GANPAT UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

Programme	Bachelor of Technology		Branch/Spec.	Mechanical Engineering	
Semester	III		Version	2.0.0.0	
Effective from Academic Year	2019-20		Effective form the batch Admitted in	July 2018	
Subject code	**2ME3103**	Subject Name	**Engineering Thermodynamics**		

Teaching scheme						Examination scheme (Marks)			
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	0	0	0	3	Theory	40	60	100
Hours	3	0	0	0	3	Practical	00	00	00

Pre-requisites:

- Elements of mechanical Engineering

Learning Outcome:

After learning this course, student should be able to:

- Understand the fundamentals of Classic Thermodynamics.
- Understanding with major concepts like Laws of thermodynamics, Exergy, Energy, Various thermodynamic Cycles, etc.
- Able to solve various engineering problems related to heat and work transfer.
- Able to Analyses physical and practical importance of the Thermodynamics.

Theory syllabus

Unit	Content	Hrs
1	**Introduction:** Thermodynamic Systems, Micro v/s macro view point, Thermodynamic states, properties, equilibrium, Cycles. Heat, work, Thermodynamic co-ordinates, Quasi-static process, Zeroth law of Thermodynamics,	**3**
2	**First Law of Thermodynamics:** Law of energy conservation, PMM-1, First law of Thermodynamic Analysis for Non-Flow Process, Steady Flow Energy Equation, First law of Thermodynamic Analysis for Flow Processes, Throttling Process, Applications of Steady Flow Energy Equation.	**5**
3	**Second law of thermodynamics:** Heat Engine, Heat Pump, PMM-2, Kelvin-Plank, Clausius Statements of Second law of thermodynamics, Corollaries of II law of Thermodynamics, Clausius Inequality.	**5**
4	**Entropy:** Entropy,T-Splot,E ntropytransferwithheattransfer,Entropygenerationin Close and open system, entropy and direction, entropy and disorder.	**5**
5	**Availability:** Available Energy, Quality of Energy, Dead State, Irreversibility, Concept of Exergy and its Analysis.	**5**
6	**Properties of Pure Substances:** State Principle, Phase Transformation, P-V-T Curve for Steam, Generation of Steam, Steam Table.	**5**

7	**Gas Mixture:** Equation of State, Properties of Mixture of Gas, Entropy of Gas Mixture, Law of corresponding states.	**5**
8	**Thermodynamic relations, equilibrium and stability:** Maxwell Equations, Difference and ratio of Heat Capacity, Energy Equations, Joule Kelvin effect, Clausius- Clapeyron equation.	**4**
9	**Vapour power cycles:** Rankine Cycle, Modified Rankine Cycle, Comparison of Rankine and Carnot, Binary Vapour cycle.	**4**
10	**Gas power cycles:** Carnot cycle, Stirling cycle, Ericson cycle, Otto cycle, Diesel cycle, Dual cycle, Lenoir cycle, Atkinson cycle, Brayton cycle, Brayton-Rankine combined cycle	**4**
Practical content		
The term work shall be based on the experimental work on the topic mentioned above.		
Text Books		
1	P.L. Ballaney, " Thermal Engineering", Khanna Publishers, 24th Edition.	
2	P.K.Nag, " Engineering Thermodynamics", McGraw Hill Education (India) Private Limited, 5th Edition.	
3	Yunus A. Cengel , Michael A. Boles, "Thermodynamics: An Engineering Approach", McGraw Hill Education (India) Private, 7th Edition.	
Reference Books		
1	Richard E. Sonnta , Gordon J. Van Wylen, "Fundamentals of Classical Thermodynamics", John Wiley & Sons, Inc, 7th Edition.	
2	Adrian Bejan, "Advance Engineering Thermodynamics", John Wiley & Sons, Inc,3rd Edition.	
3	Michael J. Moran, Howard N. Shapiro, et.al, "Introduction to ThermalSystems Engineering, John Wiley &Sons, Inc.	
ICT/MOOCs references		
1	https://nptel.ac.in/courses/112105123/	
2	https://nptel.ac.in/downloads/112108148/	
3	http://www.nptelvideos.com/mechanical/thermodynamics_video_lectures.php	