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Program Outcomes

PO1	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	**Problem analysis:** Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	**Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO6	**The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	**Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	**Individual and teamwork:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	**Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	**Life-long learning:** Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes

PSO1	**The graduate will be able to identify, analyze, and develop a solution for the complex engineering problems in the Mechanical Engineering domain.**
PSO2	**The graduate will be able to integrate technical and interpersonal skills with the ethical and professional standards in their career.**

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Course Outcomes (FE to BE)

At the end of the semester student will able to

FEC101	Applied Mathematics I
FEC101.1	Apply principles of basic operations of matrices , rank and echelon form of matrices to solve linear simultaneous equations.
FEC101.2	Able solve and Analyze Partial Derivatives and apply it in related field of Engineering
FEC101.3	Able apply the concepts of Complex Numbers,hyperbolic functions and logarithmsto solve engineering problems.
FEC101.4	Able apply Numerical Methods and Inculcate the habit of Mathematical thinking through Indeterminate forms, Taylor's Series Expansion and by using Scilab.

FEC102	Applied Physics I
FEC102.1	Draw miller indices using concept of crystallography and Identify crystal structure using X-ray diffraction techniques viz. Laue method, rotating crystal method & powder method
FEC102.2	Determine the output of LED, photoconductor and photovoltaic cell applying concepts of semiconductor physics.diffractometer application.rotating crystal method & powder method
FEC102.3	Calculate parameters of superconductor viz. Critical temperature, critical magnetic field and differentiate application of superconductor based on Mesinner effect and Josephson effect photovoltaic cell measurements.
FEC102.4	Design acoustic of hall/auditorium using reasons for acoustic defects and Select method for production of ultrasonic waves, capacitors.

FEC103	Applied Chemistry I
FEC103.1	Analyze the quality of water and suggest methods of treatment.
FEC103.2	Illustrate the knowledge of polymers, fabrication methods, conducting polymers in industrial fields.
FEC103.3	Apply the knowledge of lubricants, their properties & mechanism to avoid frictional resistance and interpret phase transformations using thermodynamics
FEC103.4	Demonstrate knowledge of portland cement.

FEC104	Engineering Mechanics
FEC104.1	Illustrate the concept of force, moment and apply the same along with the concept of equilibrium in two and three dimensional systems with the help of FBD.
FEC104.2	Demonstrate the understanding of Centroid and its significance and locate the same
FEC104.3	Estimate required force to overcome friction and correlate real life application to specific type of friction.
FEC104.4	Establish relation between velocity and acceleration of a particle and analyse the motion by plotting the relation.
FEC104.5	Illustrate different types of motions and establish Kinematic relations for a rigid body.
FEC104.6	Analyse body in motion using force and acceleration, work-energy, impulse-momentum principles

FEC105	Basic Electrical Engineering
FEC105.1	To understand fundamentals of DC circuits and apply knowledge for analyzing network theorems in DC circuits.
FEC105.2	Able to learn the fundamentals and analyze single phase AC circuits.
FEC105.3	Able to learn the basic operation and analyze the performance of single-phase transformer.
FEC105.4	Able to learn the fundamentals and analyze three phase AC circuits and

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FEC106	Environmental Studies
FEC106.1	Classify essential resources and control measures for sustainable development.
FEC106.2	Illustrate sources and effects of environmental decay.
FEC106.3	Select renewable sources of energy and technology essential for sustainable development.
FEC106.4	Apply the regulations of Environmental Protection Act and other bodies for perpetuation of environment.

FEL101	Basic Workshop Practice I
FEL101.1	Model different prototypes in the carpentry trade such as Cross cut lap joint, Tee lap joint, Dovetel lap joint.
FEL101.2	Model various basic prototypes in the trade of fitting such as Square, Hexagonal and V Male Female joint.
FEL101.3	Perform various basic House Wiring techniques while taking care of electrical safety.
FEL101.4	Perform various basic domestic plumbing operations such as pipe cutting, threading, fitting etc.

