Ref. AIKTC/MECH/PO/ Date:01/07/17

Program Outcomes (POs) & Program Specific Outcomes (PSOs)

School/ Department: SoET/Mechanical, AIKTC

Batch: 2017-21

PO No.	Program Outcomes (POs)
PO1.	Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the conceptualization of engineering models.
PO2.	Identify, formulate, research literature and solve complex engineering problems reaching substantiated conclusions using first principles of mathematics and engineering sciences.
PO3.	Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
PO4.	Conduct investigations of complex problems including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.
PO5.	Create, select and apply appropriate techniques, resources, and modern engineering tools, including prediction and modelling, to complex engineering activities, with an understanding of the limitations
PO6.	Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings
PO7.	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.
PO8.	Demonstrate understanding of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering practice.
PO9.	Understand and commit to professional ethics and responsibilities and norms of engineering practice
PO10.	Understand the impact of engineering solutions in a societal context and demonstrate knowledge of and need for sustainable development.
PO11.	Demonstrate a knowledge and understanding of management and business practices, such as risk and change management, and understand their limitations.
PO12.	Recognize the need for, and have the ability to engage in independent and life-long learning

Program Owner/ Chairperson

Dr. Abdul Razak Honnutagi
Director

CC to: All Concerned

Sr. No	Semester	Course	CO Number	Course Outcome
1	I	Applied Mathematics-I	CO 01	Apply the concepts of complex numbers to engineering problems
			CO 02	Find logarithm of complex numbers
			CO 03	Apply the principles of basic operations of matrices to engineering problems.
			CO 04	Apply basic principles of partial differentiation (maxima,minima, jacobian)Use expansion of functions as an application of successive differentiation
			CO 05	Apply the basic principles of partial differentiation and higher order derivatives to engineering problems
			CO 06	Find limits of indeterminate forms & understand various numerical methods & its use to solve the problems
2	I	Applied Physics-I	CO 01	Differentiate and analyze different crystal structures and calculate their various parameters.
			CO 02	Apply quantum mechanical ideas for solving engineering problems.
			CO 03	Differentiate working of different diodes and identify types of semiconductors.
			CO 04	Differentiate between different types of superconductors and its use in modern technology.
			CO 05	Identify various factors affecting acoustics of a hall and their remedies.
			CO 06	List out the process of production of ultrasonic waves and identify its use in various fields of technology.
3	I	Applied Chemistry I	CO 01	Apply the mechanism of lubrication and its properties in a particular machine
			CO 02	Identify,formulate and solve the numericals
			CO 03	Apply the knowledge of Chemistry of polymers and its application in the field of technology
			CO 04	Apply the knowledge of phase equilibria in the formation of alloy in the field of science and technology
			CO 05	Apply the knowledge of manufacturing process of different Engineering materials with properties and uses.
4	I	Engineering Mechanics	CO 01	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
			CO 02	Demonstrate the understanding of Centroid and its significance and locate the same
			CO 03	Correlate real life application to specific type of friction and estimate required force to overcome friction.
			CO 04	Establish relation between velocity and acceleration of a particle and analyse the motion by plotting the relation
			CO 05	Illustrate different types of motions and establish Kinematic relations for a rigid body
			CO 06	Analyse body in motion using force and acceleration, work-energy, impulse-momentum principles
			CO 01	Evaluate D.C. circuits using network theorems.

Sr. No	Semester	Course	CO Number	Course Outcome
5	I	Basic Electrical Engineering	CO 02	Evaluate 1-Φ AC circuits.
			CO 03	Illustrate constructional features and operation of 1-Φ transformer.
			CO 04	Evaluate 3-Φ AC circuits.
			CO 05	Illustrate working principle of DC machines.
6	I	Environmental studies	CO 01	Define and explain depleting nature of environmental resources, global environmental crisis and ecosystem concept
			CO 02	Define and explain concepts related to 3R (Reuse, Recovery and Recycle) System
			CO 03	Define and explain different control measures related to environmental pollution
			CO 04	Define and explain various case studies related to environmental legislation
			CO 05	Define and explain the working of renewable energy sources and equipments
			CO 06	Define and explain the techniques of disaster management and green building
7	I	Basic Workshop Practice-I	CO 01	Design and model useful prototype such as stool in the carpentry trade
			CO 02	Design and model various basic prtotypes in the trade of welding such as lap,tee and butt jointetc.
			CO 03	Interpret the drawings and model the prototype in sheet metal trade viz.Dustpan

