Phaltan Education Society's

College of Engineering, Phaltan

Mechanical Engineering Department

VISION

The Mechanical Engineering Department strives to be recognized nationally for outstanding education and research leading to well-qualified engineers, who are innovative, entrepreneurial and successful in advanced fields of engineering and research

MISSION

The mission of Mechanical Engineering Department is to provide a broad, rigorous, application oriented and contemporary understanding of mechanical engineering that prepares our graduates for successful careers and lifelong learning.

Program Outcomes

PO1	Apply knowledge of mathematics, science and engineering to analyze, design and evaluate
PO2	Analyze problems of mechanical engineering including thermal, manufacturing and industrial
PO3	Design, implement and evaluate mechanical systems and processes considering public health,
PO4	Design and conduct experiments using domain knowledge and analyze data to arrive at valid
PO5	Apply current techniques, skills, knowledge and computer based methods and tools to develop
PO6	Analyze the local and global impact of modern technologies on individual organizations, society
PO7	Apply knowledge of contemporary issues to investigate and solve problems with a concern for
PO8	Exhibit responsibility in professional, ethical, legal, security and social issues.
PO9	Function effectively in teams, in diverse and multidisciplinary areas to accomplish common goals.
PO10	Communicate effectively in diverse groups and exhibit leadership qualities.
PO11	Apply management principles to manage projects in multidisciplinary environment.
PO12	Pursue life-long learning as a means to enhance knowledge and skills.

Programme Educational Objectives

PEO1	Graduates should excel in engineering positions in industry and other organizations that emphasize
PEO2	Graduates should excel in best post-graduate engineering institutes, reaching advanced degrees in
PEO3	Within several years from graduation, alumni should have established a successful career in an
PEO4	Graduates are expected to continue personal development through professional study and self-

PEO5	Graduates are expected to be good citizens and cultured human beings, with full appreciation of the	
Subject Name	**Course Outcomes (SEM-III)**	
Engineering Mathematics-III	CO1	Understand basic concepts of Linear Differential Equations.
	CO2	Solve Linear Differential Equations with constant coefficients for solving problems in Mechanical engineering fields.
	CO3	Understand Divergence of vector point function and Solenoidal vector fields and Curl of a vector point function and Irrotational.
	CO4	Apply Laplace Transform for solving problems in different engineering fields.
	CO5	Apply fourier series to solve problems related to Mechanical Engineering.
	CO6	Solve Partial Differential Equations related to Mechanical Engineering application.
Electrical Technology	CO1	To explain different types of electrical motors, their classification and control
	CO2	To measure power factor and correct the power factor
	CO3	Select the electrical drives for different mechanical processes.
	CO4	Apply the significance of and application of DC machines while addressing problems of
	CO5	Understand concepts of electrical heating and welding.
Applied Thermodynamics	CO1	Understand basic concepts of physics and chemistry behind thermodynamics
	CO2	Solve introductory problems on Rankine cycle.
	CO3	Understand functioning of steam generators and condensers.
	CO4	Design the steam nozzle.
	CO5	Understand basic concepts of Impulse turbine.
	CO6	Understand basic concepts of Reaction turbine, Governing and trouble shooting of turbine.
Metallurgy	CO1	Understand basic concept of metal structure.
	CO2	Understand fundamental knowledge of Ferrous and Non Ferrous Metal.
	CO3	Selection of Metals and Alloys for different application.
	CO4	Understand need of Heat treatment and various heat treatment processes.
Fluid Mechanics	CO1	Understand properties of fluids and classification of flows
	CO2	Formulate and solve equations of the control volume for fluid flow systems
	CO3	Calculate resistance to flow of incompressible fluids through closed conduits and over surfaces
	CO4	Apply fundamentals of compressible fluid flows to relevant systems
	CO1	Use BIS conventions in machine drawings

