



B.Tech.	1	Semester	1/2	Teaching Scheme				Evaluation Scheme	
Subject Name	Basic Mechanical Engineering Lab			L	T	P	Credits	CCE	SEE
Subject Code	BTME22104			0	0	2	1	25	25
Type of course	Engineering Science Course (ESC)			CCE : Continuous and Comprehensive Evaluation SEE : Semester End Evaluation					
Prerequisite	No prerequisites								
Rationale	The course is designed to understand basic principles of mechanical engineering and its application in various fields of engineering and industries. Students will learn and understand various energy sources and its applications in power plants, fundamentals of thermodynamics, refrigeration and air conditioning, internal combustion engines, engineering materials, motion and power transmission elements, mechanical measurements and fluid machines. Students will have idea about the emerging fields of mechanical engineering.								

Course Outcomes (COs): At the end of the course, students will be able to		Marks % Weightage
CO-1	Describe the various types of engine.	15
CO-2	Explain the working of refrigeration & air conditioning	30
CO-3	Examine various performance parameters of pump.	15
CO-4	Illustrate the various power transmission elements with their applications.	15
CO-5	Apply the working of principle of mechanical measurements.	15
CO-6	Classify various engineering materials and their properties for engineering applications.	10

Course Contents		
Unit	Content	Tentative Teaching Hours
1.	Internal Combustion Engines: Definition, classification and components of engines, working of the two stroke and four-stroke cycle engines, spark and compression ignition engines, performance analysis.	4





Unit	Content	Tentative Teaching Hours
2.	Refrigeration & Air Conditioning: Definition, refrigeration and air conditioning system, vapour compression refrigeration system, vapour absorption refrigeration system, domestic refrigerator, window air conditioner, split air conditioner.	4
3.	Pumps: Introduction, classifications, terminology, types of pumps, components and working of reciprocating, centrifugal and rotary pumps, priming mechanism, power and efficiency.	4
4.	Motion and Power Transmission Elements: Methods of drives, power transmission elements, shaft and axle, types of drives: belt drive, gear drive, rope drive and chain drive.	4
5.	Mechanical Measurements: Principles of measurements, methods of measurement, linear measurement, temperature measurement, pressure measurement, speed and torque measurements.	2
6.	Engineering Materials: Stress-strain, mechanical properties of materials. definitions and applications of ferrous, non-ferrous metals and alloys. non-metallic materials.	2

List of Practicals:

1. Demonstration of Engineering Instruments for Measurement of Dimensional Properties of Objects.
2. Measurement of Pressure, Temperature, Velocity of air, and rotation of the objects.
3. Performance test on Internal Combustion Engines.
4. Study of vapour compression refrigeration and vapour absorption refrigeration cycles.
5. Demonstration of Air Conditioning System.
6. Study of various types of pumps.
7. Performance Test on Centrifugal Pump.
8. Demonstration of Motion and Power Transmission Elements.
9. Study of Various Engineering Materials and their Mechanical Properties.
10. Demonstration of Robotic Arm for Pick and Place Application.





Suggested Specification Table of Marks as per Revised Bloom's Taxonomy

% Distribution of Marks					
R Level	U Level	A Level	N Level	E Level	C Level
15	30	45	10	--	--

Legends: R: Remembrance, U: Understanding; A: Application, N: Analyze, E: Evaluate, C: Create and above Levels

Recommended Reference Books

1. Brian Bunnell and Samer Najia, Mechanical Engineering for Makers: A Hands-On Guide to Designing and making physical Things, Make, 2020.
2. Jonathan Wickert and Kemp er Lewis, An Introduction to Mechanical Engineering, Cengage Learning, 2019.
3. Pravin Kumar, Basic Mechanical Engineering, Pearson, 2018.
4. G. S. Sawhney, Fundamental of Mechanical Engineering, PHI Learning Private Limited, 2015.
5. G. Shanmugam and S Ravindran, Basic Mechanical Engineering, McGraw Hill, 2010

Mapping of Course Outcomes (CO's) with Program Outcomes (PO's)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	2	1	-	1	-	-	1	-	-	-	1	1
CO-2	2	1	-	1	1	-	1	-	-	-	1	1
CO-3	2	1	-	1	1	-	-	-	-	-	1	1
CO-4	2	1	-	-	1	-	-	-	-	-	1	1
CO-5	2	-	-	-	1	-	-	-	-	-	-	1
CO-6	2	-	-	-	-	-	-	-	-	-	-	-

Major Equipment and Accessories

Single cylinder four stroke petrol and diesel engine, thermometer, temperature sensors, sling Psychrometer, digital bevel protector, laser distance meter, manometer and pressure gauge, Vernier caliper, micro meter, infrared thermometer, thermocouple, hygrometer, anemometer, digital tachometer, duct air conditioning system, centrifugal pump, motion and power transmission elements.