FEC201	Applied Mathematics II
FEC201.1	Able to apply euler, runge kutta method to solve differential equations of second and fourth order and apply trapezoidal, simpson's 1/3rd, simpson's ⅜ th rule to solve definite integrals numericaly and by using scilab.
FEC201.2	Able to solve differential equations of first order, first degree and engineering problems representable in form of linear differential equations with constant coefficients, Cauchy's/Legendre's homogenous equations
FEC201.3	Able to apply Beta, Gamma functions and D.U.I.S. to evaluate definite integrals.
FEC201.4	Able to apply double /triple integration to find area, mass, volume and find length of

FEC202	Applied Physics II
FEC202.1	Calculate thickness of thin wire or foil to wedge-shaped thin film, refractive index, wavelength of light /or radius of curvature to Newton's rings in interference application and calculate missing order, grating element wavelength of light using diffraction grating considering parameter viz resolving power of grating
FEC202.2	Compare characteristics of images received by photography and holography using concept of LASER
FEC202.3	Calculate critical angle, angle of acceptance, V number, number of modes of propagation, numerical aperture of step index fibre
FEC202.4	Apply concept of electromagnetism in focussing system and CRO

FEC203	Applied Chemistry II
FEC203.1	Illustrate types of corrosion & suggest control measures in industries.
FEC203.2	Analyze the quality of fuel & calculate the oxygen required for combustion of fuel.
FEC203.3	Illustrate composition, properties of alloys & properties & application of composite material.
FEC203.4	Illustrate the principles of green chemistry

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FEC204	Engineering Drawing
FEC204.1	Apply the basic principles of projections in Projection of Lines, Planes and Engineering Curves
FEC204.2	Apply the basic principles of projections in Projection of Solids & Section of solids
FEC204.3	Visualize the given 3D object and draw Orthographic projections
FEC204.4	Draw Isometric view from the given orthographic projections
FEC204.5	Draw Orthographic and Isometric Projection using AutoCad

FEC205	Structured Programming
FEC205.1	Identify the terminologies in operating system used for computer programming and
FEC205.2	Use Variables, derived data types and control structures to write C program.
FEC205.3	Implement solutions to the problem using strings and functions.
FEC205.4	Use Pointers, Structure-Union and Files for solving complex Computational problem.

FEC206	Communication Skills
FEC206.1	To develop the ability to understand the importance of communication fundamentals and its usage in social context
FEC206.2	Develop message generating and delivery skills, gain insight into their own speaking skills
FEC206.3	Can draft letters and other technical documents paying attention to the writer's objectives and reader's needs
FEC206.4	Implement all the important aspects of reading including skimming, scanning, note making and discourse coherence

FEL201	Basic Workshop II
FEL201.1	Model different prototypes in the carpentry trade such as Cross cut lap joint, Tee lap joint, Dovetel lap joint.
FEL201.2	Model various basic prototypes in the trade of fitting such as Square, Hexagonal and V Male Female joint.
FEL201.3	Read various basic Layout drawing; make positive and negative film, and perform PCB etching and drilling, Tinning and soldering operations.
FEL201.4	Dismantle and Assemble a Personal Computer, perform Basic troubleshooting and maintenance, identify network components and perform Basic networking and crimping.

MEC301	Applied Mathematics-III
MEC301.1	Apply the knowledge of Laplace transform and Inverse Laplace transform to solve ODE's
MEC301.2	Apply the concept of Fourier Series for the expansion of Periodic functions
MEC301.3	Understand Complex Variables and functions and perform mapping using different tecniques
MEC301.4	Solve Partial Differential Equations numerically and analytically and Correlation, Regression and Curve Fitting

MEC302	Thermodynamics
MEC302.1	Apply first law of thermodynamics for various flow and non-flow systems.
MEC302.2	Compute quantification and grade of energy using second law, entropy and availability.
MEC302.3	Use steam table and Mollier chart to compute properties of steam and Rankine cycle parameters.
MEC302.4	Analyse various heat engines cycles and compressors.

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MEC303	Strength of Materials
MEC303.1	Demonstrate the concepts of direct stresses and strain in simple and compound bars.
MEC303.2	Analyse the principal planes and stresses induced in thin shell subjected to internal and external pressure
MEC303.3	Draw the SFD & BMD for the different types of loads and support conditions
MEC303.4	Analyse the stresses induced in basic mechanical components due to shearing force, bending moment, twisting moment
MEC303.5	Estimate the strain energy in Mechanical Elements subjected to different types of loading.
MEC303.6	Estimate buckling and deflection phenomenon in columns, struts and beams by using different methods

MEC304	Production Process I
MEC304.1	Demonstrate understanding of casting process.
MEC304.2	Demonstrate applications of various types of welding process and differentiate clip forming processes.
MEC304.3	Illustrate Principles of forming process.
MEC304.4	Illustrate the concept of producing polymer components and ceramic components and distinguish between conventional and modern machine tools.