Sr. No	Semester	Course	CO Number	Course Outcome
1	II	Applied Mathematics-II	CO 01	Identify &Solve First Order and first degree Differential equations
			CO 02	Apply the concepts of Higher Order Linear Differential equation to the engineering problems.
			CO 03	Solve D.E using numerical methods
			CO 04	Apply beta, gamma functions & DUIS, and learn to find length of curves using integration(rectification)
			CO 05	Solve problems involving double integration and learn to find area and mass of lamina using it.
			CO 06	Find volume using triple integration and learn to evaluate integration using numerical methods
2	II	Applied Physics-II	CO 01	Comprehend the concepts of Interference, Diffraction and their applications.
			CO 02	Illustrate the principle, construction and working of various LASERs and their applications.
			CO 03	Differentiate between the types of optical fibre and identify their application in the field of technology.
			CO 04	Identify different coordinate system and use of Maxwell's equations in telecommunication systems.
			CO 05	Compare the motion of charged particle in electromagnetic field and use CRO for measurement of phase, frequency and voltages.
			CO 06	Identify processes and tools in Nanotechnology with applications of nanomaterials.
3	II	Applied Chemistry II	CO 01	Apply the knowledge of composite materials ,its properties and applications in the field of science and technology.
			CO 02	Apply the knowledge of different types of fuels,its mining,refining,production,analysis and combustion reactions.
			CO 03	Identify types of corrosion ,its mechanism,factors affecting corrosion and control methods.
			CO 04	Illustrate the principles of Green Chemistry and use of Green solvents to control global warming and environment hazards.
			CO 05	Illustrate composition and properties of different types of alloys and the manufacturing process by powder metallurgy.
4	II	Engineering Drawing	CO 01	Apply Basic Principles of projections in 2D drawing
			CO 02	Apply the basic principles of projections in converting 3D views to 2D drawings.
			CO 03	Read a given drawing
			CO 04	Visualize an object from the given two views
			CO 05	Use CAD tool to draw different views of a 3D object.
			CO 06	Use CAD tool to draw an object in 3D
			CO 01	Formulate simple algorithms for arithmetic, logical problems and translate them to programs in C language

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5	II	Structured Programming Approach	CO 02	Implement, test and execute programs comprising of control structures
			CO 03	Decompose a problem into functions and synthesize a complete program.
			CO 04	Demonstrate the use of arrays, strings and structures in C language.
			CO 05	Understand the concept of pointers
6	II	Communication Skills	CO 01	Apply Communication Theories with the help of effective communication cycle.
			CO 02	Display competence in oral, written and visual communication.
			CO 03	Respond effectively to various bariers to communication and apply it at different levels
			CO 04	Present idean in an appropriate manner with the help of expanded grammar and vocabulary.
			CO 05	Write business letters by following a standardised documentation format.
			CO 06	Read and summarise effectively by using skimming and scanning method. understand technical description and instructions.
7	II	Basic Workshop Practice-II	CO 01	Intrepret the job drawings and prepare a male female joint using appropriate operation such as filling, drilliing &tapping.
			CO 02	Student able to intrepret the wiring diagramsand perform various basic wiring techniques such as houshold ,staicase,godown,3 phase etc.
			CO 03	Demonstrate the use of appropriate accessories such as coupling, elbow and plumbing tools such as spanner, wrench etc. for preparation of domestic plumbing line.

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1	III	Applied Mathematics III	CO 01	Apply Knowledge of laplace transform to solve DE
			CO 02	Apply Knowledge of fourier series to expand periodic function into infinite series & use it to solve PDE
			CO 03	Identify analytic function & use them to solve problems on Confermal Mapping
			CO 04	Identify the applicability of thms & evaluate Contour integral
			CO 05	Learn to use Numerical Method to solve PDE
			CO 06	Learn to fit the curve using concept of Correlation & Regression
2	III	Thermodynamics	CO 01	Demonstrate application of the laws of thermodynamics to wide range of systems.
			CO 02	Write steady flow energy equation for various flow and non-flow thermodynamic systems
			CO 03	Compute heat and work interactions in thermodynamics systems
			CO 04	Demonstrate the interrelations between thermodynamic functions to solve practical problems.
			CO 05	Use steam table and mollier chart to compute thermodynamics interactions
			CO 06	Compute efficiencies of heat engines, power cycles etc.
3	III	Strength of Materials	CO 01	Demonstrate fundamental knowledge about various types of loading and stress induced
			CO 02	Draw shear forces and bending moments distribution diagram (SFD and BMD) across the span of the beam.
			CO 03	Analyse the stresses induced in basic mechanical components
			CO 04	Calculate Torsion of shafts and strain energy stored.
			CO 05	Analyse deflection of beams and stresses in thin shells
			CO 06	Analyse buckling and bending phenomena in columns and struts
4	III	Production Process I	CO 01	Classify and describe different types of metal casting processes
			CO 02	Identify and explain different types of bulk forming processes.
			CO 03	Differentiate and describe different types of metal joining processes with special emphasize on welding process
			CO 04	Describe different types of polymer moulding and ceramic process
			CO 05	Enlist and explain different chip forming process and describe gear manufacturing process.
			CO 06	Explain modern machine tools
			CO 01	Classify materials,Identify defects in materials and express the phenomenon of strain hardening of metals
			CO 02	Describe different failure mechanisms and relate them with modes of failure

