3004 - ELEMENTS OF MECHANICAL ENGG.

Teaching Schedule Per Week			Progressive Assessment		Examination Schedule (Marks)			
					Theory		Practical Ex.	Total
Lectures	Practical	Credits						
3	1	4	25	25	3Hrs	100	-	150

Pre-requisite	Source
Nil	MCL

Semester	Theory	Test	Total	TW	PR	Gr Total
	75	25	100	25	-	125

RATIONALE: - In the present day a technician in any branch of engineering in industry requires certain knowledge pertaining to Mechanical Engineering as to enable him/her to perform his/her day to day work. The course content is designed to acquaint the students with the principles, practices and other basic constructional details of some of the machines widely used in production.

OBJECTIVES On completion of this course a student is expected to gain basic knowledge with operational/constructional details of the machines.

COURSE CONTENTS	Hrs	Mks
1. MECHANICAL POWER TRANSMISSION	11	24

Classification of drives. Introduction.

Belt drive: -Types – flat "V" & rope, materials used, application, merits and demerits, use of Idler pulleys, simple power calculation.

Chain-drive: -Types, advantages & disadvantages, maintenance.

Gear drives: -Classification, application, gear trains – simple and compound.

Bearing: -Definition, classification of bearing, sliding contact bearing, journal thrust bearing and their application, rolling contact bearing – classification & application, merits and demerits of ball & roller bearing and plain journal bearing.

3. I. C. ENGINES (no mathematical treatment) Introduction. Classification. Working Cycles. Engine components – Identification & functions. Different between petrol and diesel engines. Study of cooling, lubrication, fuel & ignition system. Trouble-shooting.	10	22
4. BOILER Definition & terminology, classification, accessory & mounting. Package type boiler – working, identification of various components, accessories and mounting, maintenance and trouble shooting.	5	10
4. COMPRESSORS AND AIR MOTORS Use of compressed air. Terminology. Classification of compressors and application. Working of reciprocating and rotary compressors, air motors – construction, working and application, principles of working pneumatic tools. (no mathematical treatment)	8	16
5. LUBRICATION Necessity of lubrication, types of lubricants, desirable properties of a good lubricant, methods of lubrication.	4	8
6. HYDRAULICS AND HYDRAULIC MACHINES (No mathematical treatment) Properties of fluids: - Specific volume, mass density and weight density, kinematic and dynamic viscosity. Absolute gauge and atmospheric pressure, pressure head, Pascal law, equation of continuity, Bernoulli's theorem. Head loss in pipe due to friction, bend enlargement, contraction and obstruction. Pumps. (No mathematical treatment.) Classification – Centrifugal, reciprocating and rotary. Head -Static head, manometric head. Cavitation in pump, multistage and submersible pumps, trouble shooting of pumps.	10	20
Total	48	100

PRACTICAL

1. Identification parts of I.C. engine system: -Fuel system, Air intake system, Lubrication system, Cooling system and Exhaust system
2. Operation and maintenance of I.C. engine: -Starting, Running, Stopping, Preventive maintenance and trouble shooting of common faults.
3. Operation and maintenance of reciprocating compressor: -Starting, Running, Stopping, Preventive maintenance and trouble shooting of common faults.
4. Operation and maintenance of centrifugal pump: -Starting, Running, Stopping, Preventive maintenance and trouble shooting of common faults.
5. Study of belts used for power transmission types, uses and technical specifications.
6. Study of bearing, types, application, technical specifications of rolling bearings, lubrication of bearings.
7. Study of various types of coupling.
8. Study of any one types low-pressure boiler. Working, principle and identification parts.
9. Study of types of gears and designation of spur gears as per I. S.

REFERENCE BOOKS

1. Theory of Machines by: 1) R. S. Gupta and J. K. Khurmi. 2) P.L. Ballaney
2. Thermal Engines by P.L. Ballaney.
3. Heat Engine by 1) Pandya and Shah , 2) Patel, Karamchanda