MEC305	Material Technology
MEC305.1	Identify various defects and failure mechanisms
MEC305.2	Interpret Iron-Iron carbide phase diagram, TTT diagram and their significance
MEC305.3	Select appropriate heat treatment process for specific requirement
MEC305.4	Identify effect of alloying element on properties of steel and Illustrate basics of composites, Nano materials and polymers

MEL301	Computer Aided M/c Drawing
MEL301.1	Sketch various machine elements and conventional representation.
MEL301.2	Practice Geometric dimensioning and Tolerance.
MEL301.3	Prepare detail & assembly drawing of Bearings
MEL301.4	Prepare detail & assembly drawing of Pulleys & Pipe joints.
MEL301.5	Prepare detail & assembly drawing of Valves & I C Engine components.
MEL301.6	Prepare detailed drawing of any given physical object/machine element with actual measurements

MEL302	Strength of Material
MEL302.1	Analyse the stress strain behaviour of materials.
MEL302.2	Assess the modulus of rupture (bending strength) for the material and calculate the stresses in beams.
MEL302.3	Measure the hardness of materials
MEL302.4	Measure the impact strength (toughness) of materials.
MEL302.5	Measure the torsional strength of the matrials
MEL302.6	To conduct the deflection test and calculate SFD, BMD, slope and deflection for the beam under different loading.

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MEL303	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.

MEL304	Machine shop Practice-I
MEL304.1	Perform plain turning, taper turning, screw cutting, drilling and boring operations on lathe machine
MEL304.2	Perform plane and inclined shaping on shaper machine
MEL304.3	Perform rough and smooth grinding on pedestal grinder and precision grinding on surface grinder
MEL304.4	Perform basic milling operations and gear cutting on universal milling machine
MEL304.5	Perform forging and heat treatment operations to prepare forging tool
MEL304.6	Prepare composite welded job using arc welding machine

MEC401	Applied Mathematics IV
MEC401.1	Apply matrix theory to solve the system of linear equations and eigen values and eigen vectors and their applications
MEC401.2	Apply principles of Vector Differentiation and Integration to engineering problems
MEC401.3	Optimise LPP using various optimisation techniques
MEC401.4	Apply the concepts of Probability Distribution and Sampling theory to engineering problems

MEC402	Fluid Mechanics
MEC402.1	Define properties of fluids and classification of flows
MEC402.2	Formulate and solve equations of the control volume for fluid flow systems
MEC402.3	Calculate resistance to flow of incompressible fluids through closed conduits and over surfaces
MEC402.4	Apply fundamentals of compressible fluid flows to relevant systems

MEC403	Industrial Electronics
MEC403.1	Examine the working of Combinational circuits and describe the operation of Sequential circuits.
MEC403.2	Distinguish between microprocessor and microcontroller and interpret working of MSP430 microcontroller for applications.
MEC403.3	Explain and illustrate operation of analog circuits (Op-AMP and IC555 timer).
MEC403.4	Compare performances of power semiconductor devices and explain speed torque characteristics of AC and DC motors.

MEC404	Production Process II
MEC404.1	Demonstrate understanding of casting process.
MEC404.2	Demonstrate applications of various types of welding process and differentiate clip forming processes.
MEC404.3	Illustrate Principles of forming process.
MEC404.4	Illustrate the concept of producing polymer components and ceramic components and distinguish between conventional and modern machine tools.

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MEC405	Kinematics of Machinery
MEC405.1	Illustrate various components of mechanisms.
MEC405.2	Develop mechanisms to provide specific motion.
MEC405.3	Draw velocity and acceleration diagrams of various mechanisms using graphical methods.
MEC405.4	Plot s-t, v-t, a-t and j-t diagram for specific cam and follower motion.
MEC405.5	Analyze power transmission through spur gears.
MEC405.6	Select appropriate power transmission for specific applications from belt, rope and chain drive.