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5	III	Material Technology	CO 03	Interpret Fe-Fe3C diagram, TTT diagram and their significance
			CO 04	Select appropriate heat treatment process for specific requirements
			CO 05	Illustrate the effect of alloying elements on properties of steel.
			CO 06	Identify new materials and state their properties, processing methods and applications
6	III	Computer Aided Machine Drawing	CO 01	visualise and prepare a detailed drawing of a given object
			CO 02	read and interpret the drawing
			CO 03	draw details and assembly of different mechanical system
			CO 04	convert detail drawing into assembly drawing using modelling software
			CO 05	convert assembly drawing into details drawing using modelling software
			CO 06	prepare detailed drawing of any given physical objects / machine element with actual measurement
7	III	Strength of Material Lab	CO 01	Analyse the stress- strain behaviour of materials
			CO 02	Measure torsional strength of the material
			CO 03	Perform impact test using izod and charpy method
			CO 04	Measure the hardness of material
			CO 05	Perform flexural and bending test
			CO 06	Demonstrate fundamental knowledge about various types of loading and stress induced
			CO 07	Draw shear forces and bending moments distribution diagram (SFD and BMD) across the span of the beam.
			CO 08	Analyse the stresses induced in basic mechanical components
			CO 09	Calculate Torsion of shafts and strain energy stored.
			CO 10	Analyse deflection of beams and stresses in thin shells
			CO 11	Analyse buckling and bending phenomena in columns and struts
8	III	Material Technology Lab	CO 01	Demonstrate the functioning of optical Metallurgical Microscope & the understanding of the procedure to prepare samples for studying microstructure using microscope (metallography)
			CO 02	Interpret different phases present in plain carbon steels and cast irons samples.
			CO 03	Perform different heat treatment processes for a steel and observe microstructures by preparing the samples of these heat treated parts.
			CO 04	Illustrate the effects of Annealing, Normalizing and Hardening on microstructure of medium carbon steel

Sr. No	Semester	Course	CO Number	Course Outcome
			CO 05	Express the procedure for finding the hardenability of steel using Jominy end Quench test.
			CO 06	Illustrate S-N curve by Fatigue Test
9	III	Machine Shop Practice I	CO 01	Operate various machines like lathe, shaper etc.
			CO 02	Perform plain turning, taper turning, and screw cutting etc. on lathe machine.
			CO 03	Perform machining operations on shaper.
			CO 04	Demonstrate metal joining process like compressive welding.
			CO 05	Perform forging operations
			CO 06	Perform shaping operations

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1	IV	Applied Mathematics IV	CO 01	Apply Knowledge of Matrix to solve system of homogeneous linear equations and to find diffrenet functions of matrix
			CO 02	Identify applicability of theroms and their use to solve problems
			CO 03	Distiguish and apply concept of probabilty distributions to solve problems
			CO 04	Apply concept of sampling theory to solve the problems
			CO 05	Identify and solve different problems of LPP and NLPP using optimization technique
2	IV	Fluid Mechanics	CO 01	Define properties of fluids and classification of fluids
			CO 02	Evaluate hydrostatic forces on various surface and predict stability of floating bodies
			CO 03	Formulate and solve equation of the control volume for fluid flow systems
			CO 04	Apply Bernoulli's equation to various flow measuring devices
			CO 05	Calculate resistance to flow of incompressible fluids through closed conduits and over surfaces
			CO 06	Apply fundamentals of compressible fluid flows to relevant systems
3	IV	Industrial Electronics	CO 01	Understand the application of power electronic converters
			CO 02	Understanding the basic concept of op amp and its real time applications.
			CO 03	Demonstrate the knowledge of basic functioning of digital circuits and micro-controllers.
			CO 04	Understand the speed-torque characteristics of electrical machines for implementation of speed control methods using electrical drives
4	IV	Production Process II	CO 01	Demonstrate understanding of metal cutting principles and mechanism
			CO 02	Identify cutting tool geometry of single point and multipoint cutting tool
			CO 03	Demonstrate various concepts of sheet metal forming operations
			CO 04	Demonstrate concepts and use of jigs and fixtures
			CO 05	Illustrate various non-traditional machining techniques
			CO 06	Illustrate concepts and applications of additive manufacturing
5	IV	Kinematics of Machinery	CO 01	Define various components of mechanism
			CO 02	Construct/Compose mechanism to provide specific motion
			CO 03	Draw velocity and acceleration diagram of various mechanism.
			CO 04	Construct CAM profile for the specific follower motion.

