AMRUTVAHINI COLLEGE OF ENGINEERING, SANGAMNER
Department of Mechanical Engineering
Course Outcome (CO)

Fourth Year -2012 Course			
Course Code	**Course Name**	**Course Outcomes**	
Semester I			
402041	**Refrigeration and Air Conditioning**	C401.1	Illustrate the fundamental principles and applications of refrigeration and air conditioning system
		C401.2	Obtain cooling capacity and coefficient of performance of vapour compression refrigeration systems
		C401.3	Understand the properties, applications and environmental issues of different refrigerants
		C401.4	Calculate cooling load for air conditioning systems used for various applications
		C401.5	Operate and analyze the refrigeration and air conditioning systems.
		C401.6	Understand, analyse and design of air distribution system
402042	**CAD/CAM Automation**	C402.1	Apply geometrical transformations, mapping and projections for editing and manipulation of basic geometric entities and verify using MATLAB
		C402.2	Illustrate the mathematical representation of curves and surfaces and methods of solid modeling.
		C402.3	Evaluate the performance of simple mechanical elements like beams, trusses, plates etc. using analytical method and FEA software tool
		C402.4	Develop CNC part program for turning and milling operations manually and using CAM software.
		C402.5	Demonstrate the understanding of various rapid Prototyping manufacturing techniques and apply it to produce suitable component
		C402.6	Understand the types of automation and robot system, group technology and their applications in manufacturing industries.
402043	**Dynamics of Machinery**	C403.1	Apply balancing techniques to solve the static and dynamic balancing problems of rotary system, single Cylinder engine and multi cylinder inline, radial and v engines.
		C403.2	Identify the type of vibration in the given system; formulate the equations to determine the natural frequencies and mode shapes of freely vibrating longitudinal and torsional vibration systems of single degree and two degrees of freedom.
		C403.3	Ability to calculate natural frequencies, Eigen values & Eigen vectors.
		C403.4	Evaluate effect of damping; determine the response of forced vibration due to harmonic excitation, excitation

			Due to unbalanced forces and base excitation.
		C403.5	Explain the noise concepts, methods of measurement of vibration and noise; Demonstrate the techniques for Vibration control and noise control of the industrial as well as day today life problems.
		C403.6	Solve the balancing problem of a wheel using computerized balancing machine; utilize the FFT vibration analyzer tool for measurement and analysis of vibration and noise.
402044 A	**Energy Audit Management (Elective-I)**	C404A.1	Understand the General Aspects of Energy Management
		C404A.2	Carry out Energy Audit of there residence / society / college where they are studying.
		C404A.3	Understand Energy Economics and Determination of cost of steam, natural gas, compressed air.
		C404A.4	Carry out electrical tariff calculation and accurately predict the electricity bill required for the installation.
		C404A.5	Suggest various methods to reduce energy consumption of the equipment / office / premises.
402044B	**Tribology (Elective-I)**	C404B.1	To understand the importance of tribology in industry.
		C404B.2	To create the mathematical model for friction and wear measurement.
		C404B.3	To apply the knowledge of different lubrication process in various industrial application.
		C404B.4	To evaluate the performance of different types of bearings and analysis thereof.
		C404B.5	To apply the principles of surface engineering for different applications of tribology
402045 C	**Operation Research (Elective-II)**	C405C.1	Formulate linear programming problems and understand their limitations.
		C405C.2	Solve complicated problems of management science using appropriate techniques and models, interpret the results obtained and translate solutions into directives for action
		C405C.3	Construct variety of problems such as assignment, transportation, travelling salesman etc. and solve these problems using linear programming approach
		C405C.4	Select appropriate model for queuing situations and replacement situations and find the optimal solutions using models for different situations
		C405C.5	Evaluate various situations of Games theory and Sequencing models and apply them to solve them in real life for decision making
		C405C.6	Plan optimum project schedule for network models arising from a wide range of applications.
402045 D	**Advanced Manufacturing Processes (Elective-II)**	C405D.1	To Classify and analyze special forming processes.
		C405D.2	Analyze and identify applicability of advanced joining processes.
		C405D.3	Understand and apply various additive manufacturing technology for product development.
		C405D.4	Understand material characterization techniques to