MEL401	Data Base and Information Retrieval
MEL401.1	Determine the data models and selection of data models
MEL401.2	Apply the features of database management systems and relational database
MEL401.3	Use SQL – the standard language for relational database
MEL401.4	Apply concept of functional dependencies and design of the database
MEL401.5	Design graphical user Interface for specific application
MEL401.6	Create visual software entities

MEL402	Fluid Mechanics
MEL402.1	Calculate the coefficient of discharge for Orifice meter and Venturimeter
MEL402.2	Determine Metacentric height of floating ship.
MEL402.3	Verify the Bernoulli's Principle.
MEL402.4	Determine Friction factor for a pipe & calculate energy loss due to pipe fittings.
MEL402.5	Verify Momentum principle using Impact of Jet on Vane.
MEL402.6	Determine pressure profile over an aerofoil.

MEL403	Industrial Electronics
MEL403.1	Design and develop combinational circuits. Develop MSP430 program for LED(blinking, rotating, running etc)
MEL403.2	Construct and analyze performance of integrated circuits (Opamp and 555 Timer).
MEL403.3	Examine the working of semi-conductor device based on the Turning ON methods, commutation methods and its characteristics.
MEL403.4	Compare performances of power semiconductor devices and explain speed torque characteristics of AC and DC motors.

MEL404	Kinematics of Machinery
MEL404.1	Draw velocity diagrams of 6 link mechanisms using instantaneous center methods.
MEL404.2	Draw velocity and acceleration diagrams of 6 link mechanisms using graphical method.
MEL404.3	Plot s-t, v-t, a-t and j-t diagram for specific cam and follower motion.
MEL404.4	Analyze power transmission through spur gears.
MEL404.5	Select appropriate power transmission for specific applications from belt, rope and chain drive.
MEL404.6	Develop and build mechanisms to provide specific motion

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MEL405	Machine shop Practice-II
MEL405.1	Perform plain turning, taper turning, screw cutting, drilling and boring operations on lathe machine
MEL405.2	Perform plane and inclined shaping on shaper machine
MEL405.3	Perform rough and smooth grinding on pedestal grinder and precision grinding on surface grinder
MEL405.4	Perform basic milling operations and gear cutting on universal milling machine
MEL405.5	Perform forging and heat treatment operations to prepare forging tool
MEL405.6	Prepare composite welded job using arc welding machine

MEC501	Internal Combustion Engines
MEC501.1	Demonstrate the principle concepts pertaining to Internal combustion engines.
MEC501.2	Demonstrate and Examine working of spark ignition engine components and systems
MEC501.3	Compute and Examine working of compression ignition engine components and systems
MEC501.4	Illustrate the working of lubrication, cooling and analyze supercharging systems
MEC501.5	Plot and analyze engine performance characteristics also discuss emission norms and control.
MEC501.6	Comprehend the different technological advances in engines and alternate fuels.

MEC502	Mechanical Measurements and Control
MEC502.1	Illustrate various types of static characteristics and types of errors occurring in the system.
MEC502.2	Demonstrate the linear and angular displacement measuring instruments for industrial applications.
MEC502.3	Demonstrate the pressure and temperature measuring instruments for industrial applications.
MEC502.4	Design mathematical model of system/ process for standard input responses.
MEC502.5	Analyze error and differentiate various types of control systems and time domain specifications.
MEC502.6	Analyze the problems associated with stability.

MEC503	Heat Transfer
MEC503.1	Identify basic modes of heat transfer (Conduction, Convection and Radiation)
MEC503.2	Apply one dimensional steady state heat conduction through various systems
MEC503.3	Develop mathematical model of convection with the flow of fluids in different elements
MEC503.4	Develop mathematical model of radiation and application in heat transfer systems.
MEC503.5	Demonstrate and explain mechanism of boiling and condensation
MEC503.6	Design and analyses different heat exchangers

MEC504	Dynamics of Machinery
MEC504.1	Apply principles of different types of governors and Gyroscopic effects on the mechanical systems
MEC504.2	Illustrate basic of static and dynamic forces
MEC504.3	Determine natural frequency of element/system
MEC504.4	Determine vibration response of mechanical elements / systems
MEC504.5	Select vibration isolation system for a specific application
MEC504.6	Demonstrate basic concepts of balancing of forces and couples

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MEDLO5011	Department Level Optional Course I-Press Tool Design
MEDLO5011.1	Demonstrate press working operation for mass production of sheet metal parts
MEDLO5011.2	Design and Select elements pertaining to requirements and materials of press tool
MEDLO5011.3	Illustrate development in bend and draw components
MEDLO5011.4	Illustrate automation and safety aspects in press working

