

GANPAT UNIVERSITY									
FACULTY OF ENGINEERING & TECHNOLOGY									
Programme		Bachelor of Technology			Branch/Spec.		Petrochemical Engineering		
Semester		III			Version		1.0.0.0		
Effective from Academic Year			2020-21		Effective for the batch Admitted in			July 2019	
Subject code		2PCE3105		Subject Name		Plant Utilities			
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	4	0	0	0	4	Theory	40	60	100
Hours	4	0	0	0	4	Practical	0	0	0
Pre-requisites:									
<ol style="list-style-type: none"> 1. Fundamental knowledge of Thermodynamics Laws 2. Basic understanding of systems. 									
Course Objective									
<ul style="list-style-type: none"> • to understand thermodynamics processes, First and Second Law of thermodynamics. • To Know about steam generators and turbines. • To understand internal combustion engine two and four stroke cycle. • to learn refrigeration and its applications. 									
Theory syllabus									
Unit	Content								Hrs
1	Thermodynamics: Laws of perfect gases, thermodynamics processes, First and Second Law of thermodynamics, Entropy, The clausius inequality, Steady Flow Processes, Carnot Cycle. PROPERTIES OF STEAM: Use of steam tables, measurement of dryness fraction, entropy of steam, temperature entropy and mollier charts, clausius clapeyron equation, Rankine Cycle.								8
2	Steam Generators: General Description, Boiler Mounting and Accessories, Natural and Artificial Draught, Equivalent Evaporation and Thermal efficiency. Fuels use in boilers – liquids, gaseous and hydrocarbon								7
3	Turbine: Theory and working of impulse, reaction and gas turbine. Bleeding and reheating.								6
4	Internal Combustion Engine: Cycle of operation, two and four stroke cycle, general description of S.I and C. I. engines, ignition, injection and governing.								7
5	Water Management : Sources, conditioning and management of water for cooling of hot gases, cooling towers, cooling ponds. Design of chimney. Constructional details and design aspects.								6
6	Introduction to refrigeration: , various cycles, coefficient of performance. Applications of refrigeration								6
Practical content									
The Practical/term work shall be based on the topics mentioned above and will be defended by the candidates.									
Text Books									
1	Fundamental of Engineering Thermodynamics – John and Howel								
2	THERMODYNAMICS An Engineering Approach – Y.A. Cengel and M.A. Boles								

Reference Books	
1	Applied Thermodynamics – Aestop
2	Smith, J.M., Van Ness, H.C., Abbott, M.M., “Introduction to Chemical Engineering Thermodynamics”, 7 th Edition, <i>McGraw-Hill</i> 2005
ICT/MOOCs references	
1	https://nptel.ac.in/courses/103106071/
2	https://nptel.ac.in/content/syllabus_pdf/103107156.pdf
Course Outcomes	
	<p>Student will be able to understand thermodynamics processes, First and Second Law of thermodynamics.</p> <p>Know about steam generators and turbines.</p> <p>Student will be able to understand internal combustion engine two and four stroke cycle.</p> <p>Student will be able to understand refrigeration and its applications.</p>