BHARATI VIDYAPEETH'S

COLLEGE OF ENGINEERING

Lavale, Pune-412115

Department of Mechanical Engineering

Final Year EngineernigCourse Outcome

(2015 Course)

Course Name:- Hydraulics and Pneumatics(402041)

Pre-requisites : Fluid Mechanics, Manufacturing Processes and Machines, Mechatronics

Course Outcomes:

On completion of the course, students will be able to –

1. Understand working principle of components used in hydraulic & pneumatic systems
2. Identify various applications of hydraulic & pneumatic systems
3. Selection of appropriate components required for hydraulic and pneumatic systems
4. Analyse hydraulic and pneumatic systems for industrial/mobile applications
5. Design a system according to the requirements
6. Develop and apply knowledge to various applications

Course Name:-CAD CAM and Automation (402042)

Pre-requisites : Engineering Graphics, Engineering Mathematics, Numerical Methods & Optimization, Computer Aided Machine Drawing, Strength of Materials, Manufacturing Processes

Course Outcomes:

On completion of the course, students will be able to –

1. Apply homogeneous transformation matrix for geometrical transformations of 2D CAD entities for basic geometric transformations.
2. Use analytical and synthetic curves and surfaces in part modelling.
3. Do real times analysis of simple mechanical elements like beams, trusses, etc. and comment on safety of engineering components using analysis software.
4. Generate CNC program for Turning / Milling and generate tool path using CAM software.
5. Demonstrate understanding of various rapid manufacturing techniques and develop competency in designing and developing products using rapid manufacturing technology.
6. Understand the robot systems and their applications in manufacturing industries.

Course Name : Dynamics of Machinery: (402043)

Pre-requisites : Strength of Materials, Engineering Mechanics, Engineering Mathematics and Numerical Methods.

Course Outcomes:

On completion of the course, students will be able to –

1. Apply balancing technique for static and dynamic balancing of multi cylinder inline and radial engines.
2. Estimate natural frequency for single DOF undamped & damped free vibratory systems.
3. Determine response to forced vibrations due to harmonic excitation, base excitation and excitation due to unbalance forces.
4. Estimate natural frequencies, mode shapes for 2 DOF undamped free longitudinal and torsional vibratory systems.
5. Describe vibration measuring instruments for industrial / real life applications along with suitable method for vibration control.
6. Explain noise, its measurement & noise reduction techniques for industry and day today life problems.

Course Name: Elective – I Finite Element Analysis(402044 A)

Pre-requisites : Fluid Mechanics, Heat transfer, Numerical methods, Programming Languages.

Course Outcomes:
On completion of the course, students will be able to -
1. Understand the different techniques used to solve mechanical engineering problems.
2. Derive and use 1-D and 2-D element stiffness matrices and load vectors from various methods to solve for displacements and stresses.
3. Apply mechanics of materials and machine design topics to provide preliminary results used for testing the reasonableness of finite element results.
4. Explain the inner workings of a finite element code for linear stress, displacement, temperature and modal analysis.
5. Use commercial finite element analysis software to solve complex problems in solid mechanics and heat transfer.
6. Interpret the results of finite element analyses and make an assessment of the results in terms of modeling (physics assumptions) errors, discretization (mesh density and refinement toward convergence) errors, and numerical (round-off) errors.

Course Name : Elective – I Computational Fluid Dynamics (402044 B)

Pre-requisites : Fluid Mechanics, Heat transfer, Numerical methods, Programming Languages.

Course Outcomes:
On completion of the course, students will be able to –
1. Analyze and model fluid flow and heat transfer problems.
2. Generate high quality grids and interpret the correctness of numerical results with physics.
3. Conceptualize the programming skills.
4. Use a CFD tool effectively for practical problems and research.

Course Name : Elective – I Heating, Ventilation, Air Conditioning and Refrigeration Engineering (402044 C)

Pre-requisites: Thermodynamics I and II, Refrigeration and Air Conditioning.

Course Outcomes:
1. On completion of the course, students will be able to
2. Determine the performance parameters of trans-critical & ejector refrigeration systems
3. Estimate thermal performance of compressor, evaporator, condenser and cooling tower.
4. Describe refrigerant piping design, capacity & safety controls and balancing of vapour compressor system.
5. Explain importance of indoor and outdoor design conditions, IAQ, ventilation and air distribution system.
6. Estimate heat transmission through building walls using CLTD and decrement factor &time lag methods with energy-efficient and cost-effective measures for building envelope.
7. Explain working of types of desiccant, evaporative, thermal storage, radiant cooling, clean room and heat pump air-conditioning systems.

Course Name: Elective–II Automobile Engineering (402045 A)

Pre-requisites:I. C. Engines, Theory of Machines, Basics of Electrical and Electronics

Course Outcomes:
On completion of the course, students will be able to –
1. To compare and select the proper automotive system for the vehicle.
2. To analyse the performance of the vehicle.
3. To diagnose the faults of automobile vehicles.
4. To apply the knowledge of EVs, HEVs and solar vehicles

Course Name : Elective – II Operation Research (402045 B)

Pre-requisites: Mathematics I, II and III

Course Outcomes:
On completion of the course, students will be able to –
1. Apply LPP and Decision Theory to solve the problems
2. Apply the concept of transportation models to optimize available resources.
3. Decide optimal strategies in conflicting situations.
4. Implement the project management techniques.
5. Minimize the process time
6. Optimize multi stage decision making problems

Course Name : Elective – II Energy Audit and Management(402045 C)

Pre-requisites: Thermodynamics, Turbo Machines

Course Outcomes:
On completion of the course, students will be able to –
1. Compare energy scenario of India and World.
2. Carry out Energy Audit of the Residence / Institute/ Organization.
3. Evaluate the project using financial techniques
4. Identify and evaluate energy conservation opportunities in Thermal Utilities.
5. Identify and evaluate energy conservation opportunities in Electrical Utilities.
6. Identify the feasibility of Cogeneration and WHRUse a CFD tool effectively for practical problems and research.

