Faculty of Engineering & Technology
Bachelor of Technology (B. Tech)
(W. E. F.: 2023-24)

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Name of Faculty	:	Faculty of Engineering & Technology
Name of Program	:	Bachelor of Technology (B. Tech)
Course Code	:	2BME01
Course Title	:	Fundamentals of Mechanical Engineering
Type of Course	:	Basic Engineering (BE)
Year of Introduction	:	2023-24

Prerequisite	:	
Course Objective	:	The goal of the course is to familiarize students with the fundamental ideas behind mechanical systems and engineering so they can carry out basic analyses of mechanical systems and interpret the results.
Course Outcomes	:	At the end of this course, students will be able to:
	CO1	Learn fundamental concepts and terms concerning mechanical engineering
	CO2	Learn properties of ideal gases and steam
	CO3	Learn different types of steam generators
	CO4	Learn various energy conversion cycles and their analysis
	CO5	Learn various power transmission elements and their applications

Teaching and Examination Scheme

Teaching Scheme (Contact Hours)			Credits	Examination Marks				
				Theory Marks		Practical Marks		Total Marks
L	**T**	**P**	**C**	**SEE**	**CIA**	**SEE**	**CIA**	
3	0	2	4	70	30	30	20	150

Legends: ***L****-Lecture;* ***T****–Tutorial/Teacher Guided Theory Practice;* ***P*** *– Practical,* ***C*** *– Credit,* ***SEE*** *– Semester End Examination,* ***CIA*** *- Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.))*

Course Content

Unit No.	Topics	Teaching Hours	Weightage	Mapping with COs
1	**BASICS OF THERMAL ENGINEERING:** Prime Movers, sources of energy, Different terminology: Force, Pressure, Energy, Work, Power, System, Heat, Temperature, Specific heat capacity, Internal Energy and Enthalpy, Zeroth Law, First Law and Second Law of Thermodynamics	4	10%	CO1

2	**PROPERTIES OF GASES & STEAM:** Gas Laws, Isochoric Process; Isobaric Process; Isothermal Process; Adiabatic Process; Poly-tropic Process, Steam formation, Types of steam, Properties of steam and dryness fraction of steam, steam tables, steam calorimeters	4	10%	CO1 CO2
3	**STEAM GENERATOR:** Definition, Classification, Boilers: Cochran, Babcock Wilcox, Lancashire and locomotive boilers. Boilers: Functions of different mountings and accessories.	12	25%	CO3
4	**INTERNAL COMBUSTION ENGINES**: Definition, Classification and Components, Terminology, Working of the two stroke and Four-stroke cycle engines, S.I. and C.I. Engines, Air standard cycles – Otto, diesel, Carnot, numerical.	7	15%	CO4
5	**AIR COMPRESSORS AND PUMPS:** Introduction, Classification, Reciprocating compressors: Work for compression, efficiency, multi-staging, intercooling, Rotary compressors, Axial flow compressors, Pumps: Types, Reciprocating pump, Air Chamber, Centrifugal pumps, Priming, Rotary pumps.	7	15%	CO1 CO4
6	**REFRIGERATION AND AIR CONDITIONING**: Introduction, Refrigerants; Vapor Compression Refrigeration Cycle; Vapor Absorption Refrigeration Cycle Air conditioning: Window Air Conditioning and Split Air Conditioning.	7	15%	CO4
7	**TRANSMISSION OF MOTION AND POWER**: Belt drive; Chain drive; Friction drive and Gear drive Couplings: Box; Flange; Pin type flexible; Universal and Oldham, Clutches: Cone, Disc and Centrifugal, Brakes: Block; Shoe; Band and Disc	4	10%	CO5

Suggested Distribution of Theory Marks Using Bloom's Taxonomy						
Level	Remembrance	Understanding	Application	Analyse	Evaluate	Create
Weightage	**20**	**40**	**20**	**15**	**05**	**0**

NOTE: This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Suggested List of Experiments/Tutorials

Sr. No.	Name of Experiment/Tutorial	Teaching Hours
1	Study of construction and working of various types of boilers.	02
2	Study of construction and working of different boiler mountings and accessories.	02
3	Study of construction and working of Petrol Engine.	02
4	Study of construction and working of Diesel Engine.	02
5	Study of construction and working of different types of pumps.	02
6	Study of construction and working of different types of air compressors.	02
7	Demonstration of vapor compression refrigeration cycle	02
8	Demonstration of vapor absorption refrigeration cycle.	02
9	Study of construction, working and applications of motion and power transmission devices.	02
10	Study of construction, working and applications of different types of coupling, clutch and brake.	02

Major Equipment/ Instruments and Software Required

Sr. No.	Name of Major Equipment/ Instruments and Software
1	Models of Cochran, Lancashire and Babcock & Wilcox boilers.
2	Models of various boiler mountings and accessories.
3	Models of various types of IC engines: Single cylinder two stroke /four stroke petrol/ diesel engine.
4	Models of pumps, compressors, refrigeration, air conditioner.
5	Models of various types of brakes, coupling, clutches.

Suggested Learning Websites

Sr. No.	Name of Website
1	https://nptel.ac.in

Reference Books

Sr. No.	Name of Reference Books
1	Thermal Engineering by R. K. Rajput; Laxmi Publication.
2	Thermal Science and Engineering by Dr. D. S. Kumar; S. K. Kataria and sons Publishers.
3	Elements of Mechanical Engineering by Sadhu Singh, S. Chand Publication
4	Fundamental of Mechanical Engineering by G. S. Sawhney; PHI Publication New Delhi.