MEL501	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

MEL502	Mechanical Measurements and Control
MEL502.1	Calibrate displacement sensors.
MEL502.2	Calibrate pressure gauges.
MEL502.3	Measure torque using strain gauges.
MEL502.4	Identify system/process characterstics 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
MEL503.1	Estimate thermal conductivity of metals / non metals
MEL503.2	Compute heat transfer coefficient in natural and forced convection
MEL503.3	Measure emissivity of grey body
MEL503.4	Quantify fin effectiveness / efficiency
MEL503.5	Analyse heat exchanger performance
MEL503.6	Demonstrate Heat Pipe

MEL504	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 system
MEL504.4	Analyse vibration response of mechanical systems
MEL504.5	Determine damping coefficient of a system
MEL504.6	Balance rotating mass

MEL505	Manufacturing Sciences Lab
MEL505.1	Design of Simple progressive die for sheet metal parts.
MEL505.2	Design a simple tool for production system.
MEL505.3	Calculate geometry of metal cutting tool.
MEL505.4	Demonstrate parameter for metal cutting

MEL506	Business Communication and Ethics
MEL506.1	Develop the interpersonal skills to progress professionally by building stronger relationships
MEL506.2	Design a technical document using precise language, suitable vocabulary and apt style
MEL506.3	Apply the techniques to participate in GD, Interviews and write Resume
MEL506.4	Display competence required for professional career growth

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MEC601	Metrology and Quality Engineering
MEC601.1	Demonstrate inspection methods and different gauges.
MEC601.2	Illustrate working principle of measuring instruments and calibration methodology.
MEC601.3	Illustrate basic concepts of quality and statistical methods in quality control.
MEC601.4	Select the appropriate sampling technique and non-destructive techniques.

MEC602	Machine Design I
MEC602.1	Illustrate the basic principle and procedure of machine design and various parameters involved in machine design
MEC602.2	Design of joints against static load
MEC602.3	Design and analyse fasteners for given application
MEC602.4	Design machine elements against fluctuating load
MEC602.5	Design and analyse various forces acting on shaft and couplings
MEC602.6	Design springs for strength and stiffness for given application

MEC603	Finite Element Analysis
MEC603.1	Select appropriate element for given problem and solve differential equations using weighted residual methods
MEC603.2	Develop the finite element equations to model engineering problems governed by second order differential equations
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

MEC604	Refrigeration and Air Conditioning
MEC604.1	Demonstrate fundamental principles of refrigeration & air conditioning,Vapour absorption, Non conventional systems and analyse air refrigeration systems.
MEC604.2	Explain components of the vapour compression refrigeration system (VCRS), refrigerants, cooling towers and analyse VCRS.
MEC604.3	Illustrate air conditioning processes using psychrometry and design air conditioning system using cooling load calculations.
MEC604.4	Explain controls & application of refrigeration & air conditioning and estimate duct parameters

MEDLO6021	Department Level Optional Course II-Mechatronics
MEDLO6021.1	Demonstrate mechatronics system and it's application
MEDLO6021.2	Identify appropriate sensor and actuator for mechatronics system
MEDLO6021.3	Analyze data acquisition, signal conditioning and it's interfacing with microcontrollers
MEDLO6021.4	Design pneumatic, electo-pneumatic, hydraulic circuit and it's application
MEDLO6021.5	Analyze continuous control logics for standard input condition
MEDLO6021.6	Develop ladder logic program in PLC for various example and demonstrate team work

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MEDLO6023	Department Level Optional Course II-Industrial Automation
MEDLO6023.1	Demonstrate basics of industrial automation and discuss safety monitoring.
MEDLO6023.2	Compare mechanization and automation, and communicate importance of atomization to engineering community
MEDLO6023.3	Design electro-pneumatic, pneumatic and hydraulic circuits.
MEDLO6023.4	Choose sensors and mechano-electrical actuators
MEDLO6023.5	Write program in PLC for process industry
MEDLO6023.6	Demonstrate basic working of robots and apply knowledge in multidisciplinary environment.