			analyze effects of chemical composition, composition variation, crystal structure, etc.
		C405D.5	Understand Measurement Techniques in Micro machining.
402046	**Project- I**	C406.1	Ability to identify the community that shall benefit through the solution to the identified engineering problem and also demonstrate concern for environment.
		C406.2	Ability to engage in independent study to research literature in the identified domain and to consolidate the literature search to identify and formulate the engineering problem.
		C406.3	Ability to engage in independent study to identify the mathematical concepts, science concepts, engineering concepts, management principles and select the engineering tools/components necessary for solving the identified engineering problem.
		C406.4	Ability to apply the identified concepts and engineering tools to arrive at design solution(s) for the identified engineering problem.
		C406.5	Ability to prepare the Gantt Chart for scheduling the project work and designate responsibility of every member in the team.
		C406.6	Ability to perform in the team, contribute to the team and mentor/lead the team.
		C406.7	Ability to engage in effective oral communication through presentation of the project stage-1 work, demonstration of the project concept, effective written communication through the project stage-1 report.
Semester II			
402047	**Power Plant Engineering**	C407.1	To analyze the steam condenser and recognize the environmental impacts of thermal power plant and methods to control pollution.
		C407.2	Ability to have adequacy with Design, erection and development of energy conversion plants.
		C407.3	To recognize the layout, component details of hydroelectric and Nuclear power plant.
		C407.4	To understand details of diesel & Gas power plant and able to prepare the layout and analyze gas and diesel power plant
		C407.5	To emphasis the fundamentals of non-conventional power plants.
		C407.6	Describe the different power plant instruments and able to do economics of power generation.
402048	**Mechanical System Design**	C408.1	To understand the difference between component level design and system level design.
		C408.2	To design various mechanical systems like pressure vessels, machine tool gear boxes, material handling systems, I.C. Engine Components for the specifications stated/ formulated.
		C408.3	To learn and apply the optimum design principles to

			mechanical components.
		C408.4	To handle system level projects from concept to product.
402049 B	**Robotics (Elective - III)**	C409B.1	Identify different type of robot configuration with relevant terminology.
		C409B.2	Select suitable sensors, actuators and drives for robotic systems stated/formulated.
		C409B.3	Select correct mechanism for operation of the robot.
		C409B.4	Understand the complete design procedure of the robot.
		C409B.5	Select appropriate robot programming for given application.
		C409B.6	Understand Artificial Intelligence and Image Processing technology in robotics.
402049 C	**Industrial Engineering (Elective - III)**	C409C.1	To apply the Industrial Engineering concept in the industrial environment.
		C409C.2	To manage and implement different concepts involved in methods study and understanding of work content in various situations.
		C409C.3	To describe different aspects of work system design and facilities design related to Manufacturing and service industries
		C409C.4	Identify various cost accounting and financial management practices widely applied in industries
		C409C.5	To undertake the project work based on modeling & simulation area
402050 B	**Finite Element Analysis (Elective - IV)**	C410B.1	Understand the concept of finite element method for solving machine design problems
		C410B.2	Formulate and solve manually problems in 1-D structural systems involving bars, trusses, beams.
		C410B.3	Develop 2-D finite element formulations involving triangular, quadrilateral elements and higher order elements.
		C410B.4	Apply the knowledge of FEM for stress analysis, modal analysis, heat transfer analysis.
		C410B.5	Develop algorithms and write finite element code for solving simple design problems and understand the use of commercial packages for complex problems.
402050 C	**Design of Pumps, Blowers and Compressors (Elective - IV)**	C410C.1	Understand the used of Pump, Blower, fan or compressor.
		C410C.2	Select suitable Pump, Blower, fan or compressor for a given application.
		C410C.3	Design and optimization of Pumps for given application.
		C410C.4	Design and optimization of Fans and Blowers with airfoil theory, vortex theory for given application.
		C410C.5	Design of Compressors based on enthalpy-entropy diagrams.
402051	**Project- II**	C411.1	Ability to transform the design solution(s) for the identified engineering problem into a full-scale model/prototype/virtual model using CAD tools by following manufacturing process sheets/CAD tool

			procedure for virtual model creation.
		C411.2	Ability to demonstrate compliance to the prescribed standards/ safety norms through implementation of the identified engineering problem.
		C411.3	Ability to analyze and interpret results of testing and validation of full-scale model/prototype/virtual model and to arrive at valid conclusions.
		C411.4	Ability to perform the budget analysis of the project through the utilization of resources (finance, power, area, bandwidth, weight, size, any other)
		C411.5	Ability to engage in effective oral communication through presentation of the project stage-II work, demonstration of the project full-scale model/prototype/virtual model, effective written communication through the project stage-II report, journal publication and the one-page poster presentation of the project work.
		C411.6	Ability to abide by the norms of professional ethics.