



DEPARTMENT OF MECHANICAL ENGINEERING		
SUBJECTS FOR B.Tech (HONORS) in MECHANICAL ENGINEERING (R20)		
S.No	COURSE CODE:	COURSE NAME: ADVANCED MECHANICS OF FLUIDS
1	CO 1: Understand the general concepts of in viscid flow of incompressible fluids.	
	CO 2: Apply the concepts of viscous flow.	
	CO 3: Analyse the boundary layer concepts and expressions for local and mean drag coefficients for different velocity profiles.	
	CO 4: Understand fundamental concept of turbulence.	
	CO 5: Illustrate the compressible fluid flow and supersonic wave drag	
	COURSE CODE:	COURSE NAME: GREEN MANUFACTURING
2	CO 1: Understand concepts of green manufacturing.	
	CO 2: Illustrate various recycling techniques.	
	CO 3: Apply concepts of green design methods.	
	CO 4: Understand the concepts of eco design and emission less manufacturing.	
	CO 5: Apply concepts of the sustainable economic environment.	
	COURSE CODE:	COURSE NAME: ANALYSIS AND SYNTHESIS OF MECHANISMS
3	CO 1: Understand the general concepts of advanced kinematics of plane motion-I.	
	CO 2: Apply the concepts of advanced kinematics of plane motion-II.	
	CO 3: Understand the introduction to synthesis-graphical methods – I with function and path generation..	
	CO 4: Analyze the synthesis-graphical methods with Velocity – pole method and Roberts’s theorem.	
	CO 5: Illustrate the synthesis of four-bar mechanisms for prescribed extreme values of the angular velocity of driven link.	
	COURSE CODE:	COURSE NAME: ALTERNATIVE FUELS TECHNOLOGIES
4	CO 1: Understand significance of fossil fuels and their limitations.	
	CO 2: Apply the concepts of methods of production of various liquid alternative fuels.	
	CO 3: Analyze different ways of using alternative liquid fuels in engines.	
	CO 4: Illustrate the concepts of usage of gaseous fuels in alternative fuels technologies.	
	CO 5: Understand principles of duel fuel combustion, hybrid power plants and fuel cell.	
	COURSE CODE:	COURSE NAME: GEAR ENGINEERING
5	CO 1: To understand the Principles of gear tooth action and spur gears.	
	CO 2: To illustrate the concepts of helical and bevel gears.	
	CO 3: To interpret the design considerations and methodology of worm gear teeth and gear failures.	
	CO 4: To analyze design of gear trains for various applications.	

		CO 5: To understand the optimization of gear design parameters.
	COURSE CODE:	COURSE NAME: EXPERIMENTAL METHODS IN FLUID MECHANICS
6		CO 1: Understand general concepts of measurement systems and analysis of first order and second order measurement systems
		CO 2: Identify the operating principles and design considerations of various pressure measurement systems.
		CO 3: Understands the operating principles and design considerations of various temperature measurement systems.
		CO 4: Apply the operating principles and design considerations of various flow and velocity measurement systems
		CO 5: Illustrate the working of different voltage indicating, recording and data acquisition systems.
	COURSE CODE:	COURSE NAME: ADVANCED OPTIMIZATION TECHNIQUES
7		CO 1: Understand the Engineering applications of optimization.
		CO 2: Apply the concepts of unconstrained optimization techniques.
		CO 3: Understand the concepts of constrained optimization techniques.
		CO 4: Apply concepts of geometric programming problems.
		CO 5: Analyze multistage decision processes and dynamic programming problems.
	COURSE CODE:	COURSE NAME: MICRO ELECTRO MECHANICAL SYSTEMS
8		CO 1: To understand basics of Micro Electro Mechanical Systems (MEMS), mechanical sensors and actuators.
		CO 2: Illustrate thermal sensors and actuators used in MEMS.
		CO 3: To apply the principle and various devices of Micro-Opto-Electro Mechanical Systems (MOEMS), magnetic sensors and actuators.
		CO 4: Analyze applications and considerations on micro fluidic systems.
		CO 5: Illustrate the principles of chemical and bio medical micro systems.
	COURSE CODE:	COURSE NAME: TRIBOLOGY
9		CO 1: Learn the concepts of surface topography and types of lubrication.
		CO 2: Learn the genesis of friction, the theories/laws of sliding and rolling friction.
		CO 3: Apply the principles and design procedures for hydrostatic bearings.
		CO 4: Analyze the principles of hydrodynamic and mixed/ boundary lubrication.
		CO 5: Gain knowledge about the types of seals and failure of tribological components.
	COURSE CODE:	COURSE NAME: STATISTICAL DESIGN IN QUALITY CONTROL
10		CO 1: Interpret quality engineering in production design, Loss Function and Quality Level in production process
		CO 2: Illustrate tolerance design for N-type. L-type and S-type characteristics and tolerance allocation.
		CO 3: Interpret ANOVA techniques and need for ANOVA with multiple level factors.
		CO 4: Make use of orthogonal arrays for typical test strategies and interpolate experimental results.