MEL601	Metrology and Quality Engineering
MEL601.1	Measure linear and angular dimensions.
MEL601.2	Use Comparators for inspection and control charts.
MEL601.3	Measure roughness and flatness of surface.
MEL601.4	Measure various parameters of gear tooth profile and screw threads.

MEL602	Machine Design I
MEL602.1	Use design data book/standard codes to standardise the designed dimensions
MEL602.2	Design of components subjected to static loading such as knuckle joint or cotter joint
MEL602.3	Design and analyse power transmission devices such as screw jack or C - clamp
MEL602.4	Design machine elements against fluctuating loads for finite and infinite life
MEL602.5	Design of shaft and flexible flange couplings under various loading conditions
MEL602.6	Design springs for strength and stiffness in order to meet desired needs

MEL603	Finite Element Analysis
MEL603.1	Perform analysis of one dimensional Bar element
MEL603.2	Perform analysis of one dimensional Truss element
MEL603.3	Perform analysisof one dimensional Beam element
MEL603.4	Perform analysis of Beam element for Modal and Harmonic conditions
MEL603.5	Perform analysis of Two dimensional Plate element
MEL603.6	Perform analysis of Axisymmetric Element

MEL604	Refrigeration and Air Conditioning
MEL604.1	Identify parts, operate & compute COP of refrigeration & air conditioning system.
MEL604.2	Plot processes on psychrometric chart.
MEL604.3	Compute performance of cooling tower.
MEL604.4	Simulate vapour compression refrigeration system.
MEL604.5	Write technical report of industrial visit.

MEL605	Mechatronics Lab
MEL605.1	Demonstrate implementation of interfacing sensors and actuators.
MEL605.2	Demonstrating interfacing of appropriate sensors for different applications.
MEL605.3	Develop pneumatic circuits for a specific system
MEL605.4	Development and visualization of robotic arm
MEL605.5	Implement program to PLC system and demonstrate its application
MEL605.6	Design and development of Mechatronic system

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MEC701	Machine Design II
MEC701.1	Select appropriate gears for power transmission on the basis of given load and speed application
MEC701.2	Design and Analyse various forces acting on the gear for given application
MEC701.3	Choose appropriate bearings for a given application from the manufacturer's catalogue
MEC701.4	Design and analyse of belts and flywheel for given application
MEC701.5	Design and analyze of cam and follower mechanisms for the given conditions
MEC701.6	Design and analyze clutches and brakes for the given conditions

MEC702	CAD/CAM/CAE
MEC702.1	Illustrate methods of geometric modelling using computer graphics techniques.
MEC702.2	Illustrate transformation, manipulation of 2D objects for storing and managing data
MEC702.3	Create CAM Toolpath and NC - G code output for technologically driven practices
MEC702.4	Demonstrate rapid prototyping and tooling concepts for real life applications.
MEC702.5	Identify tools for modeling and analysis of structural, fluid and dynamic systems.

MEC703	Production Planning and Control
MEC703.1	Illustrate production planning functions and manage manufacturing functions.
MEC703.2	Develop competency in scheduling and sequencing of manufacturing operations
MEC703.3	Develop competency in Forecasting 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

MEDLO7032	Department Level Optional Course III-Automobile Engineering
MEDLO7032.1	Demonstrate various systems like Clutch, Transmission, Axle, Differential, Steering in an automobile.
MEDLO7032.2	Illustrate importance and features of different systems like Brakes, Suspension, Wheel and balancing in an automobile.
MEDLO7032.3	Illustrate Electrical system and Body engineering in an automobile.
MEDLO7032.4	Compare the different technological advances in automobile.

MEDLO7034	Department Level Optional Course III-Computational Fluid Dynamics
MEDLO7034.1	Demonstrate methodology to work with CFD
MEDLO7034.2	Illustrate principles of grid generation and discretization methods
MEDLO7034.3	Identify and apply specific boundary conditions relevant to specific application surfaces
MEDLO7034.4	Develop solution parameters relevant to specific application
MEDLO7034.5	Analyze the results and draw the appropriate inferences
MEDLO7034.6	Demonstrate basic principles of FVM

ILO7013	Institute Level Optional Course I-Management Information System
ILO7013.1	Identify the impact of information systems on an organization
ILO7013.2	Use tools and technologies to access database information for improving business performance and decision making
ILO7013.3	Design an IT infrastructure for MIS
ILO7013.4	Identify the Transaction Processing, Functional Area Information and ERP system for enterprise-wide knowledge management

