FACULTY OF ENGINEERING & TECHNOLOGY

First Year Bachelor of Engineering

Course Code: 102001202

Course Title: BASIC MECHANICAL ENGINEERING

Type of Course: Engineering Science Course

Course Objectives: The course is intended to make students familiar with the basic concepts of Mechanical systems and engineering and enable them to carry out elementary analysis of mechanical systems and interpret the outcomes.

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
				Internal		External		Total
Lecture	Tutorial	Practical		Theory	J/V/P*	Theory	J/V/P*	
3	0	2	4	30 / 9	20 / 6	70 / 21	30 / 9	150 / 45

* **J**: Jury; **V**: Viva; **P**: Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	Introduction: Prime movers and its types, Concept of Force, Pressure, Energy, Work, Power, System, Heat, Temperature, Specific heat, Change of state, Path, Process, Cycle, Internal energy, Enthalpy, Statements of Zeroth law and First law	04
2	Properties of gases: Boyle's law, Charles's law, Gay-Lussac's law, Avogadro's law, Combined gas law, Gas constant, Relation between Cp and Cv, Various non-flow processes like constant volume process, constant pressure process, Isothermal process, Adiabatic process, Polytropic process	06
3	Steam Generation: Steam formation, Types of steam, Enthalpy, Specific volume, Internal energy and dryness fraction of steam, use of steam tables, Introduction to boilers, boiler classification, Babcock and Wilcox boiler	06
4	Heat Engines: Heat engine cycle and Heat engine, working substances, Classification of heat engines, Description and thermal efficiency of Carnot; Rankine; Otto cycle and Diesel cycles	07
5	Internal Combustion Engines: Introduction, Classification, Engine details, four-stroke/ two-stroke cycle Petrol/Diesel engines, Indicated power, Brake Power, Efficiencies	06
6	Pumps: Types and operation of Reciprocating, Rotary and Centrifugal pumps, Priming	04
7	Air Compressors: Types and operation of Reciprocating and Rotary air compressors	04
8	Refrigeration & Air Conditioning: Refrigerant, Vapor compression refrigeration system, Domestic Refrigerator, Window and split air conditioners	04
9	Transmission of Motion and Power: Shaft and axle, Different arrangement and applications of Belt drive; Chain drive; Friction drive and Gear drive	04

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Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks						**R**: Remembering; **U**: Understanding; **A**: Application, **N**: Analyze; **E**: Evaluate; **C**: Create
R	**U**	**A**	**N**	**E**	**C**	
20%	40%	20%	15%	05%	0 %	

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

Reference Books:

1	Basic Mechanical Engineering by Pravin Kumar, Pearson Publications
2	Engineering Thermodynamics by Rayner Joel
3	Thermal Science and Engineering by Dr. D.S. Kumar, S.K. Kataria & sons Publications
4	Fundamental of Mechanical Engineering by G.S. Sawhney, PHI Publications
5	Elements of Mechanical Engineering by Sadhu Singh S. Chand Publication
6	Elements of Mechanical Engineering by P.S.Desai and S.B.Soni

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Learn fundamental concepts and terms concerning mechanical engineering	**20**
CO-2	Learn properties of ideal gases and steam	**25**
CO-3	Learn various energy conversion cycles and their analysis	**45**
CO-4	Learn various power transmission elements and their applications	**10**

List of Practicals / Tutorials:

1	Study of different configurations of steam generators
2	Study of different boiler mountings and accessories
3	Study of different calorimeters - measurement of steam quality
4	Study of different I C engines
5	Study of different types of pumps.
6	Study of different types of compressors
7	Study of refrigeration and air Conditioning systems
8	Study of elements of motion transmission and power transmission
9	Study of different couplings , clutches and brakes
10	Performance test on four stroke diesel engine

Curriculum Revision:	
Version:	**1**
Drafted on (Month-Year):	**Apr-20**
Last Reviewed on (Month-Year):	**Oct-20**
Next Review on (Month-Year):	**Apr-22**

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