	CO 5: Understand six sigma DMAIC methodology and tools for process improvement in services and small organizations	
	COURSE CODE:	COURSE NAME: ADVANCED COMPUTATIONAL FLUID DYNAMICS
11	CO1: Learn the principles of various flows, finite difference and finite volume methods	
	CO2: Learn the concepts of higher order upwind schemes for incompressible flow.	
	CO3: Analyze the implicit methods for incompressible flow.	
	CO4: Apply the concepts of compressible flow.	
	CO5: Model and simulate the turbulence.	
	COURSE CODE:	COURSE NAME: MATERIALS CHARACTERIZATION TECHNIQUES
12	CO1: Understand the various structure analysis tools	
	CO2: Apply microscopic techniques for material characterization.	
	CO3: Learn about thermal analysis techniques.	
	CO4: Understand magnetic characterization techniques	
	CO5: Learn about optical and electronic characterization techniques.	
	COURSE CODE:	COURSE NAME: PRODUCT DESIGN
13	CO1: Understand the basic concepts of product design process	
	CO2: Identify the operations of product management and impact of manufacturing processes on product decisions	
	CO3: Understand concepts of risks and reliability of the products design	
	CO4: Interpret the various testing procedure of the product design.	
	CO5: Illustrate the concepts of maintainability.	
	COURSE CODE:	COURSE NAME: ELECTRIC AND HYBRID VEHICLES
14	CO1: Understand electric vehicle & HEV for various applications	
	CO2: Have knowledge about the electric vehicle system and its parameters	
	CO3: Learn about EV motor drives	
	CO4: Understand the concepts of HEV.	
	CO5: Learn about the energy sources, battery chargers and charging infrastructure.	
	COURSE CODE:	COURSE NAME: MECHANICAL VIBRATIONS AND ACCOUSTICS
15	CO1: Learn about the basic concepts and behavior of vibrations in machines	
	CO2: Analyze the machine vibrations in multi degree of freedom systems	
	CO3: Apply the torsional vibration concepts to the continuous systems	
	CO4: Learn about the basic concepts of acoustics	
	CO5: Utilize the noise measuring instruments	
	COURSE CODE:	COURSE NAME: ADVANCED THERMODYNAMICS
16	CO1: Understand the thermodynamic laws and corollaries.	
	CO2: Illustrate the concepts of real gas behavior	
	CO3: Apply the general concepts of combustion reactions and chemical equilibrium of ideal gases.	
	CO4: Analyze power cycles.	

	CO5: Apply the working principles of direct energy conversion techniques.	
	COURSE CODE:	COURSE NAME: Design for Manufacturing and Assembly
17	CO1: Understand the basic concepts of design for manual assembly	
	CO2: Identify basic design procedure of various machining processes.	
	CO3: Illustrate the design considerations metal casting, extrusion and sheet metal work	
	CO4: Interpret the design considerations of various metal joining process.	
	CO5: Understand the basic design concepts involved in the assembly automation	
	COURSE CODE:	COURSE NAME: ROBOTICS AND CONTROL
18	CO1: Demonstrate basic concepts of motion controllers, robot actuation and feedback components	
	CO2: Interpret the sensing and Digitizing-imaging devices, image processing and analysis on image data reduction, feature extraction and Object recognition	
	CO3: Classify generations of robot programming languages, Robot language structures, their elements and function	
	CO4: Make use of AML Language	
	CO5: Explain Robot cell design and control and practical study of virtual robot	
	COURSE CODE:	COURSE NAME: TURBO MACHINES
19	CO1: Illustrate the concepts of turbo machines.	
	CO2: Analyze the thermal analysis of steam nozzles and steam turbines	
	CO3: Build the concepts of gas dynamics and centrifugal compressor	
	CO4: Build the concepts of cascade analysis and axial compressors	
	CO5: Understand the concepts axial flow gas turbines	
	COURSE CODE:	COURSE NAME: MATERIAL TECHNOLOGY
20	CO1: Learn the concepts of different strengthening mechanisms and plastic behaviour of engineering materials.	
	CO2: Learn the principles of deformation and fracture mechanism.	
	CO3: Analyze the concepts of fatigue and fracture of non-metallic materials.	
	CO4: Select the modern metallic materials for various engineering applications.	
	CO5: Gain knowledge about the non-metallic materials and applications.	

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