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ILO7015	Institute Level Optional Course I-Operation Research
ILO7015.1	Formulate and solve engineering and managerial situations as LPP
ILO7015.2	Formulate and solve engineering and managerial situations as sensitivity analysis of LPP
ILO7015.3	Formulate and solve engineering and managerial situations as Transportation, Assignment Problem and network models
ILO7015.4	Solve Integer programming and queuing problems

ILO7016	Institute Level Optional Course I-Cyber Security and Laws
ILO7016.1	Illustrate the concept of cybercrime, cyber-frauds, cybercriminal types with their motives and relate legal issues with respect to cybercrime.
ILO7016.2	Analyze and discriminate cyberattack types with tools used for attacks.
ILO7016.3	Identify the security challenges presented by mobile devices and infer measures for protecting the same.
ILO7016.4	Discover and apply different aspects of cyber law and Information Security Standards compliance.

ILO7017	Institute Level Optional Course I-Disaster Management and Mitigation Measures
ILO7017.1	Illustrate scenario of disaster and its effects in India
ILO7017.2	Compare Manmade and Natural disasters and their extent and possible effects on the economy
ILO7017.3	Outline the Government Policies, acts and administration
ILO7017.4	Employ the knowledge of Institutional Framework for Disaster Management in India
ILO7017.5	Apply the knowledge of Financing and Relief Measures
ILO7017.6	Utilize the knowledge of preventive and mitigation measures to know the simple do's and don’ts in disasters

ILO7018	Institute Level Optional Course I-Energy Audit and Management
ILO7018.1	Compare the present state of energy security and its importance to achieve sustainability
ILO7018.2	Explore the basic principles and methodologies adopted in energy audit of an utility
ILO7018.3	Evaluate the energy performance of electrical installations and identify the energy saving opportunities
ILO7018.4	Evaluate the energy performance of some common thermal installations and identify the energy saving opportunities
ILO7018.5	Analyse the data collected during performance evaluation and recommend energy saving measures

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

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MEL702	CAD/CAM/CAE
MEL702.1	Illustrate methods of geometric modelling using computer graphics techniques.
MEL702.2	Illustrate transformation, manipulation of 2D objects for storing and managing data
MEL702.3	Create CAM Toolpath and NC - G code output for technologically driven practices
MEL702.4	Demonsrate rapid prototyping and tooling concepts in any real life applications.
MEL702.5	Identify tools for modeling and analysis of structural, fluid and dynamic systems.

MEL703	Production Planning and Control
MEL703.1	Apply Knowledge of production planning functions and manage manufacturing functions.
MEL703.2	Develop and solve problems in scheduling and sequencing of manufacturing operations
MEL703.3	Solve examples in Forecasting the demand of the product and prepare an aggregate plan
MEL703.4	Develop the skills of Inventory Management and cost effectiveness
MEL703.5	Create a logical approach to Line Balancing in various production systems
MEL703.6	Implement techniques of manufacturing planning and control

MEL704	Project I
MEL704.1	Identify societal needs, industrial, research problems and investigate them through in-depth literature survey for defining the problem statement.
MEL704.2	implement the appropriate methodology with modern tools.
MEL704.3	Manufacture the product for experimentations and corelate with theoretical/computational results to draw the proper inferences.
MEL704.4	Work as an individual and contribute as a team member with effective management skills to achieve a common objective.
MEL704.5	Write and present their work effectively with ethical values.
MEL704.6	Engage themselves in their area of interest and explore engineering advancements to structure open problem competency.

MEC801	Design of Mechanical Systems
MEC801.1	Analys of optimum design for mechanical elements
MEC801.2	Design material handling systems such as hoisting mechanism of EOT Crane
MEC801.3	Design material handling systems such as belt conveyor
MEC801.4	Design engine components such as cylinder, piston, connecting rod and crankshaft from system design point of view
MEC801.5	Design pumps for given application
MEC801.6	Prepare layout of machine tool gear box and select number of teeth on each gear.

MEC802	Industrial Engineering and Management
MEC802.1	Illustrate the concept of Industrial Engineering & productivity.
MEC802.2	Differentiate between value analysis and value engineering and their significance.
MEC802.3	Recognize methods of work study.
MEC802.4	Identify different aspects of work system design for manufacturing industries
MEC802.5	Explain discrete features of facility design pertaining to manufacturing industries.
MEC802.6	Outline concepts of Agile, Lean and Flexible manufacturing.

