



COURSE MODULE

Faculty Name: ANIL KUMAR K				Academic Year:2022- 2023			
Department: Mechanical Engineering							
Course Code	Course Title	Core/Elective	Prerequisite	Contact Hours			Total Hrs/ Sessions
				L	T	P	
BEME203	Elements of Mechanical Engineering	Core	Basic concepts	2	2	-	40
Course Objectives	<p>Course objectives: This course (BEME203) will enable students to:</p> <ul style="list-style-type: none"> Acquire a basic understanding about scope of mechanical engineering, fundamentals about steam and nonconventional energy sources. Acquire a basic knowledge about conventional and advanced manufacturing processes. Acquiring a basic understanding about IC engines, propulsive devices and air-conditioner. Acquiring a basic knowledge about power transmission and joining processes. Acquiring a basic insight into future mobility and mechatronics and robotics. 						
Topics Covered as per Syllabus							
<u>MODULE-I</u>							
<p>Introduction to Mechanical Engineering (Overview only): Role of Mechanical Engineering in Industries and Society- Emerging Trends and Technologies in different sectors such as Energy, Manufacturing, Automotive, Aerospace, and Marine sectors.</p> <p>Steam Formation and Application: Modes of heat transfer, Steam formation, Types of steam, Steam properties and applications of steam (simple numerical problems).</p> <p>Energy Sources and Power Plants: Basic working principles of Hydel power plant, Thermal power plant, nuclear power plant, Solar power plant, Tidal power plant and Wind power plant.</p>							
<u>MODULE-2</u>							
<p>Machine Tool Operations: Lathe: Principle of working of a center lathe, lathe operations: Turning, facing, knurling, thread cutting, taper turning by swivelling the compound rest,</p> <p>Drilling Machine: Working of simple drilling machine, drilling operations: drilling, boring, reaming, tapping, counter sinking, counter boring,</p> <p>Milling Machine: Working and types of milling machine, milling operations: plane milling, end and slot milling.</p> <p>Introduction to Advanced Manufacturing Systems: Introduction, components of CNC, advantages and applications of CNC, 3D printing.</p>							
<u>MODULE - 3</u>							
<p>Introduction to IC Engines: Components and working principles, 4-Stroke Petrol and Diesel engines, Application of IC Engines, performance of IC engines (Simple numerical).</p> <p>Introduction to Refrigeration and Air Conditioning: Principle of refrigeration, Refrigerants and their desirable properties. Working principle of VCR refrigeration system, working principle of room air conditioner & Applications of air Conditioners</p>							
<u>MODULE-4</u>							
<p>Mechanical Power Transmission:</p> <p>Gear Drives: Types - spur, helical, bevel, worm and rack and pinion, velocity ratio, simple and compound gear trains (simple numerical problems)</p> <p>Belt Drives: Introduction, Types of belt drives (Flat and V-Belt Drive), length of the belt and tensions ratio (simple numerical problems)</p> <p>Joining Processes: Soldering, Brazing and Welding, Definitions, classification of welding process, Arc welding, Gas welding, (types of flames), TIG welding, MIG welding and Fusion, welding.</p>							
<u>MODULE-5</u>							
<p>Insight into future mobility technology; Electric and Hybrid Vehicles, Components of Electric and Hybrid Vehicles. Advantages and disadvantages of Electric Vehicles (EVs) and Hybrid vehicles.</p> <p>Introduction to Mechatronics and Robotics: open-loop and closed-loop mechatronic systems. Joints & links, Robot anatomy, Applications of Robots in material handling, processing and assembly and inspection.</p>							



Department of Mechanical Engineering

List of Text Books

1. Elements of Mechanical Engineering, K R Gopala Krishna, Subhash Publications, 2008
2. Elements of Workshop Technology (Vol. 1 and 2), Hazra Choudhry and Nirzar Roy, Media Promoters and Publishers Pvt. Ltd., 2010.

List of Reference Books

1. An Introduction to Mechanical Engineering, Jonathan Wickert and Kemper Lewis, Third Edition, 2012
2. Manufacturing Technology- Foundry, Forming and Welding, P.N.Rao Tata McGraw Hill 3rd Ed., 2003.
3. Robotics, Appu Kuttan KK K. International Pvt Ltd, volume 1

Course Outcomes

Students will be able to:
CO1: Explain the role of mechanical engineering in industry and society, fundamentals of steam and non-conventional energy sources
CO2: Describe different conventional and advanced machining processes, IC engines, propulsive devices, air-conditioning, refrigeration.
CO3: Explain different gear drives, gear trains, aspects of future mobility and fundamentals of robotics
CO4: Determine the condition of steam and its energy, performance parameters of IC engines, velocity ratio and power transmitted through power transmission systems.

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50). The minimum passing mark for the SEE is 35% of the maximum marks (18 marks out of 50). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 35% (18 Marks out of 50) in the semester-end examination (SEE), and a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

The Correlation of Course Outcomes (CO's) and Program Outcomes (PO's)

Subject Code:	BEME203	TITLE: Elements of Mechanical Engineering										Faculty Name:	ANIL KUMAR K
List of Course Outcomes	Program Outcomes												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	
CO-1	2	2	2	-	-	1	1	-	-	1	-	1	
CO-2	2	2	2	-	-	1	1	-	-	1	-	1	
CO-3	3	2	3	-	-	1	1	-	-	1	-	1	
CO-4	3	3	2	-	-	1	1	-	-	-	-	-	

Note: 3 = Strong Contribution 2 = Average Contribution 1 = Weak Contribution - = No Contribution

The Correlation of Course Outcomes (CO's) and Program Specific Outcomes (PSO's)

Subject Code:	TITLE: Elements of Mechanical Engineering		Faculty Name:	ANIL KUMAR K
List of Course Outcomes	Program Specific Outcomes			
	PSO1	PSO2		
CO-1	1	-		
CO-2	2	-		
CO-3	2	-		
CO-4	1	-		
CO-5	2	-		

Note: 3 = Strong Contribution 2 = Average Contribution 1 = Weak Contribution - = No Contribution