C. U. SHAH UNIVERSITY
Wadhwan City

FACULTY OF:-Technology and Engineering
DEPARTMENT OF: - CE/IT/EC/MECH/EEE/AUTO/IC/EE/CIVIL
SEMESTER: - I
CODE: - 4TE01EME1
NAME – Elements of Mechanical Engineering (EME)

Teaching and Evaluation Scheme :-

Subject Code	Name of the Subject	Teaching Scheme (Hours)				Credits	Evaluation Scheme							
							Theory				Practical (Marks)			Total
		Th	Tu	Pr	Total		Sessional Exam		University Exam		Internal		University	
							Marks	Hrs	Marks	Hrs	Pr/Viva	TW	Pr	
4TE01EME1	Elements of Mechanical Engineering (EME)	4	0	2	6	5	30	1.5	70	3	30	20	---	**150**

Objectives:-

- The objective is to impart training to help the students to develop engineering skill on basic topics of mechanical engineering. By this course student can gain knowledge of basic equipment knowledge.
- Looking to the wide field of the engineering there is a need of basic mechanical course.

Prerequisites:-

- Basic knowledge of Physics and fundamentals of mathematics.

Course outline:-

Sr. No.	Course content	No. of Hours
1.	**Introduction:** Prime movers, Sources of energy, Types of prime movers, Pressure, Work, Power, temperature, Systems and control volumes, thermodynamic properties, state and equilibrium processes and cycles, Enthalpy, Entropy, Efficiency, zeroth law of thermodynamics. Forms of Energy, energy transfer by work and heat, First and second law of thermodynamics	**06**
2.	**Properties of gases :** Gas laws, Boyle's law, Charle's law, Combined gas law, Gas constant, Internal energy, Relation between Cp and Cv, Enthalpy, Non flow process, Constant volume process, Constant pressure process, Isothermal process, Polytropic process, Adiabatic process.	**05**
3.	**Properties of Steam :** Introduction, Steam formation, Types of Steam,	**06**

	Enthalpy, Specific volume of steam and dryness fraction of steam ,Internal energy, Steam tables, Measurement of dryness fraction, Bucket calorimeter, Throttling calorimeter, Separating calorimeter, Combined calorimeter.	
4.	**Heat Engines :**Heat Engines and their classifications, working substances, converting machines, Essential elements of heat engines, Heat engine cycles, Carnot cycle, Rankine cycle, Ottocycle, Diesel cycle	**05**
5.	**Steam Boilers:** Study of steam, boilers, fire tube and water tube boilers, its accessories and mountings.	**06**
6.	**Internal Combustion Engines:** Introduction, classification and brief description of I.C. engines mechanism, 4-Stroke and 2-Stroke petrol and diesel engines, Otto, Diesel and Dual cycles and their air standard efficiencies and mean effective pressures. Comparison of petrol and diesel engines. Engine efficiencies and performance	**06**
7.	**Speed Control:** Introduction, Governors, I.C. Engine governing, Flywheel.	**03**
8.	**Pumps:** Introduction, Reciprocating pump, types and operation, Air Chamber, Centrifugal pumps, Priming, Positive displacement pumps.	**04**
9.	**Air Compressors:** Introduction and classification of air compressor, Reciprocating compressors, Operation of a compressor, Work for compression, Power required, Reciprocating compressor efficiency, Rotary compressors.	**05**
10.	**Refrigeration & Air Conditioning:** Introduction, Refrigerant, Types of refrigerators, Vapour compression refrigerating system, Window and split air conditioners	**05**
11.	**Couplings, Clutches and Brakes:** Introduction, Couplings, Clutches, Brakes, Types of brakes. Difference between a brake and a clutch.	**04**
12.	**Transmission of Motion and Power:** Introduction, Methods of drive, Power transmission elements, shaft and axle, Belt-drive, Pulleys, Power transmitted by a belt, Chain drive, Friction drive, Gear drive.	**05**

Learning Outcomes: -

- Student would feel very much self-satisfied and self-confident after learning the basic intricacies of mechanical engineering field like prime movers, internal combustion engines, Pumps Air compressors, Refrigeration etc.

Books Recommended:-

1. "Elements of Mechanical Engineering", **K. P. Roy and Prof. S. K. Hajra Chaudhary** Media Promoters & Publishers Pvt. Ltd.
2. "Fundamental of Mechanical Engineering", **G.S. Sawhney**, Prentice Hall
3. "Thermal Engineering", **R.K. Rajput** ,S.Chand Publication New Delhi
4. "Thermal Engineering", **P. L. Ballaney,** L. J. Launer Ohio.
5. "Engineering Thermodynamics", **Rayner Joel** , ELBS Longman.
6. "Thermodynamics and Heat Engines", **Yadav R.**, Central Publishing House, Allahabad
7. "Thermodynamics – An Engineering Approach", **Cengel Y.A. and Boles M.A**., Tata McGraw Hill.