

GANPAT UNIVERSITY

FACULTY OF U. V. PATEL COLLEGE OF ENGINEERING

Programme	Degree Engineering				Branch/Spec.	Automobile Engineering			
Semester	III				Version	1.0.0.0			
Effective from Academic Year		2018-19			Effective for the batch Admitted in			July 2017	
Subject code	2ME302		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	0	0	0
Pre-requisites:									
None									
Learning Outcome:									
Learning Outcomes:									
After completion of this course, student will be able to									
<ul style="list-style-type: none"> • 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								4
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-S plot, Entropy transfer with heat transfer, Entropy generation in close and open system, Entropy and direction, Entropy and disorder.								4
5	Availability: Available energy, Quality of energy, Dead state, Irreversibility, Concept of exergy and its analysis								3
6	Properties of Pure Substances: State principle, Phase transformation, P-V-T curve for steam, Generation of steam, Steam table.								3
7	Gas Mixture: Equation of state, Properties of mixture of gas, Entropy of gas mixture, Law of corresponding states.								3
8	Thermodynamic relations, equilibrium and stability: Maxwell equations, Difference and ratio of heat capacity, Energy equations, Joule Kelvin effect, Clausius- Clapeyron equation.								8
9	Vapour power cycles: Rankine Cycle, Modified Rankine Cycle, Comparison of Rankine and Carnot, Binary Vapor cycle.								5
10	Gas power cycles: Carnot cycle, Stirling cycle, Ericson cycle, Otto cycle, Diesel cycle, Dual cycle, Lenoir								10

	cycle, Atkinson cycle, Brayton cycle, Brayton-Rankine combined cycle	
Practical content		
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 Thermal Systems Engineering, John Wiley & Sons, Inc.	