Program : Mechanical Engineering

Third Year : Semester - V

Course Code: MEC501	Course Name: Mechanical Measurements and Controls
MEC501.1	Handle, operate and apply the precision measuring instruments / equipments.
MEC501.2	Analyze simple machined components for dimensional stability & functionality.
MEC501.3	Classify various types of static characteristics and types of errors occurring in the system.
MEC501.4	Classify and select proper measuring instruments for displacement, pressure, flow and temperature measurements.
MEC501.5	Design mathematical model of system/process for standard input responses and analyse error and differentiate various types of control systems and time domain specifications.
MEC501.6	Analyse the problems associated with stability.

Course Code: MEC502	Course Name: Thermal Engineering
MEC502.1	Analyze the three modes of heat transfer in engineering application.
MEC502.2	Develop mathematical models for different modes of heat transfer.
MEC502.3	Analyze performance parameters of different types of heat exchangers.
MEC502.4	Identify and analyze the Transient heat Transfer in engineering applications.
MEC502.5	Explain construction and working of different components of internal combustion engines.
MEC502.6	Evaluate engine performance and emission characteristics.

Course Code: MEC503	Course Name: Dynamics of Machinery
MEC503.1	Demonstrate working Principles of different types of governors and Gyroscopic effects on the mechanical systems.
MEC503.2	Illustrate basic of static and dynamic forces.
MEC503.3	Determine natural frequency of element/system.
MEC503.4	Determine vibration response of mechanical elements / systems.
MEC503.5	Design vibration isolation system for a specific application.
MEC503.6	Demonstrate basic concepts of balancing of forces and couples

Program : Mechanical Engineering

Third Year : Semester - V

Course Code: MEC504	Course Name: Finite Element Analysis

MEC504.1	Solve differential equations using weighted residual methods.
MEC504.2	Develop the finite element equations to model engineering problems governed by second order differential equations.
MEC504.3	Apply the basic finite element formulation techniques to solve engineering problems by using one dimensional elements.
MEC504.4	Apply the basic finite element formulation techniques to solve engineering problems by using two dimensional elements.
MEC504.5	Apply the basic finite element formulation techniques to find the natural frequency of a single degree of vibration system.
MEC504.6	Use commercial FEA software, to solve problems related to mechanical engineering.

Course Code: MEDLO5011	Course Name: Optimization Techniques

MEDLO5011.1	Identify the types of optimization problems and apply the calculus method to single variable problems.
MEDLO5011.2	Formulate the problem as a Linear Programming problem and analyze the sensitivity of a decision variable.
MEDLO5011.3	Apply various linear and non-linear techniques for problem solving in various domains.
MEDLO5011.4	Apply multi-objective decision making methods for problems in the manufacturing environment and other domains.
MEDLO5011.5	Apply multi criterion decision making methods for problems in the manufacturing environment and other domains.
MEDLO5011.6	Apply Design of Experiments method for Optimization.

Course Code: MEL501	Course Name: Thermal Engineering

MEL501.1	Estimate thermal conductivity of engineering materials.
MEL501.2	Evaluate performance parameters of extended surfaces.
MEL501.3	Analyze heat transfer parameters in various engineering applications.
MEL501.4	Analyze engine performance and emission parameters at different operating conditions.

Program : Mechanical Engineering	
Third Year : Semester - V	
Course Code: MEL502	**Course Name: Dynamics of Machinery**
MEL502.1	Plot and analyze governor characteristics.
MEL502.2	Analyze gyroscopic effect on laboratory model.
MEL502.3	Estimate natural frequency of mechanical systems.
MEL502.4	Analyze vibration response of mechanical systems.
MEL502.5	Determine damping coefficient of a system.
MEL502.6	Balance rotating mass.
Course Code: MEL503	**Course Name: Finite Element Analysis**
MEL503.1	Select appropriate element for given problem.
MEL503.2	Select suitable meshing and perform convergence test.
MEL503.3	Select appropriate solver for given problem.
MEL503.4	Interpret the result.
MEL503.5	Apply basic aspects of FEA to solve engineering problems.
MEL503.6	Validate FEA solution.
Course Code: MESBL501	**Course Name: Professional Communication And Ethics-II**
MESBL501.1	Plan and prepare effective business/ technical documents which will in turn provide solid foundation for their future managerial roles.
MESBL501.2	Strategize their personal and professional skills to build a professional image and meet the demands of the industry.
MESBL501.3	Emerge successful in group discussions, meetings and result-oriented agreeable solutions in group communication situations.
MESBL501.4	Deliver persuasive and professional presentations.
MESBL501.5	Develop creative thinking and interpersonal skills required for effective professional communication.
MESBL501.6	Apply codes of ethical conduct, personal integrity and norms of organizational behaviour.

Program : Mechanical Engineering	
Third Year : Semester - V	
Course Code: MEPBL501	**Course Name: Mini Project - 2A**
MEPBL501.1	Identify problems based on societal /research needs.
MEPBL501.2	Apply Knowledge and skill to solve societal problems in a group.
MEPBL501.3	Develop interpersonal skills to work as a member of a group or leader.
MEPBL501.4	Draw the proper inferences from available results through theoretical/ experimental/simulations.
MEPBL501.5	Analyze the impact of solutions in societal and environmental context for sustainable development.
MEPBL501.6	Use standard norms of engineering practices.
MEPBL501.7	Excel in written and oral communication.
MEPBL501.8	Demonstrate capabilities of self-learning in a group, which leads to lifelong learning.
MEPBL501.9	Demonstrate project management principles during project work.

