

GUJARAT TECHNOLOGICAL UNIVERSITY

COURSE NAME : ELEMENTS OF MECHANICAL ENGINEERING

1. RATIONALE :

In the era of technology integration, it has become unavoidable to possess the basic knowledge of various engineering disciplines. The advancement in technology is the best on multi technology integration and hence in performance too. The motive of this subject is to enhance the knowledge & skill level in the inter disciplinary area to strengthen the present practices.

This course is specially designed with a view to impart basic knowledge of other conventional disciplines (other than his own discipline). In this course, the Civil Engg. students will study the curriculum of other two disciplines i.e. Mechanical and Electrical Engg. portions of this course. Similarly, Mechanical Engg. students will study the curriculum of other two disciplines i.e. Electrical Engg. and Civil Engg. portions of this course. Similarly, Electrical Engg. students will study the curriculum of other two disciplines i.e. Civil Engg. and Mechanical Engg.

2. SCHEME OF TEACHING

TOPIC NO.	TOPICS	THEORY hours	PRACT. hours	TOTAL hours
1	Power Transmission and Safety	5	4	9
2	Gas & Arc welding	3	2	5
3.	Boilers & Accessories	1	2	3
4	I.C. Engines	3	6	9
5	Steam Prime movers	4	2	6
6	Hydraulic Principles & Water Turbines	4	2	6
7	Pumps	4	6	10
8	Material Handling	4	4	8
	Total	28	28	56

3. TOPICS AND SUB TOPICS

Topic -1 Power Transmission & Safety

- Importance of power Transmission
- Modes of Power transmission
- Application
- Belt & rope drive systems
- Power transmission by gears & chains
- Role of coupling & journal in power Transmission

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- Causes of accidents & their remedies
- Personal safety in shops
- Tool safety in shops

Topic-2 Gas & Arc welding

- Welding
- Types of welding
- Basic Gas welding
- Basic Arc welding, Soldering & Brazing
- Suitable Application

Topic- 3 Boiler & Accessories

- Functions & classification
- Working Principles of Boilers & Accessories
- Uses

Topic- 4 I.C. Engines

- Function & classification
- Working Principle
- Uses

Topic-5 Steam Prime movers

- Meaning of the term “ Prime movers “
- Function and classification of Prime movers
- Working principle of Turbines
- Function & working of steam turbines

Topic-6 Hydraulic Principles & water Turbines

- Concept of Theory of fluid flow
- General properties of fluids
- Water Turbines
- Working principles & classification

Topic-7 Pumps

- Function of pumps
- Types of pumps :
 - * Centrifugal * Reciprocating

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- Faults in Pumps (C & R pumps)

Topic - 8 Material Handling

- Need of material handling
- Types of material handling equipment
 - (i) Hoisting equipment
 - (ii) Conveying equipment
 - (iii) Surface & overhead equipment
- Criteria for selection
- Factors affecting selection
- Selection of suitable material handling equipment for the given situation.

4. LIST OF LABORATORY EXPERIENCES:

1. Demonstrate an I.C. Engine (Identification of Parts, its function, Classification, working etc.)
2. Locate the faults in a given I.C. Engine and suggest remedial measures
3. Study the effect of variation of load on fuel-consumption of an I.C. Engine.
4. Demonstrate a water-turbine.
5. Demonstrate a pump
6. Perform test on Centrifugal pump
7. Find fault and remedies for C.F. Pump.
8. Study various types of material handling equipment.
9. Study power transmission systems.
10. Demonstrate an Air-compressor.

5. REFERENCES :-

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| 1. Pumps operation and maintenance | Tyler and Hicks |
| 2. Elements of Workshop Technology (Vol. 1,2) | Hazara chaudhary |
| 3. Theory of Machines | R.C.Patel |
| 4. Heat engine | Shah & Pandya |
| 5. Material Handling equipments | M.Rundenko |
| 6. Material Handling | John Immer |
| 7. Hydraulic Machines | Jagdish Lal |
| 8. Hydraulics | R.C.Patel |

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9.	Text book on Surveying & levelling	T.P.Kanitkar
10.	Text book on Surveying & levelling cubicmeter.	B.C.Punmia
11.	Civil Engg. Drawing	Shah,Kale & Patki
12.	IS.1256-1967, IS.-962	Indian standard
13.	Engg. Material	S.C.Rangwala
14.	IS-2974 part-1 and part-2	
15.	Engg.material	Rajaraman
16.	Properties of concrete	A.M.Neville
17.	Estimating and costing	B.N.Dutta
18.	Estimating and costing	G.S.Birdie
19.	Estimating and costing	S.C.Rangwala
20.	Planning and designing buildings	Y.S.Sane
21.	Planning and designing buildings	Gurucharan Singh
22.	Fundamentals of Elect. Engg.	B.L.Theraja
23.	Fundamentals of Elect. Engg	V.K.Mehta
24.	A Text book of Elect. Engg.	S.L.Uppal
25.	Elementary Electrical Engg.	M.L.Gupta