Machine Drawing	CO2	Find line/curve of intersection between two solids
	CO3	Sketch the various machine components
	CO4	Read and interpret the given production drawings
	CO5	Understand significance of assembly and detail drawings.
Computer Graphics	CO1	Understand basic concepts of computer graphics.
	CO2	Understand graphic devices.
	CO3	Understand importance of Curves and Surfaces.
	CO4	Do three dimensional transformations.
Computer Programming using C++	CO1	Develop algorithms for solving problems using object oriented language.
	CO2	Apply their knowledge and programming skills to solve various computing problems in the field of Mechanical Engineering.
Workshop Practice – III	CO1	Understand types of patterns and Core boxes,Materials used, Pattern Allowances.
	CO2	Understand Permeability Test, Green Compressive strength, Preparation of green sand mold.
Subject Name	**Course Outcomes (SEM-IV)**	
Applied Numerical Methods	CO1	Identify, classify and choose the most appropriate numerical method for solving a problem.
	CO2	Solve the Mechanical Engineering problems using softwares.
Analysis of Mechanical Elements	CO1	Demonstrate fundamental knowledge about various types of loading and stresses induced.
	CO2	Draw SFD and BMD for different types of loads and support conditions.
	CO3	Compute and analyze stresses induced in mechanical components.
	CO4	Analyze buckling and bending phenomenon in columns and beams.
Fluid and Turbo Machinery	CO1	Understand working principle of Impulse and Reaction turbine.
	CO2	Understand the concept of Centrifugal pumps and various efficiencies related to it.
	CO3	Understand the concept of centrifugal and Axial compressors.
	CO4	Understand working of Gas Turbines and know its various configurations.
Theory of Machines-I	CO1	Understand different types of mechanisms and their applications
	CO2	Analyze kinematic theories of mechanism,
	CO3	Design cam with follower for different applications
	CO4	Select different power transmitting elements according to application
	CO5	Select different governing mechanisms according to application.

Machine Tools and Processes	CO1	Understand Importance of casting as manufacturing Process.
	CO2	Understand different types of forming and Plastic Shaping processes.
	CO3	Understand Basic working principle, Configuration, Specification and classification of machine tools.
	CO4	Understand Working Principle and Applications of non-traditional machining
Testing and Measurement	CO1	Be able to critically evaluate assessment instruments
	CO2	Have the basic tools to critically construct and execute assessment instruments
	CO3	Have a working understanding of reliability and validity
	CO4	Appreciate the ethical and legal issues involved in the assessment process.
Computer Aided Drafting	CO1	Analyze and interpret design data.
	CO2	Draw 2D drawings and 3D models.
	CO3	Use modern engineering techniques, tools and skills for engineering practice.
Workshop Practice – IV	CO1	Understand Importance of casting as manufacturing Process.
	CO2	Understand different types of forming and Plastic Shaping processes.
	CO3	Understand Basic working principle, Configuration, Specification and classification of machine tools.
	CO4	Understand Working Principle and Applications of non-traditional machining
Subject Name	**Course Outcomes (SEM-V)**	
Control Engineering	CO1	Understand control system, its type and applications.
	CO2	Understand model of physical simple systems.
	CO3	Determine system stability and system response.
	CO4	Understand various control actions.
	CO5	Use MATLAB software to analyze control system.
Theory of Machines – II	CO1	Indentify the various types of gears.
	CO2	Select a gear drive for practical purpose.
	CO3	Analyze the gyroscopic effects for practical life.
	CO4	Solve a balancing problem.
	CO5	Do the balancing of practical devices to reduce vibration.
	CO6	Do force analysis of mechanisms
Heat and Mass	CO1	A student will be able to do basic calculations involving heat and mass transfer as is typical for a mechanical engineer. This includes conduction, convection and radiation heat transfer as well as heat exchanger design.

Heat and Mass Transfer	CO2	Obtain numerical solutions for conduction and radiation heat transfer problems.
	CO3	Calculate and evaluate the impact of boundary conditions on the solutions of heat transfer problems.
	CO4	Evaluate the relative contributions of different modes of heat transfer.
Machine Design – I	CO1	Apply basic principles of machine design.
	CO2	Design machine elements on the basis of strength concept.
	CO3	Use design data books and standard practices.
	CO4	Select machine elements from Manufacturer's catalogue.
Manufacturing Engineering	CO1	Identify parameters of single and multipoint cutting tools
	CO2	Design jigs and fixtures
	CO3	Understand single spindle automat, tool layout, cam design.
	CO4	Select and design dies for press working operations
CAD/CAM Laboratory	CO1	Understand and read engineering Drawings
	CO2	Prepare design intent.
	CO3	Apply appropriate command to construct solid model
	CO4	Use the techniques, skills, and computer aided tools necessary for advance engineering practice
Professional skill Development	CO1	Strengthen technical and soft skills necessary for workplace success
	CO2	Increase awareness of marketability on the job market and confidence in abilities
	CO3	Effectively make the transition from school to the workplace
	CO4	Manage their career by navigating through the working world more effectively
Workshop Practice V	CO1	Select the suitable machining operations and prepare process sheet to manufacture a component and implement the same.
	CO2	Control key dimensions on a component using principles of metrology and assembly
Mini-project-I	CO1	Work in a group on specific assignment.
	CO2	Think creatively to come out with feasible solution for engineering real life problem.
Subject Name	**Course Outcomes (SEM-VI)**	
Industrial Management and Operation	CO1	Understand the concepts of Industrial management and operations research approaches.
	CO2	Formulate and solve engineering and managerial situations as LPP.
	CO3	Formulate and solve engineering and managerial situations as Transportation and Assignment problems.

