Mechanical Engineering Department

Course Outcomes (COs)

B.E. Mechanical Engineering (2015 Course)

Course Code: **402041**	
Name of Course: **Hydraulics and Pneumatics**	
C401.1	Understand working principle of components used in hydraulic & pneumatic systems and their comparison.
C401.2	Identify various actuators and their role is Fluid Power System.
C401.3	Selection of appropriate Control Valves for regulating the Pressure and Direction of fluid in Hydraulic and Pneumatic systems.
C401.4	Analyze Hydraulic circuits with their circuit diagram and Incorporate the appropriate Contamination removal system.
C401.5	Design a Pneumatic system with suitable components, Control valves and related units.
C401.6	Develop and apply knowledge to Design and analyze the Fluid power system with major components.

Course Code:**402042**	
Name of Course: **CAD CAM Automation**	
C402.1	APPLY homogeneous transformation matrix for geometrical transformations of 2D CAD entities for basic geometric transformations.
C402.2	APPLY analytical and synthetic curves and surfaces in part modelling.
C402.3	ANALYSE predict performance of simple mechanical components
C402.4	CREATE CNC program for Turning / Milling and generate tool path using CAM software.
C402.5	DEVELOP competency in designing and developing products using rapid manufacturing technology.
C402.6	UNDERSTAND the robot systems and their applications in manufacturing industries. Recognize part families and group technology.

Course Code:**402043**
Name of Course: **Dynamics of Machinery**

C403.1	Estimate natural frequency for single degree of freedom un-damped and damped free vibratory systems.
C403.2	Determine response of forced vibration due to harmonic excitation, base excitation and excitation due to unbalanced forces.
C403.3	Estimate natural frequencies and mode shapes for two degree of freedom un-damped free longitudinal and torsional vibratory systems.
C403.4	Calculate the magnitude and position of balancing mass for static and dynamic balancing of rotating and reciprocating machines.
C403.5	Select vibration measuring instruments and vibration control methods for industrial/real-life applications.
C403.6	Illustrate noise measuring instruments and noise reduction techniques for industries /real-life applications.

Course Code: **402044A**
Name of Course: Elective-I **(Finite Element Analysis)**

C404A.1	Understand the different technique and types of analysis used to solve mechanical engineering problems for industrial/real-life applications
C404A.2	Derive and use 1-D and 2-D element stiffness matrices and load vectors from various methods to solve for displacements and stresses
C404A.3	Determine shape functions for CST, LSR, Quadrilateral element and solve numerical integration for 2 and 3 Guass quadrature.
C404A.4	Explain the inner workings of a finite element code for linear stress, displacement, temperature and modal analysis.
C404A.5	Determine complex problems in solid mechanics and heat transfer by using commercial finite element analysis.
C404A.6	Evaluation of Eigen value and Eigen vectors(natural frequencies and mode shapes) for dynamic analysis of problems.

Course Code: **402044C**	
Name of Course: Elective-I (**Heating Ventilation and Air Conditioning**)	
C404C.1	Determine the performance parameters of trans-critical & ejector refrigeration systems
C404C.2	Estimate thermal performance of compressor, evaporator, condenser and cooling tower.
C404C.3	Describe refrigerant piping design, capacity & safety controls and balancing of vapour compressor system.
C404C.4	Explain importance of indoor and outdoor design conditions, IAQ, ventilation and air distribution system.
C404C.5	Estimate heat transmission through building walls using CLTD and decrement factor &time lag methods with energy-efficient and cost-effective measures for building envelope.
C404C.6	Explain working of types of desiccant, evaporative, thermal storage, radiant cooling, clean room and heat pump air-conditioning systems.

Course Code:**402045A**	
Name of Course: Elective-II (**Automobile Engineering**)	
C405A.1	To identify the different parts and systems of the automobile.
C405A.2	To understand importance and features of different systems like axle, wheel, steering etc.
C405A.3	To understand functioning of suspension, and break systems etc.
C405A.4	To identify vehicle performance and safety measures used in Automotive Vehicles.
C405A.5	To gather the knowledge of electrical system, accessories, batteries and vehicle maintenance.
C405A.6	Develop a strong base for understanding EVs and HEVs.