Sr. No	Semester	Course	CO Number	Course Outcome
			CO 05	Select appropriate power transmission and control mechanism
6	IV	Data Base and Information Retrieval	CO 01	Identify data model and schemes in DBMS
			CO 02	Demonstrate features of data base management system & relational data base
			CO 03	Use SQL std. Language of retional data base
			CO 04	Demonstrate underastanding of functional dependencies and design of the data base
			CO 05	Designe graphical user interface for specific application
			CO 06	Create visual Software entities
7	IV	Fluid Mechanics Lab	CO 01	Define properties of fluids and classification of fluids
			CO 02	Evaluate hydrostatic forces on various surfacesand predic stability of floating bodies
			CO 03	Formulate and solve equations of control volume for fluid flow systems
			CO 04	Apply Nernaulli's equation to various flow measuring devices
			CO 05	Calculate resistance to flow of incompressible fluid through closed conduits and over surfaces
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9	IV	Kinematics of Machinery Lab	CO 01	Define various components of mechanism
			CO 02	Construct/Compose mechanism to provide specific motion
			CO 03	Draw velocity and acceleration diagram of various mechanism.
			CO 04	Construct CAM profile for the specific follower motion.
			CO 05	Select appropriate power transmission and control mechanism
10	IV	Machine Shop	CO 01	Operate lathe machine,
			CO 02	Perform shaping operations
			CO 03	Perform finishing operations on grinding machine

Sr. No	Semester	Course	CO Number	Course Outcome
10	IV	Practice II Lab	CO 04	Perform milling operations.
			CO 05	Perform precision turning
			CO 06	Perform drilling and threading operations.

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1	V	Internal Combustion Engines	CO 01	Demonstrate The Working Of Different Systems And Processes Of S.I. Engines
			CO 02	Demonstrate The Working Of Different Systems And Processes Of C.I. Engines
			CO 03	Illustrate The Working Of Lubrication, Cooling And Supercharging Systems
			CO 04	Analyze Engine Performance
			CO 05	Illustrate Emission Norms And Emission Control
			CO 06	Comprehend The Different Technological Advances In Engines And Alternate Fuels
2	V	Mechanical Measurements and Control	CO 01	Classify various types of static characterstics and type of errors occuring in the system
			CO 02	Classify and select proper measuring instrument for linear and angular displacement
			CO 03	Classify and select proper measuring instrument for pressure and temprature measurement
			CO 04	Design mathematical model of system / process for standard inpute responces
			CO 05	Analyse error and differentive various type of control system and time domain specifications
			CO 06	Analyse the Proplems associated with stability
3	V	Heat Transfer	CO 01	IDENTIFY THREE MODE OF HEAT TRANSFER
			CO 02	ILLUSTRATE BASIC MODE OF HEAT TRANSFER
			CO 03	DEVELOP MATHEMATICAL MODEL FOR EACH MODE OF HEAT TRANSFER
			CO 04	DEVELOP MATHEMATICAL MODEL FOR TRANSIENT HEAT TRANSFER
			CO 05	DEMONSTRATE AND EXPLAIN MECHANISM OF BOILING AND CONDENSATION
			CO 06	ANALYSE DIFFERENT HEAT EXCHANGER AND QUANTIFY THEIR PERFORMANCE
4	V	Dynamics of Machinery	CO 01	Demonstrate working Principles of different types of governors and Gyroscopic effects on the mechanical systems
			CO 02	Analyse static and dynamic forces in mechanical systems
			CO 03	Determine natural frequency of element/system
			CO 04	Determine vibration response of mechanical elements / systems
			CO 05	Calculate parameters of vibration isolation system for a specific application
			CO 06	Demonstrate basic concepts of balancing of forces and couples
			CO 01	Demonstrate various press working operations for mass production of sheet metal parts
			CO 02	Identify press tool requirements to build concepts pertaining to design of press tools

