



DEPARTMENT OF MECHANICAL ENGINEERING		
YEAR: IVth	SEMESTER: Ist	COURSE OUTCOMES(R20)
S.No	COURSE CODE: (PE-3)	COURSE NAME: MECHANICAL VIBRATIONS (PE-3)
1	CO1: Understand the concepts of vibrational analysis	
	CO2: Understand the concepts of free and forced multi degree freedom systems	
	CO3: Summarize the concepts of torsional vibrations	
	CO4: Solve the problems on critical speed of shafts	
	CO5: Apply and Analyze the systems subjected to Laplace transformations response to different inputs	
	COURSE CODE: (PE-3)	COURSE NAME: OPERATIONS RESEARCH (PE-3)
2	CO1: Understand Linear Programming models.	
	CO2: Interpret Transportation and sequencing problems.	
	CO3: Solve replacement problems and analyze queuing models.	
	CO4: Understand game theory and inventory problems.	
	CO5: Interpret dynamic programming and simulation.	
	COURSE CODE: (PE-3)	COURSE NAME: UNCONVENTIONAL MACHINING PROCESSES (PE-3)
3	CO1: Understand the concepts of modern machining processes. .	
	CO2: Learn the principles of ultrasonic machining.	
	CO3: Apply the principles and procedure of electro chemical and chemical machining processes.	
	CO4: Apply the principles and procedure of thermal metal removal processes	
	CO5: Illustrate the principles and procedure of electron beam machining, laser beam machining and plasma machining.	
	COURSE CODE: (PE-3)	COURSE NAME: COMPUTATIONAL FLUID DYNAMICS (PE-3)
4	CO1: Explain elementary details and numerical techniques for solving various engineering problems involving fluid flow.	
	CO2: Study about finite difference applications in heat conduction and convection.	
	CO3: Apply finite difference for flow modeling.	
	CO4: Understand the concepts of finite volume method.	
	CO5: Understand the concepts of finite element method applied to heat transfer problems.	
	COURSE CODE: (PE-4)	COURSE NAME: AUTOMATION IN MANUFACTURING (PE-4)
5	CO1: Understands the types and strategies and various components in Automated Systems.	
	CO2: Classify the types of automated flow lines and analyze automated flow lines	
	CO3: Solves the line balancing problems in the various flow line systems with and without buffer storage	
	CO4: Interpret different automated material handling systems, storage and retrieval systems and automated inspection systems.	
	CO5: Understand the principles of Adaptive Control systems and recognize the types of automated inspection techniques and their applications	

	COURSE CODE: (PE-4)	COURSE NAME: POWER PLANT ENGINEERING (PE-4)
6	CO1: Identify the different components of the steam power plant for power production.	
	CO2: Illustrate the component used in the diesel and gas power plant for power production	
	CO3: Understand how the power is produced by hydro-electric and nuclear power plants	
	CO4: Interpret the power production by combined power plants and operating principles of different instruments used in power plants.	
	CO5: Analyze power plant economics and implementation of pollution standards and control of pollution caused by the power plants.	
	COURSE CODE: (PE-4)	COURSE NAME: BIG DATA ANALYTICS (PE-4)
7	CO1: Understand the characteristics of big data and concepts of Hadoop ecosystem.	
	CO2: Design programs for big data applications using Hadoop components.	
	CO3: Apply Map reduce programming model to process big data.	
	CO4: Analyze Spark and its uses for big data processing.	
	CO5: Apply the concepts of NOSQL databases.	
	COURSE CODE: (PE-4)	COURSE NAME: Production Planning and Control (PE-4)
8	CO1: To understand the different types of production systems and the internal organization of production planning and control.	
	CO2: To estimate forecasts in the manufacturing and service sectors using selected quantitative and qualitative techniques.	
	CO3: To understands the importance and function of inventory and to be able to apply for its control and management.	
	CO4: To apply routing procedures and differentiate schedule and loading and interpret scheduling policies and aggregate planning.	
	CO5: To understand dispatching procedure and applications of computers in production planning and control.	
	COURSE CODE: (PE-4)	COURSE NAME: CONDITION MONITORING (PE-4)
9	CO1: Understand the basics of vibration.	
	CO2: Analyze vibration measurement and analysis using transducers and mounting methods.	
	CO3: Understand fault diagnosis and interpret vibration measurements.	
	CO4: Understand oil and wear debris analysis.	
	CO5: Interpret Ultrasonic monitoring and analysis.	
	COURSE CODE: (PE-5)	COURSE NAME: ADVANCED MANUFACTURING PROCESSES (PE-5)
10	CO1: Understand the working principles of various surface coating methods.	
	CO2: Discuss novel and promising techniques in the processing of ceramics and composites.	
	CO3: Select suitable fabrication methods for MEMS components.	
	CO4: Learn the concepts and principles of nano manufacturing methods.	
	CO5: Illustrate the working principles of RP and select appropriate RP process for the application.	

