

Branch Name:	Mechanical Engineering
Program Code:	ET402
Course Title:	Thermodynamics
Course Code:	2ET4020302
Pre-requisite Course:	-----

Course Objectives:

1. Identify and use units and notations in thermodynamics.
2. State and illustrate first and second law of thermodynamics.
3. Apply the first and second law to various gas processes and cycles.

Teaching and Examination Scheme:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture (L)	Tutorial (T)	Practical (P)	Credit	Theory (Marks)		Practical (Marks)		Total (Marks)
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	0	0	3	60	40	--	--	100

Course Contents:

Unit No	Topic	Total Hours	Weightage (%)
1	Basic Concepts of Thermodynamics - Identify a thermodynamic property and use it with appropriate units. - Explain Zeroth law of thermodynamics. - Name of various Temperature measurement devices/ instruments used with related units.	06	14
2	First Law of Thermodynamics - Explain first law of thermodynamics. - Apply first law of thermodynamics to real life situations. - Identify the applications of First law of thermodynamics for green environment.	06	14
3	Ideal Gases and Thermodynamic Processes - Explain various ideal gas laws, Derive the relationship of specific heats. - Plot various thermodynamic processes on P-V and T-S diagrams. - Calculate amount of heat transfer, work transfer & internal energy associated with the process.	10	24
4	Second Law of Thermodynamics - Describe second law of Thermodynamics. - Apply second law of thermodynamics in real life problems and identify its applications for green environment, Appreciate importance of entropy.	10	24
5	Thermodynamic Cycles - Identify thermodynamic Processes in a cycle. - Plot various cycles on Property diagram. - Derivation of thermal efficiency of Carnot cycle. - Derivation of thermal efficiency of Otto cycle. - Diesel, Dual and Brayton cycle (Without derivation) - Solve simple examples of power producing cycle	10	24

Reference Books:

1. Engineering Thermodynamics, Yunus A. Cengel, Tata McGraw Hill 975-1-25-906256-8
2. Thermodynamics, R. Yadav, CPH ISBN-13: 9788185444031
3. Thermodynamics for Engineers, M.L.Mathur, Dhanpatrai & sons 81-200-0029-3
4. Heat Engines, C.S. Shah & N.C. Pandya, Charotar Publi.House 81-85594-49-X
5. Elements of Heat Engines Vol. I & II, R.C. Patel, Acharya Book Depot
6. Engineering Thermodynamics- 2nd Edition, P.K. Nag, Mc-Graw Hill Education 978-0-07-026062-7

List of Open-Source Software/learning website:

1. <https://lawofthermodynamicsinfo.com/what-is-thermodynamic-system/>
2. <https://thermo.pressbooks.com/chapter/chapter-4/>
3. <https://study.com/academy/lesson/First-law-of-thermodynamics-law-of-conservation>
4. <https://nptel.ac.in/courses/112/105/112105123/of-energy.htm>
5. <http://www.grc.nasa.gov/WWW/k-12/airplane/thermo.html>
6. <https://www.youtube.com/watch?v=WTtxlaeC9PY>
7. <http://www.youtube.com/watch?v=GKqG6n6nAmg>
8. <https://www.youtube.com/watch?v=Jsnv8L7HdEk>

Course Learning Outcomes (CLO):

1. Apply various thermodynamics laws to real system.
2. Explain fundamental thermodynamic properties.
3. Derive and discuss the first and second laws of thermodynamics.
4. Solve problems using the properties and relationships of thermodynamic fluids.
5. An understanding of the interrelationship between thermodynamic cycles.
6. Students must have understanding of thermodynamic fundamentals before studying their application in applied thermodynamics.
7. The understanding of thermodynamic properties and processes will assist students in other related coursework.

Mapping of CLO with PO and PSO

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes(PSOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CLO1	H												L	L		
CLO2	H												L	M		
CLO3	M						M						L	M		
CLO4	H					L							M	L		
CLO5	M			M			M						M		M	
CLO6	H	L		L			M						L	L	L	
CLO7	M	L		M								L	M	M		

H: High, M: Medium, L: Low