

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**DIPLOMA IN MECHANICAL ENGINEERING**  
**Semester – V**

Subject Code : **2351906**

Subject Name : **Thermal Engineering Practice**

**Laboratory Experiences:**

<b>Experience Type</b>	<b>Experience Number</b>	<b>Description of Laboratory Experience</b>	<b>Hrs.</b>
Preparatory Activity (Includes Home Assignments)	1	k. Related SI units and their conversions l. Thermodynamic properties. m. Reading of steam tables. n. Interpretation of Molier chart. o. Thermodynamic laws. p. Thermodynamic processes.	2
Demonstration and Study (Video/ Movie/Cut Sections /Models May Be Used in Absence of Required Machine/ Equipment/ Device.)	2	Compare the boilers on the following aspects: Types, working, application and capacity.	4
	3	Boiler mountings and accessories.	
	4	Various types of condensers and cooling towers.	
Visual Aids	5	Collect / Download product catalogues with specifications of various types of boilers, boiler mountings and boiler accessories.	2
	6	Collect / Download product catalogues with specifications of various types of Energy Conservation equipments/devices and heat exchangers of recent trends.	
Performance	7	Performance test of air compressor.	16
	8	Disassemble, assemble and inspection of <ul style="list-style-type: none"> <li>• Fuel pump.</li> <li>• Multipoint fuel injection, echo friendly fuel Injectors.</li> </ul>	

	9	a. Performance test and heat balance sheet of I.C. Engine.(Petrol and Diesel both) b. Morse test of IC Engine.	
	10	Valve timing diagram of given IC Engine.	
	11	Determine Coefficient Of Performance(COP) of Vapor compression refrigeration system.	
	12	Determine thermal efficiency of heat exchanger.	
Download, Seminar Presentation And Lab. Talk (Copy Downloaded Content and Seminar of Whole Batch In One /One Set of Cd/Dvd )	13	Download videos for working of multi-cylinder IC Engines and explain in group.	4
		Download videos for working of cooling towers and explain in group.	
		Download videos/content on recent trends in effective and efficient heat transfer methods and discuss with group.	
		On topic approved by batch faculty, prepare the Seminar. Also present the seminar at least for 10 minutes using Power point Presentation.	
Live Learning (Home-Self Assignment)	14	1. Prepare student for live learning. 2. Study activities through powerful observation. 3. Visit nearby any CNG/LPG refilling station and prepare the report on refilling system.	-
Tutorial (Home Assignment)	15	Solve given examples on boiler performance/efficiency and heat balance sheet.	-
		Solve given example on steam condenser.	
		Solve given example on air compressor.	
		Solve given example on heat exchanger.	
Industrial Visit	16	1. Visual inspection of actual working of boiler during industrial visit. The report should include : <ul style="list-style-type: none"> <li>• Type of boiler.</li> <li>• Capacity, temperature, pressure.</li> <li>• Use of steam.</li> <li>• Locations of mounting/accessories</li> <li>• Types of fuel used</li> <li>• Water/steam and flue gas path.</li> <li>• IBR followed.</li> </ul> 2. Industrial visit of at least two related industries.	-
Assignments (Home Assignment)	17	Solve the given assignments. One assignment must be on preparation of chart / diagram / poster / graph / drawing / cycle / etc on half imperial size drawing sheet.(For Thermal Engineering subject).	-
		Total	28

## Notes:

1. Term work report content of each experience should also include following.
  - a. Experience description / data and objectives.
  - b. Skill/s which is / are expected to be developed in student after completion of experience.
  - c. Drawing of experience / setup with labels/nomenclature to carry out the experience
  - d. The specifications of machines / equipments / devices / tools / instruments /items/elements which is / are used to carry out and to check experience.
  - e. Process parameters / setup settings' values applied to carry out experience.
  - f. Steps / Process description to execute experience.
  - g. Information on recent machines / equipments / devices / tools / instruments /items available in market to carry out the experience.
  - h. Special / Additional notes or remarks.
2. Term work report of student of regular mode should exclude Distance Learning manual, photocopies & printed content(except visual aids), etc. Focus should be on developing the term work as original efforts of students.
3. Term work content of industrial visit report should also include following.
  - a. Brief details of industry visited.
  - b. Type ,location, products, rough layout, human resource, etc of industry.
  - c. Details, description and broad specifications of machineries/processes observed.
  - d. Safety norms and precautions observed.
  - e. Student's own observation on Industrial environment, culture and attitude.
  - f. Any other details / observations asked by accompanying faculty.
4. Term work should also includes experience logbook duly certified by subject teachers.
5. Term work is to be defended (along with term work) with practical examination by external and
  - i. internal examiners .Practical examination will include followings:
    - Viva
    - Explanation of working of any one machine, equipment, devise or setup (using machine or model) like any one boiler, any one IC engine, any turbine, any heat exchanger, etc.
    - Performance of any one experience from experience number 7-12.

### **Reference Books:**

1. Thermal Engineering, P. L. Ballaney
2. Thermal Engineering, A. S. Sarao
3. Heat Engines, A. R. Basu & T. P. Mukherjee
4. Heat Engines, Pandya and Shah.
5. Heat Engineering, Vasandani and Kumar.
6. Elements of Heat Engines, Patel and Karamchandani Vol. I, II, III.
7. An introduction to Energy conversion, Kadambi and Manoharprasad Vol. I, II, III
8. Thermodynamics and Heat power Engg, Mathur and Mehta.
9. Heat Engines, D. A. Wrangham.
10. Refrigeration and Air conditioning, Domkundwar.