



# DURGAPUR INSTITUTE OF ADVANCED TECHNOLOGY & MANAGEMENT

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## Strategic Plan for Learning and Teaching Department of Chemical Engineering

<b>Branch Name:</b>	Chemical Engineering (CHE)	<b>Session :</b>	2018-2019
<b>Subject Name:</b>	Industrial Stoichiometry	<b>Year:</b>	2 <sup>nd</sup>
<b>Subject Code:</b>	CHE 302	<b>Semester :</b>	3 <sup>rd</sup>

<b>Course Objective:</b>	To understand and apply the basics of calculations related to material and energy flow in the processes.
<b>Course Outcome:</b>	<ul style="list-style-type: none"> <li>Will be able to understand fundamental chemical engineering and its relation to other disciplines</li> <li>Familiarization with computer applications in process industries along with the ability to list chemical processes, units, the corresponding equipments and to perform simultaneous material and energy balances on unit operations and processes.</li> <li>It will also develop the quest to understand the degrees of freedom analysis and its significance and the concept of humidity and usage of psychrometric chart.</li> </ul>

### Teaching-Learning Plan:

Lecture Class No.	Reference to the WBUT Syllabus	Subject Topics to be discussed/ covered/ delivered	Text book / Referred book Sl.No.
1	Mod I	Introduction: Industrial Stoichiometry	2,4
2		Units and Dimensions	
3		Conversion of units, related problems	
4		Conversion of Equations, Systems of Units, related problems	
5		Dimensional Homogeneity and Dimensionless Quantities	
6		Buckingham Pi-theorem for Dimensional Analysis,	
7		Reyleighs Method for Dimensional Analysis,	
8		Introduction to Chemical Engineering Calculations	
9		Basis, Mole Fraction and Mole Percent, Mass Fraction and Mass Percent	
10		Concentration of different forms, Conversion from one form to another,	
11	Mod II	Related problems	1,4
12		Dalton's law, Amagot's law, related problems	
13		Henry's law, related problems	
14		Clausius Clapeyron Equation., Antoine's Equation.	
15		Triangular Diagram, related problems	
16		Vapour Pressure, Roults Law, related problems	
17		Related problems	
18		Method of Regression, Least Square Method, Curve Fitting	
19		Graphical Differentiation and Graphical Integration,	
20		Related problems	
21	Mod III	Concept of Material Balance	1,3,4
22		Material Balance without Chemical Reaction	
23		Material Balance during Mixing and Related problems	

24		Material Balance during Humidification and Related problems			
25		Application of Psychrometric Chart			
26		Material Balance during Solubility and Related problems			
27		Material Balance during Crystallization and Related problems			
28		Material Balance during Evaporator and Related problems			
29		Material Balance during Distillation			
30		Related problems			
31		Mod IV		Material Balance during Absorption	1,4
32		Related problems			
33		Material Balance in Drier and Related problems			
34	Material Balance in Liquid – Liquid and Solid – Liquid Extraction Units				
35	Related problems				
36	Concept of Energy Balance, Material Balance with Chemical Reaction				
37	Reactions with Recycle and Related problems				
38	Reactions with Purge and Bypass and Related problems				
39	Combustion Reaction				
40	Calculation of Excess Air				

**Recommended Text/ Reference Books:**

Sl.No.	Name of Text/ Reference Book	Name of Author	Publisher & edition
1	Chemical Process Principles (Part I), 2 <sup>nd</sup> . Ed.	O. A. Hougen, K. M. Watson, and R. A. Ragatz	John Wiley (Asian Edn.).
2	Principles and Calculations in Chemical Engineering, 6 <sup>th</sup> . Ed.	D.M. Himmelblau	Prentice Hall
3	Stoichiometry, 4 <sup>th</sup> . Ed.	B.I.Bhat and S.M.Vora	McGraw Hill
4	Introduction to Chemical Engineering	S.K. Ghosal, S.K. Sanyal, S. Datta	Tata McGraw Hill
5.	Chemical Process Calculations	D. C. Sikdar	PHI Learning Pvt. Ltd

**Course Co-ordinator / Faculty**

Sl. No.	Name of the Course Co-ordinator / Faculty	Signature of Course coordinator / Faculty		Signature of HOD	
1	Dr. Projjwal Sarkar				
2	Dr. Sujoy Bose				