SARVAJANIK UNIVERSITY

SARVAJANIK COLLEGE OF ENGINEERING AND TECHNOLOGY

BACHELOR OF TECHNOLOGY

B.Tech.	1	Semester	1/2	Teaching Scheme				Evaluation Scheme	
Subject Name	Basic Mechanical Engineering			**L**	**T**	**P**	**Credits**	**CCE**	**SEE**
Subject Code	BTME22103			3	0	0	3	50	50
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 various elements of mechanical engineering, source of energy and power generation.	15
CO-2	Memorize the fundamental knowledge of thermodynamics, heat transfer and I.C. engines.	15
CO-3	Explain the working of refrigeration & air conditioning and pumps.	30
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	Tentative Unit Weightage
1.	**Introduction to Mechanical Engineering:** Elements of mechanical engineering, applications of mechanical engineering, definitions and applications: Industrial automation, mechatronics, biomechanical engineering, robotics, nanotechnology, Electric vehicle Technology, Evolution of Industry 5.0.	3	7%

Unit	Content	Tentative Teaching Hours	Tentative Unit Weightage
2.	**Energy Sources and Power Generation:** Introduction, comparison and applications: Non-renewable and renewable energy sources, types of fuels. Power generation: Steam formation, properties of steam, properties of gas, simple vertical boiler, thermal power plant, nuclear power plant, power generation using non- conventional sources of energy.	7	15%
3.	**Introduction to Thermodynamics and heat transfer:** Definitions and applications, thermodynamic system, thermodynamic properties, temperature and zeroth law of thermodynamics forms of energy, law of conservation of energy, energy conversion efficiencies. Kelvin plank and Clausius statements. Modes of heat transfer: Conduction, convection and radiation, laws of heat transfer.	6	13%
4.	**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.	6	13%
5.	**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.	5	12%
6.	**Pumps:** Introduction, classifications, terminology, types of pumps, components and working of reciprocating, centrifugal and rotary pumps, priming mechanism, power and efficiency.	6	13%
7.	**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.	5	12%
8.	**Mechanical Measurements:** Principles of measurements, methods of measurement, linear measurement, temperature measurement, pressure measurement, speed and torque measurements.	4	8%
9.	**Engineering Materials:** Stress-strain, mechanical properties of materials, definitions and applications of ferrous, non- ferrous metals and alloys, non-metallic materials.	3	7%

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
30	30	30	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	3	-	-	-	-	-	2	-	-	-	-	1
CO-2	3	1	1	-	-	-	-	-	-	-	-	-
CO-3	3	2	1	-	1	-	1	-	-	-	-	1
CO-4	3	1	-	-	1	-	-	-	-	-	-	1
CO-5	2	-	-	-	1	-	-	-	-	-	-	-
CO-6	1	-	-	-	-	-	-	-	-	-	-	-

List of Open Source/learning website/Other Details if any

1. https://nptel.ac.in/courses/112/104/112104113/
2. https://nptel.ac.in/courses/112/107/112107242/
3. https://nptel.ac.in/courses/112/103/112103262/
4. https://nptel.ac.in/courses/112/107/112107291/