Program : Mechanical Engineering

Third Year : Semester - VI

Course Code: MEC601	Course Name: Machine Design

MEC601.1	Use design data book/standard codes to standardize the designed dimensions.
MEC601.2	Design Knuckle Joint, cotter joint and Screw Jack.
MEC601.3	Design shaft under various conditions and couplings.
MEC601.4	Select bearings for a given application from the manufacturers catalog.
MEC601.5	Select and/or design belts and flywheel for given applications.
MEC601.6	Design springs, clutches and brakes.

Course Code: MEC602	Course Name: Turbo Machinery

MEC602.1	Define various parameters associated with steam generators and turbo machines.
MEC602.2	Identify various components and mountings of steam generators with their significance.
MEC602.3	Identify various turbomachines and explain their significance.
MEC602.4	Apply principles of thermodynamics and fluid mechanics to estimate various parameters like mass flow rate power, torque, efficiency, temperature, etc.
MEC602.5	Evaluate performance of SG and Turbo machines and apply various techniques to enhance performance.
MEC602.6	Evaluate various phenomena related to performance like cavitation, choking, surging.

Course Code: MEC603	Course Name: Heating, Ventilation, Air Conditioning and Refrigeration

MEC603.1	Illustrate the fundamental principles and applications of refrigeration and air conditioning systems.
MEC603.2	Identify various HVAC&R components.
MEC603.3	Evaluate performance of various refrigeration system.
MEC603.4	Estimate cooling and heating loads for an air conditioning system.
MEC603.5	Select air handling unit & design air distribution system.
MEC603.6	Apply the knowledge of HVAC for the sustainable development of refrigeration and air conditioning systems.

Program : Mechanical Engineering

Third Year : Semester - VI

Course Code: MEC604	Course Name: Automation and Artificial Intelligence
MEC604.1	Demonstrate understanding of fundamentals of industrial automation and AI.
MEC604.2	Design & develop pneumatic / hydraulic circuits.
MEC604.3	Design and develop electro pneumatic circuits and PLC ladder logics.
MEC604.4	Demonstrate understanding of robotic control systems and their applications.
MEC604.5	Demonstrate understanding of various AI and machine learning technologies.

Course Code: MEDLO6023	Course Name: Metal Forming Technology
MEDLO6023.1	Understand the concept of different metal forming processes.
MEDLO6023.2	Approach metal forming processes both analytically and numerically.
MEDLO6023.3	Design metal forming processes.
MEDLO6023.4	Develop approaches and solutions to analyze metal forming processes and the associated problems and flaws.

Course Code: MEL601	Course Name: Machine Design
MEL601.1	Design shaft under various conditions.
MEL601.2	Design Knuckle Joint / cotter joint.
MEL601.3	Design Screw Jack.
MEL601.4	Design Flexible flange couplings/ Leaf spring.
MEL601.5	Convert design dimensions into working/manufacturing drawing.
MEL601.6	Use design data book/standard codes to standardise the designed dimensions.

Program : Mechanical Engineering	
Third Year : Semester - VI	

Course Code: MEL602	Course Name: Turbo Machinery
MEL602.1	Differentiate boiler, boiler mountings and accessories.
MEL602.2	Conduct a trial on reciprocating compressor / centrifugal compressor.
MEL602.3	Conduct a trial on impulse turbine and analyze its performance.
MEL602.4	Conduct a trail on reaction turbine and analyze its performance.
MEL602.5	Conduct a trial on Centrifugal pump and analyze its performance.
MEL602.6	Conduct a trial on Reciprocating pump and analyze its performance.
MEL602.7	Conduct a trial on gear pump.

Course Code: MEL603	Course Name: Heating, Ventilation, Air Conditioning and Refrigeration
MEL603.1	Aware of the roles and ethics of HVAC &R engineers in related industries.
MEL603.2	Present the impact of professional engineering solutions in societal and environmental contexts.
MEL603.3	Evaluate performance Evaluate of HVAC &R systems.
MEL603.4	Develop awareness of the engineering and technological aspects in the HVAC &R industries.
MEL603.5	Communicate effectively through the preparation of report and practical presentation.
MEL603.6	Analyse design aspects of HVAC&R in various application.

Course Code: MESBL601	Course Name: Measurements and Automation
MESBL601.1	Apply inspection gauge to check or measure surface parameters.
MESBL601.2	Measure surface parameters using precision measurement tools and equipment.
MESBL601.3	Measure different mechanical parameters by using sensors.
MESBL601.4	Analyse the response of a control systems.
MESBL601.5	Demonstrate use of automated controls using pneumatic and hydraulic systems.
MESBL601.6	Implement program on PLC system and demonstrate its application.

Program : Mechanical Engineering	
Third Year : Semester - VI	
Course Code: MEPBL601	**Course Name: Mini Project - 2B**
MEPBL601.1	Identify problems based on societal /research needs.
MEPBL601.2	Apply Knowledge and skill to solve societal problems in a group.
MEPBL601.3	Develop interpersonal skills to work as member of a group or leader.
MEPBL601.4	Draw the proper inferences from available results through theoretical/ experimental/ simulations.
MEPBL601.5	Analyze the impact of solutions in societal and environmental context for sustainable development.
MEPBL601.6	Use standard norms of engineering practices.
MEPBL601.7	Excel in written and oral communication.
MEPBL601.8	Demonstrate capabilities of self-learning in a group, which leads to lifelong learning.
MEPBL601.9	Demonstrate project management principles during project work.