Sr. No	Semester	Course	CO Number	Course Outcome
5	V	Press Tool Design	CO 03	Apply and Prepare working drawings and setup for economic production of sheet metal components
			CO 04	Identify and Select suitable materials for different elements of press tools
			CO 05	Explain the principles and blank development in bent & drawn components
			CO 06	Interpret and Elaborate failure mechanisms of pressed components, safety aspects and automation in press working
6	V	Internal Combustion Engines Lab	CO 01	Dismantle Engine Assembly
			CO 02	Overhaul And Assemble Engine Components
			CO 03	Perform Load Test/Speed Test On Engine Setup
			CO 04	Calculate Performance Of Multi Cylinder Engine
			CO 05	Analyze Engine Performance And Draw Heat Balance Sheet
7	V	Mechanical Measurements and Control Lab	CO 01	Calibrate displacement sensors
			CO 02	Calibrate pressure and vacuum gauges
			CO 03	Measure torque using strain gauges
			CO 04	Identify system/process characteristics for standard input responses
			CO 05	Identify various types of control systems and time domain specifications
			CO 06	Analyse the problems associated with stability
8	V	Heat Transfer Lab	CO 01	ESTIMATE THERMAL CONDUCTIVITY OF METALS/NON-METALS/LIQUIDS
			CO 02	COMPUTE HEAT TRANSFER COEFFICIENT IN NATURAL AS WELL AS FORCED CONVECTION
			CO 03	MEASURE EMISSIVITY OF GREY BODY
			CO 04	QUANTIFY FIN EFFECTIVENESS AND EFFICIENCY
			CO 05	ANALYSE HEAT EXCHANGER PERFORMANCE
			CO 06	DEMONSTRATE ENERGY BALANCE FOR HEAT EXCHANGER
9	V	Dynamics of Machinery Lab	CO 01	ESTIMATE THERMAL CONDUCTIVITY OF METALS/NON-METALS/LIQUIDS
			CO 02	COMPUTE HEAT TRANSFER COEFFICIENT IN NATURAL AS WELL AS FORCED CONVECTION
			CO 03	MEASURE EMISSIVITY OF GREY BODY
			CO 04	QUANTIFY FIN EFFECTIVENESS AND EFFICIENCY
			CO 05	ANALYSE HEAT EXCHANGER PERFORMANCE

Sr. No	Semester	Course	CO Number	Course Outcome
			CO 06	DEMONSTRATE ENERGY BALANCE FOR HEAT EXCHANGER
10	V	Manufacturing Sciences Lab	CO 01	Estimate machining time for simple and taper turning operations on lathe
			CO 02	Estimate machining time for threading/knurling operations on lathe
			CO 03	Estimate machining time for various machining operations on shaper
			CO 04	Perform NC, CNC and DNC machining operations
			CO 05	Write CNC program for different operations
			CO 06	Identify machining parameters for various Non Traditional machining operations
11	V	Business Communication and Ethics	CO 01	Design a technical document using precise language, suitable vocabulary and apt style.
			CO 02	Develop the life skills/interpersonal skills to progress professionally by building stronger relationships.
			CO 03	Demonstrate awareness of contemporary issues knowledge of professional and ethical responsibilities.
			CO 04	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.
			CO 05	Deliver formal presentations effectively implementing the verbal and non-verbal skills
			CO 06	Conduct meetings professionally and prepare the required documents