Course Name : Project – I(402046)

Course Outcomes:
On completion of the course, students will be able to –

1. Find out the gap between existing mechanical systems and develop new creative new mechanical system.
2. Learn about the literature review
3. Get the experience to handle various tools, tackles and machines.

SEM-II

Course Name : Energy Engineering(402047)

Pre-requisites: Thermodynamics I and II and Heat Transfer

Course Outcomes:
On completion of the course, students will be able to –
1. Describe the power generation scenario, the layout components of thermal power plant and analyze the improved Rankin cycle, Cogeneration cycle
2. Analyze the steam condensers, recognize the an environmental impacts of thermal power plant and method to control the same
3. Recognize the layout, component details of hydroelectric power plant and nuclear power plant
4. Realize the details of diesel power plant, gas power plant and analyze gas turbine power cycle
5. Emphasize the fundaments of non-conventional power plants
6. Describe the different power plant electrical instruments and basic principles of economics of power generation.

Course Name : Mechanical System Design (402048)

Pre-requisites: Engineering Mechanics, Manufacturing Process, Strength of Materials, Machine design, Engineering Mathematics, Theory of Machines, Dynamics of Machinery, and IC Engines.

Course Outcomes:
On completion of the course, students will be able to –
1. Understand the difference between component level design and system level design.
2. Design various mechanical systems like pressure vessels, machine tool gear boxes, material handling systems, etc. for the specifications stated/formulated.
3. Learn optimum design principles and apply it to mechanical components.
4. Handle system level projects from concept to product.

Course Name : Elective – III Tribology (402049 A)

Pre-requisites: Physics, Chemistry, Mathematics, Fluid Mechanics, Theory of Machine and Machine Design

Course Outcomes:
On completion of the course, students will be able to –
1. The course will enable the students to know the importance of Tribology in Industry.
2. The course will enable the students to know the basic concepts of Friction, Wear, Lubrications and their measurements.
3. This course will help students to know the performance of different types of bearings and analytical analysis thereof.
4. This course will help students to apply the principles of surface engineering for different applications of tribology.

Course Name : Elective – III Industrial Engineering (402049 B)

Course Outcomes:
On completion of the course, students will be able to –
1. Apply the Industrial Engineering concept
2. Understand, analyze and implement different concepts involved in method study.
3. Design and Develop different aspects of work system and facilities.
4. Understand and Apply Industrial safety standards, financial management practices.
5. Undertake project work based on modeling& simulation area.

Course Name : Elective – III Robotics (402049 C)

Pre-requisites: Engineering Mechanics, TOM, Mechatronics, Basics of Electrical and Electronics Engineering, Control system.

Course Outcomes:
On completion of the course, students will be able to –
1. Identify different type of robot configuration with relevant terminology.
2. Select suitable sensors, actuators and drives for robotic systems.
3. Understand kinematics in robotic systems.
4. Design robot with desired motion with suitable trajectory planning.
5. Select appropriate robot programming for given application.
6. Understand need of IoT, machine learning, simulation in robotics.

Course Name : Elective – IV Advanced Manufacturing Processes (402050A)

Pre-requisites: Basic Engineering Science - Physics, Chemistry, Material Science, Engineering Metallurgy, Manufacturing processes

Course Outcomes:
On completion of the course, students will be able to –
1. Classify and analyze special forming processes
2. Analyze and identify applicability of advanced joining processes
3. Understand and analyze the basic mechanisms of hybrid non-conventional machining techniques
4. Select appropriate micro and nano fabrication techniques for engineering applications
5. Understand and apply various additive manufacturing technology for product development
6. Understand material characterization techniques to analyze effects of chemical composition, composition variation, crystal structure, etc.

Course Name : Elective – IV Solar and Wind Energy (402050B)

Pre-requisites: Basic Mechanical Engineering, Basic Electrical and Electronics Engineering and Heat Transfer

Course Outcomes:
On completion of the course, students will be able to –
1. Design of solar food drier for domestic purpose referring existing system
2. Design of parabolic dish solar cooker for domestic purpose referring existing system
3. Design of solar photovoltaic system for domestic purpose referring existing system
4. Design miniature wind mill for domestic purpose referring existing system

Course Name : Elective – IV Product Design and Development (402050C)

Pre-requisites:: Basic Engineering Science - Physics, Chemistry, Material Science, Engineering Metallurgy, Manufacturing processes

Course Outcomes:
On completion of the course, students will be able to –
1. Understand essential factors for product design
2. Design product as per customer needs and satisfaction
3. Understand Processes and concepts during product development
4. Understand methods and processes of Forward and Reverse engineering
5. Carry various design processes as DFA, DFMEA, design for safety
6. Understand the product life cycle and product data management