CC152: ELEMENTS OF MECHANICAL ENGINEERING
CREDITS = 6 (L=4, T=0, P=2)

Course Objective:

To Study the fundamentals of mechanical systems and appreciate significance of mechanical engineering in different fields of engineering.

Teaching and Assessment Scheme:

Teaching Scheme			Credits	Assessment Scheme				
				Theory		Practical		Total Marks
L	T	P	C	ESE	CE	ESE	CE	
4	0	2	6	70	30	30	20	150

Course Contents:

Unit No.	Topics	Teaching Hours
1	**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. **Energy conversion:** Energy conversion: Fuels & Calorific Values, Thermal, Nuclear, Hydro and Solar power plants.	08
2	**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. **Properties of Steam:** Steam formation, Types of Steam, Enthalpy, Specific volume, Internal energy and dryness fraction of steam, use of Steam tables, steam calorimeters **Steam Boilers:** Types and classification, Boiler mountings and accessories.	13

Unit No.	Topics	Teaching Hours
3	**Internal Combustion Engines:** Introduction, Classification, Engine details, four-stroke/ two-stroke cycle Petrol/Diesel engines, Indicated power, Brake Power, **Air Compressors:** Types and operation of Reciprocating and Rotary air compressors, significance of Multistaging.	09
4	**Pumps:** Types and operation of Reciprocating, Rotary and Centrifugal pumps, Priming. **Refrigeration & Air Conditioning:** Refrigerant, Vapor compression refrigeration system, Domestic Refrigerator, Window and split air conditioners.	07
5	**Transmission of Motion and Power:** Shaft and axle, Belt drive, Chain drive, Friction drive, Gear drive, bearings. **Couplings, Clutches and Brakes:** Construction and applications of Couplings, Clutches	08

List of References:

1. T. S. Rajan, *"Basic Mechanical Engineering"*, New Age International Publication.
2. Dr. D.S. Kumar*, "Thermal Science and Engineering"*, S.K. Kataria & sons, Publication New Delhi.
3. Basant AgrawaL and C.M.Agrawal*, "Basics of Mechanical Engineering",* Wiley India Pvt. Ltd. Publication.
4. *Fundamental of Mechanical Engineering* by G.S. Sawhney, PHI Publication New Delhi
5. *Thermal-Engineering*-Mahesh M Rathore, Tata McGraw Hill Publication.

Course Outcomes (COs):

At the end of this course students will be able to …

1. Use the concepts of units, systems (open, closed systems and control volumes) and its boundaries, properties, state, process, cycle, quasi-static process in context of energy conversion.
2. Assess thermodynamic properties of gases and steam, and apply it to systems of relevance.
3. Interpret the fundamentals of I C engine and air compressors.
4. Interpret the fundamentals of pumps, refrigerators and air-conditioners.
5. Identify the transmission systems and its components.