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1	VI	Metrology and Quality engineering	CO 01	Demonstrate inspection methods for different gauges
			CO 02	Illustrate working principle of measuring instruments and calibration methodology.
			CO 03	Illustrate basic concepts and statistical methods in quality control
			CO 04	Demonstrate characteristics of screw threads, gear profile, and tool profile.
			CO 05	Illustrate the different sampling techniques in quality control
			CO 06	Illustrate different nondestructive techniques used for quality evaluation.
2	VI	Machine Design I	CO 01	Demonstrate understanding of various design considerations
			CO 02	Illustrate basic principles of machine design
			CO 03	Design machine elements for static as well as dynamic loading
			CO 04	Design machine elements on the basis of strength/ rigidity concepts
			CO 05	Use design data books in designing various components
			CO 06	Acquire skill in preparing production drawings pertaining to various designs
3	VI	Finite Element analysis	CO 01	Solve differential equations using weighted residual methods
			CO 02	Develop the finite element equations to model engineering problems governed by second order differential equations
			CO 03	Apply the basic finite element formulation techniques to solve engineering problems by using one dimensional elements
			CO 04	Apply the basic finite element formulation techniques to solve engineering problems by using two dimensional elements
			CO 05	Apply the basic finite element formulation techniques to find natural frequency of single degree of vibration system
			CO 06	Use commercial FEA software, to solve problems related to mechanical engineering
4	VI	Refrigeration and Air Conditioning	CO 01	Discuss fundamental refrigeration and air conditioning principles and system.
			CO 02	Describe the component of vcc and relate effect on p-v chart.
			CO 03	Explain refrigerant numbering system and properties of refrigerants.
			CO 04	Illustrate var and non conventional refrigeration systems.
			CO 05	Locate and analyse various refrigeration and air conditioning process on psychometric chart.

Sr. No	Semester	Course	CO Number	Course Outcome
			CO 06	Design and analyse air conditioning system.
5	VI	Mechatronics	CO 01	Identify the suitable sensor and actuator for mechatronics systems
			CO 02	select suitable logic controls
			CO 03	Analyse continuous control logics for standard input condition
			CO 04	Develop ladder logic programming
			CO 05	Design hydraulic/pneumatic circuits
			CO 06	Design mechatronics system
6	VI	Metrology and Quality engineering Lab	CO 01	Measure linear and angular dimensions and use dial gauge as comparator
			CO 02	Measure surface roughness
			CO 03	Measure angle using sine bar and slip gauges.
			CO 04	Use optical profile projector for measurement
			CO 05	Use various instruments for measurement of screw threads
			CO 06	Measure flatness by Autocollimator / Interferometry method.
7	VI	Machine Design I Lab	CO 01	Design shaft under various conditions
			CO 02	Design Knuckle Joint / cotter joint
			CO 03	Design Screw Jack/C-clamp along with frame
			CO 04	Design Flexible flange couplings/ Leaf spring
			CO 05	Convert design dimensions into working/manufacturing drawing
			CO 06	Use design data book/standard codes to standardise the designed dimensions
8	VI	Finite Element analysis Lab	CO 01	Select appropriate element for given problem
			CO 02	Select suitable meshing and perform convergence test
			CO 03	Select appropriate solver for given problem
			CO 04	Interpret the result
			CO 05	Apply basic aspects of FEA to solve engineering problems
			CO 06	Validate FEA solution
			CO 01	Demonstrate fundamental principles of refrigeration and air conditioning

Sr. No	Semester	Course	CO Number	Course Outcome
9	VI	Refrigeration and Air Conditioning Lab	CO 02	Identify and locate various important components of the refrigeration and air conditioning system
			CO 03	Represent various refrigeration and air conditioning processes using psychometric chart
			CO 04	Operate and maintain refrigeration system
			CO 05	Operate and maintain air conditioning system
			CO 06	Simulate VCRS
10	VI	Mechatronics Lab	CO 01	Demonstrate implementation of interfacing sensors and actuators using microcontrollers
			CO 02	Demonstrate of interfacing various utilities with microcontrollers
			CO 03	Demonstrate discrete control system using PLC microcontroller
			CO 04	Design and develop a control system for specific use
			CO 05	Implement program to PLC system and demonstrate its application
			CO 06	Develop pneumatic circuits for a specific system