Course Code:**402045C**	
Name of Course: Elective-II (**Energy Audit and Management**)	
C405C.1	Conceptual knowledge of the technology, economics and regulation related issues associated with energy conservation and energy auditing
C405C.2	Ability to analyze the viability of energy conservation projects
C405C.3	Capability to integrate various options and assess the business and policy environment regarding energy conservation and energy auditing
C405C.4	Advocacy of strategic and policy recommendations on energy conservation and energy auditing
C4045.5	Select appropriate energy conservation method to reduce the wastage of energy
C4045.6	Evaluate the techno economic feasibility of the energy conservation technique adopted

Course Code:**402046**	
Name of Course: **Project**	
C406.1	Apply knowledge to find out the gap between existing mechanical systems and develop new creative new mechanical system.
C406.2	Design/ develop methodology by application of core engineering fundamentals aided by modern engineering tools/ software
C406.3	Learn about the literature review.
C406.4	Prepare execution plan and schedule the activities and distribute responsibilities among the Members
C46.5	Work in a team and carry out the project activities like design/ analysis/ manufacturing as required for the project.
C406.6	Validate the project by performing testing. Prepare project report and present the project before panel members

Course Code:**402047**	
Name of Course: **Energy Engineering**	
C407.1	Describe the power generation scenario in country and the layout of thermal power plant. Analyze the improved Rankin cycle, Cogeneration cycle
C407.2	Recognize the working of steam condensers and its important , Illustrate environmental and safety aspects of power plant
C407.3	Understand the working principle and basic components of the hydroelectric plants and Describe the working principle and basic components of the nuclear power plant
C407.4	Realize the different system of diesel power plant and understand the working principles of Gas Turbine Power Plants
C407.5	Emphasize the different type of non-conventional power plants
C407.6	Describe working principles of different electrical equipment involved in the generation of power

Course Code:	**402048**
Name of Course:	**Mechanical System Design**
C408.1	Design multi speed machine tool gear box.
C408.2	Estimate reliability of mechanical elements using statistical considerations in design
C408.3	Design material handling systems
C408.4	Design cylinders and pressure vessels
C408.5	Design internal combustion engine components
C408.6	Determine optimum dimensions of mechanical components.

Course Code:	**402049 B**
Name of Course:	Elective-III **(Industrial Engineering)**
C409B.1	To understand history and describe various productivity improvement technique.
C409B.2	To analyze and implement concepts in method study & understand different charts.
C409B.3	To understand, design and Develop different aspects of work systems and time systems.
C409B.4	To describe different aspects of production is planning and capacity planning.
C409B.5	To understand the concepts of facility design & inventory control and management.
C409B.6	To identify the role of Industrial safety standards and financial management practices.

Course Code:	**402050 B**
Name of Course:	Elective-IV (**Solar & Wind Energy**)
C4050B.1	Estimating and analyzing the various parameters related to Solar radiation measurement
C4050B.2	Analyzing and designing the Evacuated tube collectors (ETC)
C4050B.3	Forming the PN junction solar cells & its applications.
C4050B.4	Building a solar food drier system for domestic purpose
C4050B.5	Analyzing the aerodynamic forces acting on wind mill blades and estimation of power output
C4050B.6	Developing a miniature wind mill for domestic purpose referring existing system

Course Code: **402050 C**	
Name of Course: Elective-IV (**Product design and development**)	
C4050C.1	Implement modern product development processes.
C4050C.2	Analyze customer needs and requirements.
C4050C.3	Apply concept generating and selection process.
C4050C.4	Describe the Forward and Reverse engineering.
C4050C.5	Select and evaluate design processes (DFA, DFMEA, Design for Reliability and Safety).
C4050C.6	Interpret the concepts of Product Lifecycle Management and Product Data Management