaluate the performance of Centrifugal Compressor and Axial Compressor
- MEDLO7033.6 Describe the types of Fans & blower and Analyse their performance

Subject: Product Lifecycle Management

- ILO7011.1 Gain knowledge about phases of PLM, PLM strategies and methodology for PLM feasibility study and PDM implementation
- ILO7011.2 Illustrate various approaches and techniques for designing and developing products.
- ILO7011.3 Apply product engineering guidelines / thumb rules in designing products for moulding, machining, sheet metal working etc.
- ILO7011.4 Acquire knowledge in applying virtual product development tools for components, machining and manufacturing plant
- ILO7011.5 Apply environmental aspects in product design.
- ILO7011.6 Illustrate various approaches and techniques in Life Cycle cost Assessment and Analysis.

Subject: Operation Research

- ILO7015.1 Apply OR techniques to formulate and solve real-world problem.
- ILO7015.2 Develop an integrated framework for strategic thinking and problem solving
- ILO7015.3 Identify mathematical tools that are needed to solve optimisation problems
- ILO7015.4 Identify appropriate decision making approaches and apply tools to be used.
- ILO7015.5 Analyse situations in manufacturing environment and optimizing the solution
- ILO7015.6 Identify features of operations and production management and provide solution .

Subject: Machine Design-II

- MEL701.1 Design gears based on the given conditions
- MEL701.2 Design gearbox for a given application
- MEL701.3 Design cam & followers for a given condition
- MEL701.4 Design clutches for a given application
- MEL701.5 Design brakes for given condition
- MEL701.6 Select bearings for a given applications from the manufacturers catalogue

Subject: CAD/CAM/CAE

- MEL702.1 Identify proper computer graphics techniques for geometric modelling.
- MEL702.2 Transform, manipulate objects as well as store and manage data
- MEL702.3 Create CAM Toolpath and prepare NC- G code
- MEL702.4 Apply rapid prototyping and tooling concepts in any real life applications
- MEL702.5 Identify the tools for Analysis of a complex engineering component.
- MEL702.6 Develop 3D models by using CAD software

Subject:	Production Planning and Control
MEL703.1	Prepare a process sheet
MEL703.2	Prepare a Gantt Chart
MEL703.3	Forecast the demand of the product and prepare an aggregate plan
MEL703.4	Perform ABC analysis of a given problem
MEL703.5	Develop the skills of Inventory Management and cost effectiveness
MEL703.6	Create a logical approach to Line Balancing for various production systems

Subject:	Project-I
MEP701.1	Literature survey / industrial visit and identify the problem
MEP701.2	Apply basic engineering fundamental in the domain of practical applications
MEP701.3	Cultivate the habit of working in a team
MEP701.4	Attempt a problem solution in a right approach
MEP701.5	Correlate the theoretical and experimental/simulations results and draw the proper inferences
MEP701.6	Prepare report as per the standard guidelines.

Final Year: Sem-VIII

Subject: Design of Mechanical Systems

- MEC801.1 Apply the concept of system design.
- MEC801.2 Design material handling systems such as hoisting mechanism of EOT crane,
- MEC801.3 Design belt conveyor systems
- MEC801.4 Design engine components such as cylinder, piston, connecting rod and crankshaft
- MEC801.5 Design pumps for the given applications
- MEC801.6 Prepare layout of machine tool gear box and select number of teeth on each gear

Subject: Industrial Engineering and Management

- MEC802.1 Identify the need for optimization of resources and its significance in manufacturing industries
- MEC802.2 Demonstrate the concept of value engineering and value analysis with its relevance.
- MEC802.3 Describe the different concepts involved in method study and understanding of work content in different situations.
- MEC802.4 Describe different aspects of work system design pertinent to manufacturing industries.
- MEC802.5 Recommend the possible ways of facility design for better utilization of available resources.
- MEC802.6 Comprehend concepts of Agile manufacturing, Lean manufacturing and Flexible manufacturing.