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1	VII	Machine Design II	CO 01	Select appropriate gears for power transmission on the basis of given load and speed
			CO 02	Design gears based on the given conditions.
			CO 03	Select bearings for a given applications from the manufacturers catalogue.
			CO 04	Select and/or design belts and flywheel for given applications
			CO 05	Design cam and follower mechanisms.
			CO 06	Design clutches and brakes
2	VII	CAD/CAM /CAE	CO 01	IDENTIFY PROPER COMPUTER GRAPHICS TECHNIQUES USED IN GEOMETRIC MODELING
			CO 02	UNDERSTAND AND APPLY 2D AND 3D TRANSFORMATION AND DATA STORAGE TECHNIQUES
			CO 03	CALCULATE AND PLAN THE MACNINING OF JOBS ON VARIOUS CNC MACHINES USING VARIOUS PART PROGRAMING LANGUAGES
			CO 04	EXPLAIN THE CONCEPT AND COMPONENTS OF COMPUTER AIDED ENGINEERING
			CO 05	EXPLAIN THE CONCEPT AND COMPONENTS OF COMPUTER INTEGRATED MANUFACTURING
			CO 06	EXPLAIN THE USE OF RAPID PROTOTYPING AND TOOLING CONCEPTS IN ANY REAL LIFE APPLICATION
3	VII	Production Planning and Control	CO 01	Illustrate production planning functions and manage manufacturing functions in a better way.
			CO 02	Forecasting the demand of products and prepare an aggregate plan.
			CO 03	Develop the skills of inventory management and cost effectiveness.
			CO 04	Create a logical approach to process planning and line balancing in various production systems.
			CO 05	Develop competency in production scheduling and production sequencing of manufacturing operations.
			CO 06	Implement techniques of manufacturing planning and control like MRP-I, MRP-II and ERP.
4	VII	Automobile Engineering	CO 01	Illustrate the types and working of clutch and transmission system.
			CO 02	Demonstrate the working of different types of final drives, steering gears and braking systems
			CO 03	Illustrate the constructional features of wheels, tyres and suspension systems
			CO 04	Demonstrate the understanding of types of storage, charging and starting systems
			CO 05	Identify the type of body and chassis of an automobile
			CO 06	Comprehend the different technological advances in automobile

Sr. No	Semester	Course	CO Number	Course Outcome
5	VII	Disaster Management and Mitigation Measures	CO 01	Define Disaster and describe direct and indirect effects of disaster. (L1,L2)
			CO 02	Classify natural and manmade disasters.(L3)
			CO 03	Identify the risks and consequences of a disaster and apply the principles of disaster management policy accordingly.(L1,L3)
			CO 04	Interpret the scope and responsibilities of disaster management authorities and internet and correlate them. (L1,L4)
			CO 05	Recognise the local, national and international ways to raise finance and infer the legal aspects of finance.(L1,L2)
			CO 06	Categorise the preventive, mitigative and curative measures taken prior to, during and post disaster. (L4)
6	VII	Operation Research	CO 01	Understand the theoretical workings of the simplex method, the relationship between a linear program and its dual, including strong duality and complementary slackness
			CO 02	Perform sensitivity analysis to determine the direction and magnitude of change of a model's optimal solution as the data change
			CO 03	Solve specialized linear programming problems like the transportation and assignment problems, solve network models like the shortest path, minimum spanning tree, and maximum flow problems
			CO 04	Understand the applications of integer programming and a queuing model and compute important performance measures
7	VII	Machine Design II Lab	CO 01	Design gears based on the given conditions
			CO 02	Design gearbox for a given application
			CO 03	Design cam & followers for a given condition
			CO 04	Design clutches for a given application
			CO 05	Design brakes for given condition
			CO 06	Select bearings for a given applications from the manufacturers catalogue
8	VII	CAD/CAM /CAE Lab	CO 01	Identify proper computer graphics techniques for geometric modelling
			CO 02	Transform, manipulate objects as well as store and manage data
			CO 03	Create CAM Toolpath and prepare NC- G code
			CO 04	Apply rapid prototyping and tooling concepts in any real life applications

Sr. No	Semester	Course	CO Number	Course Outcome
			CO 05	Identify the tools for Analysis of a complex engineering component
9	VII	Production Planning and Control Lab	CO 01	Prepare a Process Sheet.
			CO 02	Prepare a Gantt Chart.
			CO 03	Forecast the demand of a product and prepare an Aggregate Plan.
			CO 04	Perform ABC Analysis of a given problem.
			CO 05	Develop the skills of Inventory Management and Cost Effectiveness.
			CO 06	Create a logical approach to Line Balancing for various production systems.
10	VII	Project I	CO 01	Do literature survey/industrial visit and identify the problem
			CO 02	Apply basic engineering fundamental in the domain of practical applications
			CO 03	Cultivate the habit of working in a team
			CO 04	Attempt a problem solution in a right approach
			CO 05	Correlate the theoretical and experimental/simulations results and draw the proper inferences
			CO 06	Prepare report as per the standard guidelines.