	COURSE CODE: (PE-5)	COURSE NAME:MECHATRONICS (PE-5)
11	CO1: Understand the use the various mechatronics systems, measurement systems, sensors and transducers.	
	CO2: Apply the concepts of solid state electronic devices.	
	CO3: Identify the components in the design of electro mechanical systems.	
	CO4: Apply the concepts of digital electronics and applications of PLCs for control.	
	CO5: Understand system interfacing, data acquisition and design of mechatronics systems.	
	COURSE CODE: (PE-5)	COURSE NAME: REFRIGERATION & AIR-CONDITIONING (PE-5)
12	CO1: Illustrate the operating cycles and different systems of refrigeration.	
	CO2: Analyze cooling capacity and coefficient of performance of vapour compression refrigeration systems and understand the fundamentals of cryogenics	
	CO3: Calculate coefficient of performance by conducting test on vapour absorption and steam jet refrigeration systems and understand the properties of refrigerants.	
	CO4: Solve cooling load for air conditioning systems and identify the requirements of comfort air conditioning.	
	CO5: Demonstrate different components of refrigeration and air conditioning systems.	
	COURSE CODE: (PE-5)	COURSE NAME: ADDITIVE MANUFACTURING (PE-5)
13	CO1: Understand the principles of prototyping, classification of RP processes and liquid-based RP systems.	
	CO2: Understand and apply different types of solid-based RP systems.	
	CO3: Apply powder-based RP systems.	
	CO4: Analyze and apply various rapid tooling techniques.	
	CO5: Understand different types of data formats and explore the applications of AM processes in various fields.	
	COURSE CODE: (PE-5)	COURSE NAME: NON DESTRUCTIVE EVALUATION (PE-5)
14	CO1: Understand the concepts of various NDE techniques and the requirements of radiography techniques and safety aspects.	
	CO2: Interpret the principles and procedure of ultrasonic testing (BL-2).	
	CO3: Understand the principles and procedure of Liquid penetration and eddy current testing.	
	CO4: Illustrate the principles and procedure of Magnetic particle testing.	
	CO5: Interpret the principles and procedure of infrared testing and thermal testing.	
	COURSE CODE: (OE-3)	COURSE NAME: ADDITIVE MANUFACTURING (OE-3)
15	CO1: Understand the principles of prototyping, classification of RP processes and liquid-based RP systems.	
	CO2: Understand and apply different types of solid-based RP systems.	
	CO3: Apply powder-based RP systems	
	CO4: Analyze and apply various rapid tooling techniques.	
	CO5: Understand different types of data formats and explore the applications of AM processes in various fields.	

	COURSE CODE: (OE-3)	COURSE NAME: MECHATRONICS (OE-3)
16	CO1: Understand the use the various mechatronics systems, measurement systems, sensors and transducers	
	CO2: Apply the concepts of solid state electronic devices.	
	CO3: Identify the components in the design of electro mechanical systems.	
	CO4: Apply the concepts of digital electronics and applications of PLCs for control.	
	CO5: Understand system interfacing, data acquisition and design of mechatronics systems.	
	COURSE CODE: (OE-3)	COURSE NAME: FINITE ELEMENT METHODS (OE-3)
17	CO1: Learn basic principles of variational methods	
	CO2: Learn the principles of Weighted residual methods.	
	CO3: Understand the basic procedure of finite element method	
	CO4: Learn finite element modeling of two dimensional analysis	
	CO5: Learn the finite modeling using high order and isoparametric elements	
	COURSE CODE: (OE-3)	COURSE NAME: NTRODUCTION TO ARTIFICIAL INTELLIGENCE & MACHINE LEARNING (OE-3)
18	CO1: Discuss basic concepts of artificial intelligence, neural networks and genetic algorithms.	
	CO2: Apply the principles of knowledge representation and reasoning.	
	CO3: Learn about bayesian and computational learning and machine learning.	
	CO4: Utilize various machine learning techniques.	
	CO5: Apply the machine learning analytics and deep learning techniques.	
	COURSE CODE: (OE-4)	COURSE NAME: OPTIMIZATION TECHNIQUES (OE-4)
19	CO1: Understand classification of optimization problem and apply classical optimization techniques	
	CO2: Apply unconstrained optimization techniques using various methods	
	CO3: Understand the characteristics and approaches of constrained optimization techniques	
	CO4: Identify optimized solutions using constrained and unconstrained geometric programming.	
	CO5: Understand integer programming methods	
	COURSE CODE: (OE-4)	COURSE NAME: SMART MANUFACTURING (OE-4)
20	CO1: Learn about smart manufacturing systems' components and can handle it more effectively in context of Industry 4.0	
	CO2: Learn about the smart machines and smart sensors	
	CO3: Apply IoT to Industry 4.0 and they are able to make a system tailor-made as per requirement of the industry	
	CO4: Learn about concepts of Digital Twin and able to apply Machine Learning and Artificial Intelligence concepts in Manufacturing	
	CO5: Learn the concepts of AR/VR and Metaverse platform	
	COURSE CODE: (OE-4)	COURSE NAME: SAFETY ENGINEERING (OE-4)
21	CO1: Students learn the concepts of industrial safety and management.	
	CO2: Learn about the smart machines and smart sensors	
	CO3: Apply IoT to Industry 4.0 and they are able to make a system tailor-made as per requirement of the industry	

	CO4: Students learn about fire prevention and protection systems.
	CO5: Students learn and apply the fire safety principles in buildings
	COURSE CODE: (OE-4) COURSE NAME: OPERATIONS MANAGEMENT (OE-4)
22	CO1: Apply appropriate forecasting techniques & Aggregate planning methods
	CO2: Learn Materials management analysis and scheduling policies
	CO3: Learn about the inventory control techniques, MRP and contemporary management techniques.
	CO4: Apply quality management principles proposed by Taguchi, Juran & Demigs
	CO5: Apply optimization to LP model & transportation and assignment problems
	COURSE CODE: COURSE NAME: MECHATRONICS LAB
23	CO1: Understand the Characteristics of LVDT
	CO2: Measure load, displacement and temperature using analogue and digital sensors.
	CO3: Develop PLC programs for control of traffic lights, water level, lifts and conveyor belts.
	CO4: Simulate and analyze PID controllers for a physical system using MATLAB.
	CO5: Develop pneumatic and hydraulic circuits using Automaton studio.

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