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MEC803	Power Engineering
MEC803.1	Compute heat interaction in combustion of reactive mixtures
MEC803.2	Classify boilers , boiler mountings and accessories, and compute boiler and steam turbine performance,in context to safety and environment
MEC803.3	Analyse Brayton cycle and performance of gas turbine
MEC803.4	Describe jet propulsion engines
MEC803.5	Estimate performance parameters and efficiencies for impulse and reaction turbines
MEC803.6	Explain working of pumps and compute performance of reciprocating and centrifugal pumps

MEDLO8041	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	Discuss working, site selection, advantages, disadvantages of steam power plants
MEDLO8041.4	Discuss operation of Combined Cycle Power Plants
MEDLO8041.5	Discuss types of reactors, waste disposal issues in nuclear power plants
MEDLO8041.6	Illustrate power plant economics

MEDLO8043	Department Level Optional Course IV- Renewable Energy Systems
MEDLO8043.1	Demonstrate need of different renewable energy sources
MEDLO8043.2	Discuss importance of renewable energy sources
MEDLO8043.3	Discuss various renewable energy sources in Indian context
MEDLO8043.4	Calculate and analyse utilisation of solar and wind energy
MEDLO8043.5	Illustrate design of biogas plant
MEDLO8043.6	Demonstrate basics of hydrogen energy

MEDLO8044	Department Level Optional Course IV- Energy Management in Utility Systems
MEDLO8044.1	Demonstrate general aspects of energy management
MEDLO8044.2	Evaluate the need for energy management, economics and auditing
MEDLO8044.3	Illustrate basics of energy economics and financial analysis techniques
MEDLO8044.4	Analyse importance of thermal and electrical utilities maintenance
MEDLO8044.5	Assess potential and summarise benefits of waste heat recovery and cogeneration
MEDLO8044.6	Illustrate waste heat recovery and cogeneration methods

ILO8025	Institute Level Optional Course II-Professional Ethics and CSR
ILO8025.1	Use professional ethics to express rights and duties of business also explore professional ethics in the marketplace.
ILO8025.2	Demonstrate professional ethics of consumer protection and job discrimination.
ILO8025.3	Distinguish different aspects of corporate social responsibility.
ILO8025.4	Criticise corporate social responsibility in globalizing India

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ILO8029	Institute Level Optional Course II-Environmental Management
ILO8029.1	Illustrate the significance of Environment Management and sustainable development
ILO8029.2	Identify Global Environmental Concerns and Hazards
ILO8029.3	Employ the Concept of Ecology and interdependence between ecosystem and living organisms
ILO8029.4	Utilize the knowledge of Scope of Env Management and Corporate Env Responsibility
ILO8029.5	Outline the EMS Certification and ISO-14000
ILO8029.6	Interpret Environment related legislations and acts

MEL801	Design of Mechanical Systems
MEL801.1	Analys of optimum design for mechanical elements
MEL801.2	Design material handling systems such as hoisting mechanism of EOT Crane
MEL801.3	Design material handling systems such as belt conveyor
MEL801.4	Design engine components such as cylinder, piston, connecting rod and crankshaft from system design point of view
MEL801.5	Design pumps for given application
MEL801.6	Prepare layout of machine tool gear box and select number of teeth on each gear.

MEL802	Power Engineering
MEL802.1	Differentiate boilers
MEL802.2	Differentiate boiler mountings and accessories
MEL802.3	Conduct a trial on Impulse turbine and analyses its performance
MEL802.4	Conduct a trial on reaction turbine and analyses its performance
MEL802.5	Conduct a trial on centrifugal pump and analyses its performance
MEL802.6	Conduct a trial on reciprocating pump and analyses its performance

MEL803	Project II
MEL803.1	Identify societal needs, industrial, research problems and investigate them through in-depth literature survey for defining the problem statement.
MEL803.2	implement the appropriate methodology with modern tools.
MEL803.3	Manufacture the product for experimentations and corelate with theoretical/computational results to draw the proper inferences.
MEL803.4	Work as an individual and contribute as a team member with effective management skills to achieve a common objective.
MEL803.5	Write and present their work effectively with ethical values.
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