

<b>GANPAT UNIVERSITY</b>									
<b>FACULTY OF ENGINEERING &amp; TECHNOLOGY</b>									
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	<b>2PCE3104</b>		Subject Name		<b>Chemical Process Calculations</b>				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	1	0	0	4	Theory	40	60	100
Hours	3	1	0	0	4	Practical	0	0	0
Pre-requisites:									
<ol style="list-style-type: none"> <li>1. Basic Principles in Process Calculations .</li> <li>2. Introductory knowledge of chemistry</li> </ol>									
Course Objective									
<ul style="list-style-type: none"> <li>• To understand basic concept of gram atom ,gram mole and unit system.</li> <li>• to understand the concept of ideal gas law , partial and vapour pressure</li> <li>• to understand material balance reaction with and without chemical reaction.</li> <li>• to know types of fuels and their combustion.</li> </ul>									
Theory syllabus									
Unit	Content								Hrs
1	<b>Basic Principles :</b> Basic principles, the concept of gram atom and gram mole, conversion of units from one system to another, concept of excess reactant, conversion and yield, Selectivity and degree of completion of reaction.								9
2	<b>Ideal Gas Law :</b> Ideal gases, partial pressure, vapor pressure, application of ideal gas laws, volume changes with changes of composition, dissociating gases, humidity and saturation, solubility and crystallization.								9
3	<b>Material Balance Reaction :</b> Material balance without chemical reaction, recycle, purge and bypass calculations, material balance with chemical reaction.								8
4	<b>Energy Balance :</b> Energy balance without chemical reaction, combined material and energy balances..								6
5	<b>Combined Material and Energy Balance:</b> Energy balance with chemical reaction, combined material and energy balances.								6

<b>6</b>	<b>Fuels And Combustion:</b> Fuels and combustion, types of fuels, heating values of fuels, theoretical and excess air, heat and combustion problems	7
<b>Practical content</b>		
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<b>Text Books</b>		
1	Stoichiometry and Process Calculation by Narayana K.V., Laxmikutty B. , Prentice Hall of India 2006.	
2	Basic Principles and Calculations in Chemical Engineering by Himmalblau D.M. & Riggs, J.B. Prentice Hall of India 6th Edition (2011)	
<b>Reference Books</b>		
1	Stoichiometry by Bhatt B.I. , Vora S.M. Tata-McGraw-Hill 4th Edition 2004	
2	Chemical Process Calculation by Hougen A., Watson, M. John Wiley & Sons, Third Edition 2000	
<b>ICT/MOOCs references</b>		
1	<a href="https://www.youtube.com/watch?v=-Zrvfgfi0Zs">https://www.youtube.com/watch?v=-Zrvfgfi0Zs</a>	
2	<a href="https://nptel.ac.in/courses/103105110/">https://nptel.ac.in/courses/103105110/</a>	
3	<a href="http://www.nptelvideos.in/2012/12/materials-and-energy-balance.html">http://www.nptelvideos.in/2012/12/materials-and-energy-balance.html</a>	
<b>Course Outcomes</b>		
<p>Student will understand concept of gram atom ,gram mole and unit system.</p> <p>Students will able to understand the concept of ideal gas law , partial and vapour pressure</p> <p>Students will able to understand material balance reaction with and without chemical reaction.</p> <p>Students will able to understand types of fuels and their combustion.</p>		