Research	CO4	Formulate and solve engineering and managerial situations as Decision theory, Network model and Sequencing models.
Industrial Fluid Power	CO1	Explain & draw different ISO/JIC symbols used in hydraulic & pneumatic circuits.
	CO2	Demonstrate hydraulic & pneumatic system components.
	CO3	Interpret the hydraulic & pneumatic circuits with their application.
	CO4	Explain safety regulations & troubleshooting in hydraulic & pneumatic system.
	CO5	Explain fluidics & their application.
Metrology and Quality Control	CO1	Identify and use various measuring instruments and select appropriate instrument for particular feature measurement.
	CO2	Distinguish and understand quality assurance and quality control. They can use control charts and sampling plans to manufacturing and service sector problems.
	CO3	Prepare and understand drawings with general dimensions, tolerances and surface finish.
Machine Design - II	CO1	Design machine elements subjected to fluctuating loading.
	CO2	Understand the effect and contribution of manufacturing, assembly, and material election on design of machine elements.
	CO3	Understand effect of tribological considerations on design
	CO4	Select rolling contact bearings from manufacturer’s catalogue.
	CO5	Design sliding contact bearings used in various mechanical systems.
	CO6	Design various types of gears such as spur, helical, bevel and worm gear
Internal Combustion Engines	CO1	Differentiate among different internal combustion engine designs
	CO2	Recognize and understand reasons for differences among operating characteristics of different engine types and designs
	CO3	Given an engine design specification, predict performance and fuel economy trends with good accuracy
	CO4	Based on an in-depth analysis of the combustion process, predict concentrations of primary exhaust pollutants
	CO5	Exposure to the engineering systems needed to set-up and run engines in controlled laboratory environments
	CO6	Develop skills to run engine dynamometer experiments
	CO7	Learn to compare and contrast experimental results with theoretical trends, and to attribute observed discrepancies to either measurement error or modeling limitations
	CO8	Develop an understanding of real world engine design issues
Computer	CO1	Locate modern techniques for integrating CAD/CIM in CIM

Computer Integrated Manufacturing Lab	CO2	Obtain an overview of computer technology in Production Planning and Control including Computers, Data base and data collection, Networks, Machine Control, etc.
	CO3	Apply classification and coding in Group Technology.
	CO4	Elaborate Computer Aided Production Planning and Control.
Seminar	CO1	Have and develop presentation skills.
	CO2	Impart knowledge in different aspects of knowledge domains.
	CO3	Make them aware of knowledge in industry perspective and new industry trends.
	CO4	Build confidence and improve communication skills.
	CO5	Collect ideas through literature survey about new innovations, analyze and present them.
	CO6	Sharpen their personality and intelligence.
Workshop Practice -VI	CO1	Select the suitable machining operations and prepare process sheet to manufacture a component and implement the same.
	CO2	Control key dimensions on a component using principles of metrology and assembly
Mini-Project- II	CO1	Work in a group on specific assignment.
	CO2	Think creatively to come out with feasible solution for engineering real life problem.
Subject Name	**Course Outcomes (SEM-VII)**	
Refrigeration and Air Conditioning	CO1	Demonstrate an understanding of the need and importance of HVAC technology,the typical and some advanced and innovative schematic designs, and the goals of HVAC engineering and HVAC systems.
	CO2	Demonstrate an understanding thermal comfort conditions with respect to temperature and humidity and human clothing and activities and its impact on human comfort, productivity, and health.
	CO3	Demonstrate an understanding of psychrometrics and its application in HVAC engineering and design and will practice or observe psychrometric measurements.
	CO4	Demonstrate an understanding of heat transfer in buildings with a given architectural design and its application to heating and cooling load estimation especially including thermal lag effects by conducting a detailed annual load analysis for a representative building and present the results of this analysis in a formal report possibly including recommendations for energy conservation.