Subject: Power Engineering

- MEC803.1 Compute heat interactions in combustion of reactive mixtures
- MEC803.2 Differentiate boilers, boiler mountings and accessories
- MEC803.3 Calculate boiler efficiency and assess boiler performance
- MEC803.4 Demonstrate working cycles of gas turbines
- MEC803.5 Draw velocity triangles of impulse/reaction turbines and calculate performance parameters/efficiency
- MEC803.6 Demonstrate basic working of pumps

Subject: Power Plant Engineering

- MEDLO8041.1 Comprehend various equipment/systems utilized in power plants
- MEDLO8041.2 Demonstrate site selection methodology, construction and operation of Hydro Electric Power Plants
- MEDLO8041.3 Describe site selection and working of steam power plants
- MEDLO8041.4 Describe operation of Combined Cycle Power Plants
- MEDLO8041.5 Classify reactors and comprehend waste disposal issues in nuclear power plants
- MEDLO8041.6 Solve problems on power plant economics

Subject: Renewable Energy Sources

- MEDLO8043.1 Demonstrate need of different renewable energy sources and their importance.
- MEDLO8043.2 Calculate and analyse utilization of solar energy.
- MEDLO8043.3 Calculate and analyse utilization wind energy.
- MEDLO8043.4 Illustrate design of biogas plant.
- MEDLO8043.5 Illustrate concept of geothermal energy and energy from the ocean.
- MEDLO8043.6 Illustrate concepts of hydrogen energy.

Subject: Design of Mechanical Systems

- MEL801.1 Apply the concept of system design.
- MEL801.2 Design of hoisting mechanism of EOT crane,
- MEL801.3 Design belt conveyor systems
- MEL801.4 Design pumps for the given applications
- MEL801.5 Design engine components such as cylinder, piston, connecting rod and crankshaft
- MEL801.6 Design of machine tool gearbox

Subject: Power Engineering

- MEL802.1 Differentiate boilers
- MEL802.2 Differentiate boiler mountings and accessories
- MEL802.3 Conduct a trial on impulse turbine and analyse its performance
- MEL802.4 Conduct a trial on reaction turbine and analyse its performance
- MEL802.5 Conduct a trial on Centrifugal pump and analyse its performance
- MEL802.6 Conduct a trial on Reciprocating pump and analyse its performance

Subject: Project Management

- ILO8021.1 Gain project management foundation and various organizational structures knowledge.
- ILO8021.2 Apply selection criteria and select an appropriate project from different options.
- ILO8021.3 Write work break down structure for a project and develop schedule based on it.
- ILO8021.4 Identify opportunities and threats to the project and decide an approach to deal with them strategically.
- ILO8021.5 Use Earned value technique and determine & predict status of the project.
- ILO8021.6 Capture lessons learned during project phases and document them for future reference.

Subject: Digital Business Management

- ILO8028.1 Summarize drivers of digital business.
- ILO8028.2 Illustrate various approaches and techniques for E-business and management.
- ILO8028.3 Explain different digital business support services and technologies in E infrastructure.
- ILO8028.4 Explain various ethics and societal impacts of ecommerce.
- ILO8028.5 Identify the need of security and summarize various security techniques.

ILO8028.6 Develop E-business plan.

Subject: Environmental Management

ILO8029.1 Identify environmental Issues relevant to India and Global concerns.

ILO8029.2 Understand and apply the concept of Environment Management and Sustainable development.

ILO8029.3 Relate to the scope of Environment Management and identify career opportunities

ILO8029.4 Understand the concept of ecology, Ecosystem, its interdependence and food chain.

ILO8029.5 Demonstrate awareness of environment related legislations.

ILO8029.6 Develop awareness of EMS and ISO-14000.

Subject: Project-II

MEP801.1 Literature review, design and drawing for the selected problem.

MEP801.2 Cultivate the habit of working in a team .

MEP801.3 fabrication of the model.

MEP801.4 Experimentation and testing of the model.

MEP801.5 Analysis and inferences on the test result.

MEP801.6 Prepare report as per the standard guidelines.