Sr. No	Semester	Course	CO Number	Course Outcome
3	VIII	Design of Mechanical Systems	CO 01	Apply the concept of system design.
			CO 02	Design material handling systems such as hoisting mechanism of EOT crane,
			CO 03	Design belt conveyor systems
			CO 04	Design engine components such as cylinder, piston, connecting rod and crankshaft
			CO 05	Design pumps for the given applications
			CO 06	Prepare layout of machine tool gear box and select number of teeth on each gear
4	VIII	Industrial Engineering and Management	CO 01	Illustrate the need for optimizing of resources and its significance
			CO 02	Develop ability in integrating knowledge of design along with other aspects of value addition in the conceptualization and manufacturing stage of various products.
			CO 03	Demonstrate the concept of Value Analysis and its relevance.
			CO 04	Manage and implement different concepts invovled in method study and understanding of work content in different situations.
			CO 05	Describe different aspects of work system design and facilities design pertinent to manufacturing industries.
			CO 06	Illustrate the concept of agile manufactuiring, lean manufacturing and flexible manufacturing.
5	VIII	Power Engineering	CO 01	Compute heat interactions in combustion of reactive mixtures
			CO 02	Illustrate different types of steam generators with its mounting and accessories and its performance parameters.
			CO 03	Explain working principle, operation and analysis of steam turbine.
			CO 04	Compare the performance of various gas turbine power cycles and Illustrate different types of Jet Propulsion Engines.
			CO 05	Draw velocity triangles of impulse/reaction turbines and calculate performance parameters/efficiency
			CO 06	Analyze working principle of pumps.
6	VIII	Renewable Energy Systems	CO 01	DEMONSTRATE NEED OF DIFFERENT RENEWABLE ENERGY SOURCES
			CO 02	DISCUSS IMPORTANT OF RENEWABLE ENERGY SOURCES
			CO 03	DISCUSS VARIOUS RENEWABLE ENERGY SOURCES IN INDIAN CONTEXT
			CO 04	CALCULATE AND ANALYSE UTILISATION OF SOLAR AND WIND ENERGY
			CO 05	ILLUSTRATE DESIGN OF BIOGAS PLANT

Sr. No	Semester	Course	CO Number	Course Outcome
			CO 06	DEMONSTRATE BASICS OF HYDROGEN ENERGY
1	VIII	Project Management	CO 01	Apply selection criteria and select an appropriate project from different options
			CO 02	Write work break down structure for a project and develop a schedule based on it
			CO 03	Identify opportunities and threats to the project and decide an approach to deal with them strategically
			CO 04	Use Earned value technique and determine & predict status of the project
			CO 05	Capture lessons learned during project phases and document them for future reference
2	VIII	Environmental Management	CO 01	Understand the concept of Environmental Management and Sustainable Development
			CO 02	Understand the concept of global environmental concerns like Global Warming; Acid Rains; Ozone Depletion; Hazardous Waste; Endangered Life Species; Loss of Biodiversity; Industrial and Man-made Disasters; and Atomid and Biomedical Hazards.
			CO 03	Understand the concept of Ecology and Ecosystems and the interdependence among the living organisma and the habitat; Limiting Factor; Carrying Capacity; Food Chain and Food Web.
			CO 04	Understand the concept of scope of Environmental Management; the role and function of Government as Planning and Regulatory agencies; Environment Quality Management; and Corporate Environmental Responsibility.
			CO 05	Understand the concept of Total Quality Environmental Management; ISO-14000; and EMS Certtification.
			CO 06	Understand the concept of various major environmental legislations like Air Act, Water Act, Wildlife Protection, Forest Act, Factories Act, etc.
7	VIII	Design of Mechanical Systems Lab	CO 01	Apply the concept of system design.
			CO 02	Design of hoisting mechanism of EOT crane,
			CO 03	Design belt conveyor systems
			CO 04	Design pumps for the given applications
			CO 05	Design engine components such as cylinder, piston, connecting rod and crankshaft
			CO 06	Design of machine tool gearbox
			CO 01	Compute heat interactions in combustion of reactive mixtures
			CO 02	Illustrate different types of steam generators with its mounting and accessories and its performance parameters.

Sr. No	Semester	Course	CO Number	Course Outcome
8	VIII	Power Engineering Lab	CO 03	Explain working principle, operation and analysis of steam turbine.
			CO 04	Compare the performance of various gas turbine power cycles and Illustrate different types of Jet Propulsion Engines.
			CO 05	Draw velocity triangles of impulse/reaction turbines and calculate performance parameters/efficiency
			CO 06	Analyze working principle of pumps.
12	VII	Project II	CO 01	Do literature survey/industrial visit and identify the problem
			CO 02	Apply basic engineering fundamental in the domain of practical applications
			CO 03	Cultivate the habit of working in a team
			CO 04	Attempt a problem solution in a right approach
			CO 05	Correlate the theoretical and experimental/simulations results and draw the proper inferences
			CO 06	Prepare report as per the standard guidelines.