	CO5	Demonstrate an understanding of the engineering and operation of vapor compression and possibly heat-driven refrigeration systems and evaporative cooling systems and understand contemporary issues of ozone depletion and global warming potential with respect to refrigeration systems.
Mechanical System Design	CO1	Incorporate aesthetic, ergonomic and creativity considerations in industrial product
	CO2	Design different systems such as Pressure vessel, Brakes, Clutches, Machine tool Gear
	CO3	Optimize design of various components/systems in mechanical engineering
	CO4	Use IS Codes, Design data books, Handbooks required for system design .
Finite Element Analysis	CO1	Elaborate the fundamental concepts, equations of equilibrium, Stress-strain relations and the principle of potential energy and approximations of differentials equations.
	CO2	Develop the key concepts of finite element formulations by considering the 1D problem just as Shape function, element stiffness and boundary conditions.
	CO3	Apply the finite element formulations for two dimensional plane stress and plane strain problems using constant strain triangle.
	CO4	Demonstrate the modelling aspects of axisymmetric solids subjected to axisymmetric loading.
	CO5	Understand the Galerkin formulation for steady state heat transfer, torsion and potential flow.
Elective I- Automobile Engineering	CO1	Identify the different parts of the automobile
	CO2	Explain the working of various parts like engine, transmission, clutch, brakes.
	CO3	Describe how the steering and the suspension systems operate.
	CO4	Understand the environmental implications of automobile emissions.
	CO5	Develop a strong base for understanding future developments in the automobile industry.
Elective II - Total Quality Management	CO1	Understand importance of assuring quality in the service or manufacturing sector and explain Quality assurance system
	CO2	Identify and solve the quality related problems in manufacturing or service sector at various stages by using various TQM tools and techniques,
	CO3	Calculate reliability of system
	CO4	Understand vendor rating and select suitable vendor
	CO5	Interpret various quality attributes and discuss the various quality approaches.
	CO6	Comment on quality using Taguchi Philosophy.

Elective II - Industrial Product Design	CO1	Find the Customer Needs for a Quality Product through Market Research in product development process,Concept Generation, Selection and Testing.
	CO2	Describe basics of Product Architecture, Prototyping and Cost and Value Engineering. Select the Standard Ergonomics and Industry Safety parameters in Product Design.
Industrial Training	CO1	Comprehend the knowledge gained in the course work
	CO2	Create, select, learn and apply appropriate techniques, resources, and modern engineering tools.
Project Phase -I	CO1	Students are able to improve the professional competency and research aptitude in relevant area.
	CO2	Students are able develop the work practice in students to apply theoretical and practical tools/techniques to solve real life problems related to industry and current research.
Subject Name	**Course Outcomes (SEM-VIII)**	
Mechatronics	CO1	Understand the importance of integration of Mechanical, Electronics and Control in the design of Mechatronics system.
	CO2	Understand key elements of sensors and transducers and interfacing the same with problem under consideration through PLC.
Energy and Power Engineering	CO1	Students will be able to demonstrate need of different enrgy sources& their importance
	CO2	Student will be able to analyze the utilization of Solar,Wind energy etc.
	CO3	Student will be to able to comprehend various equipments/systems utilized in power plants
	CO4	Student will be able to illustrate power plant economics
Noise and Vibration	CO1	Develop mathematical model to represent dynamic system
	CO2	Estimate natural frequency of mechanical element/system
	CO3	Analyze vibratory response of mechanical element/system
	CO4	Estimate the parameters of vibration isolation system
	CO5	Carryout measurement of various vibration parameters
	CO6	Understand relevance of noise in mechanical systems
Elective-III Industrial Engineering	CO1	Analyze and design new method of performing job.
	CO2	Measure and estimate standard time for job.
	CO3	Understand different types of plant layouts.
	CO4	Interpret job evaluation and merit rating.
	CO1	Design techniques for the analysis and control of discrete event system

Elective-IV Industrial Automation and Robotics	CO2	Apply knowledge of automation tools and other equipments for manufacturing and assembly components
	CO3	Operate in research and development centre for automation
	CO4	Identify efficiencies and limitation and provide in depth evaluation of robotic system for automated manufacturing applications
Project Phase –II	CO1	Students are able to improve the professional competency and research aptitude in relevant area.
	CO2	Students are able develop the work practice in students to apply theoretical and practical tools/techniques to solve real life problems related to industry and current research.