FACULTY OF ENGINEERING AND TECHNOLOGY
First Year Bachelor of Technology
In Effect from Academic Year 2016-17

Subject Code: 1ET1000107	**Subject Title: ELEMENTS OF MECHANICAL ENGINEERING**
Pre-requisite Subject:	**None**

Course Objective:
Understanding of basic principles of Mechanical Engineering in various fields of engineering applications.

Teaching Scheme (Hours per week)				**Evaluation Scheme (Marks)**				
				Theory		**Practical**		**Total (T+P)**
Lecture	**Tutorial**	**Practical**	**Credit**	**University Assessment**	**Continuous Assessment**	**University Assessment**	**Continuous Assessment**	
3	-	2	4	70	30	-	20	120

Subject Contents			
Sr. No	**Topic**	**Total Hours**	**Weight (%)**
01	**Introduction**: Concept of Force, Pressure, Energy, Work, Power, System, Heat, Temperature, Specific heat capacity, Change of state, Path, Process, Cycle, Internal energy, Enthalpy, Laws of Thermodynamics.	5	10
02	**Energy conversion**: Prime movers and its types, Fuels & Calorific Values Nuclear, Hydro, Solar and Wind power plant.	3	5
03	**Properties of gases:** Gas laws, Boyle's law, Charle'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, Poly-tropic process.	5	20
04	**Properties of Steam**: Steam formation, Types of Steam, Enthalpy, Specific volume, Internal energy and dryness fraction of steam, use of Steam tables, steam calorimeters.	6	15
05	**Steam Boilers:** Introduction, Classification, Cochran, Lancashire and Babcock and Wilcox boiler, Functioning of different mountings and accessories.	0	15
06	**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.	5	10
07	**Internal Combustion Engines:** Introduction, Classification, Engine details, four-stroke/ two-stroke cycle Petrol/Diesel engines, Indicated power, Brake Power, Efficiencies	4	15
08	**Pumps:** Types and operation of Reciprocating, Rotary and Centrifugal pumps, Priming.	3	5
09	**Transmission of Motion and Power:** Shaft and axle, Belt drive, Chain drive, Friction drive, Gear drive.	4	5

Note: Topic No. 5 of the above syllabus to be covered in Practical Hours.
Course Outcome:
After learning the course the students should be able to

1. To understand the fundamentals of mechanical systems.
2. To understand and appreciate significance of mechanical engineering in different fields of engineering.

List of References:

1. Elements of Mechanical Engineering by P. S. Desai and S. B. Soni, Atul Prakashan
2. Elements of Mechanical Engineering by Sadhu Singh S. Chand Publication
3. Basic Mechanical Engineering by Pravin Kumar, Pearson

List of Experiments:

1. To understand construction and working of various types of boilers.
2. To understand construction and working of different boiler mountings and accessories.
3. To determine brake thermal efficiency of an I. C. Engine.
4. To understand construction and working of different types of air compressors.
5. To demonstrate vapor compression refrigeration cycle of domestic refrigerator OR window air conditioner OR split air conditioner.