MALNAD COLLEGE OF ENGINEERING, HASSAN

DEPARTEMENT OF Mechanical Engineering

Course Title	**INTRODUCTION TO MECHANICAL ENGINEERING**		
Course Code	**23ESC144/244**	**(L-T-P)C**	(3-0-0)3
SEE duration	3 hour	**Hours / Week**	03
CIE (Theory) marks	30	**CIE (Practicals)/Activity marks**	20
SEE marks	50	**Total contact hours**	39

CourseObjective:

To introduce fresh entrants of engineering courses to the principles and fundamentals of Mechanical Engineering

Course Outcomes (COs) {with mapping shown against the **Program Outcomes (POs)}Upon completion of the course, students shall be able to:**

Sl. No.	Course outcomes	Mapping to POs
1.	explain the concepts of mechanical engineering, energy sources, and engineering materials	1, 10
2.	explain the working principle of IC engines, electric and hybrid vehicles	1, 10
3.	describe non-traditional and modern manufacturing techniques and illustrate manufacturing components usingCNC, additive manufacturing, and joining processes	1, 10
4.	understand the basic principles of automation, mechatronics and robotics	1, 10

Course Contents:

ODULE –1	**10 Hrs.**

Introduction to Mechanical Engineering

Role of Mechanical Engineers in Industries and Society - Emerging Trends and Technologies in different sectors such as Energy, Manufacturing, Automotive, Aerospace, Automation, Industry 4.0 and applications in Artificial Intelligence (AI) and Machine Learning (ML).

Energy Sources: Introduction and applications of Energy sources like Fossil fuels, nuclear fuels, Hydel, Solar, wind, and biofuels.

Engineering Materials: Classification of Engineering Materials, Types and applications of Ferrous &Nonferrous Metals, silica, ceramics, glass, graphite, diamond and polymer, composite materials.

Activity:

1. Visit to any manufacturing/ aero/ auto industry or any power plant
2. Demonstration on Tensile testing using UTM

MODULE –2	**10 Hrs.**

Introduction to IC Engines: Introduction, classification, Components and working principles, 4-stroke petrol and diesel engines, Applications of IC engines, Heat sinks in electronic devices.

Electric and Hybrid Vehicles: Introduction, Working principle, Components of hybrid and electric vehicles, Advantages, and disadvantages of EVs and Hybrid vehicles.

Activity:

1. Demonstration of working of IC engine
2. Various pollutants from the IC Engine Emission and Effect on the environment
3. Demonstration of power transmission devices

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MODULE -3	**10 Hrs.**
Non-conventional machining processes: Introduction, Difference between conventional and non-conventional machining processes. Working principle, advantages, disadvantages and applications of AJM, ECM, EDM and LBM. **Joining Processes:** Soldering and Brazing - principles and applications, Welding - Definition, applications, working principle of electric arc welding, gas welding and flames.	
Activity: 1. Demonstration of welding, soldering and brazing	

MODULE – 4	**10 hrs.**
Introduction to Advanced Manufacturing Processes: Introduction, Components of CNC, advantages and applications of CNC, Additive Manufacturing. **Introduction to Mechatronics and Robotics:** Open loop and closed loop mechatronic systems,Programmable logic controllers, Sensors, Actuators, Nomenclature of an Industrial Robot: Polar Cylindrical, Cartesian coordinate and Spherical robot, Advantages, disadvantages, and applications. Automation, Types - Fixed, programmable, and flexible automation, merits and demerits of automation, Applications.	
Activity: 1. Demonstration of CNC operations and 3D Printing 2. Demonstration of pneumatic system and robot configuration in robotics lab.	
TEXTBOOK: 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. **REFERENCES:** 1. An Introduction to Mechanical Engineering, Jonathan Wickert, 2nd edition, Cengage Learning 2006, ISBN-10: 1-111-57682 2. Elements of Mechanical Engineering - K P Roy, S K H Choudhry, A K H Choudhry, Roy Media promoters and publishers, Mumbai, 7th edition, ISBN: 4567145216, 1234567145210. 3. Electric and Hybrid vehicles by A. K. Babu Khanna Publications 4. Robotics, Appuu Kuttan K K. International Pvt. Ltd, volume 1 5. Introduction to Mechatronics, Appuu Kuttan K K, Oxford University Press, 2007.	

COURSE ARTICULATION MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	**3**	-	-	-	-	-	-	-	-	**2**	-	-	-	-
CO2	**3**	-	-	-	-	-	-	-	-	**2**	-	-	-	-
CO3	**3**	-	-	-	-	-	-	-	-	**2**	-	-	-	-
CO4	**3**	-	-	-	-	-	-	-	-	**2**	-	-	-	-

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Scheme of Evaluation (Theory Courses)

	Portions for CIE	Mode of Evaluation	Weightage in Marks
CIE - 1	Syllabus to be decided by the course coordinators such that all the COs shall be covered.	Descriptive Test	**10**
CIE - 2		Descriptive Test	**10**
CIE - 3		Descriptive Test	**10**
Activity	Minimum of two activities to be conducted	Assignment / Case study/Practical/ Working model /Quiz	**20**
SEE			**50**
Total			**100**