

NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

This course outline template acts as a guide for writing your course outline. As every course is different, please feel free to amend the template/ format to suit your requirements.

COURSE OUTLINE TEMPLATE				
Course Title	PROCESS CALCULATIONS			
Course Code	CLPC15	No. of Credits	L	T
Department	Chemical Engineering	Faculty	P	C
Pre-requisites Course Code	NIL		3	1
Course Coordinator(s) (if, applicable)	Dr. N.ANANTHARAMAN			
Other Course Teacher(s)/Tutor(s) E-mail	-	Telephone No.	0431-2503103	
Course Type	Core course			
COURSE OVERVIEW				
<ol style="list-style-type: none"> To give students fundamental knowledge in Units and conversions and also the basic laws governing chemical operations. To impart knowledgeable on material and energy balance with and without reactions 				
COURSE OBJECTIVES				
<ol style="list-style-type: none"> To nurture students to observe and understand the need of material balance and energy balance in chemical process industries. To impart strong fundamental and technical knowledge among student to pursue various mathematical techniques to solve material balance and energy balance problems. To provide students experience in data analysis to formulate, solve and interpret the solutions to various unit operation problems by writing material balance. To enable students to analyze and solve material balance and energy balance problems by applying basic principles of Chemical Engineering and Mathematics 				
COURSE OUTCOMES (CO)				
Course Outcomes	Aligned Programme Outcomes (PO)			
1. COURSE OUTCOME 1. Students will have the capability to convert units and dimensions and also modify equations from system to another. 2. Students will have the capability apply the laws of physics and chemistry in solving process industry related applications.	PO1, PO2, PO3, PO5, PO8, PO9, PO11, and PO12			

3. Students will have the proficiency to integrate the data and formulate the mass and energy balance problems.
4. Students will have the capability to use mathematical knowledge for solving mass and energy balance problems with and without chemical reactions.

PO1, PO2, PO4, PO5, PO8, PO9, PO11 and PO12

PO1, PO2, PO3, PO5, PO8, PO9, PO11 and PO12

PO1, PO2, PO3, PO5, PO8, PO9, PO11 and PO12

COURSE TEACHING AND LEARNING ACTIVITIES (* : It is likely that some of the classes will be lost due to holidays and hence the semester will go upto 14 weeks)

S.No.	Week	Topic	Mode of Delivery
1	Week 1	Introduction and Objectives	Chalk and talk
2	Week 1	Introduction to units and Dimensions	Chalk and talk
3	Week 1	Problems on conversion of units	Chalk and talk
4	Week 1	Conversion of equations	Chalk and talk
5	Week 2	Problems on conversion of equations	Chalk and talk
6	Week 2	Expressing concentration and density	Chalk and talk
7	Week 2	Expressing concentration and density (continued)	Chalk and talk
8	Week 2	Problem solving	Chalk and talk
9	Week 3	Concept of average molecular weight	Chalk and talk
10	Week 3	Problems	Chalk and talk
11	Week 3	Ideal gases	Chalk and talk
12	Week 3	Concepts of partial pressure and partial volume	Chalk and talk
13	Week 4	Problems on non-reacting systems	Chalk and talk
14	Week 4	Problems on reacting systems	Chalk and talk
15	Week 4	Concept of vapour pressure	Chalk and talk
16	Week 4	VLE data estimation	Chalk and talk
17	Week 5	Application to mass balance	Chalk and talk
18	Week 5	Steam distillation	Chalk and talk
19	Week 5	Concepts of crystallization	Chalk and talk
20	Week 5	Problems on estimation of yield	Chalk and talk
21	Week 6	Problems on estimation of yield with hydrated salt	Chalk and talk
22	Week 6	Definitions on psychrometry terms	Chalk and talk
23	Week 6	Test 1	
24	Week 6	Psychrometric chart and its uses	Chalk and talk
25	Week 7	Problem solving using psychrometric chart	Chalk and talk
26	Week 7	Problem solving using psychrometric chart	Chalk and talk
27	Week 7	Problem solving using psychrometric chart	Chalk and talk
28	Week 7	Material balance for non reacting systems	Chalk and talk

29	Week 8	Material balance for non-reacting systems	Chalk and talk
30	Week 8	Material balance for reacting systems	Chalk and talk
31	Week 8	Material balance for reacting systems	Chalk and talk
32	Week 8	Material balance for reacting systems	Chalk and talk
33	Week 9	Material balance for reacting systems	Chalk and talk
34	Week 9	Combustion problems	Chalk and talk
35	Week 9	Combustion problems	Chalk and talk
36	Week 9	Combustion problems	Chalk and talk
37	Week 10	Recycle, purge and bypass	Chalk and talk
38	Week 10	Recycle, purge and bypass	Chalk and talk
39	Week 10	Test 2	
40	Week 10	Thermo-chemistry concepts	Chalk and talk
41	Week 11	Problems on the above topic	Chalk and talk
42	Week 11	Energy balance	Chalk and talk
43	Week 11	Adiabatic flame temperature estimation	Chalk and talk
44	Week 11	Adiabatic flame temperature estimation	Chalk and talk
45	Week 12	Material balance in Unsteady state operations	Chalk and talk
46	Week 12	Material balance in Unsteady state operations	Chalk and talk
47	Week 12	Energy balance in Unsteady state operations	Chalk and talk
48	Week 12	Overview of the course	Talk

COURSE ASSESSMENT METHODS

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Assignment-1	4th week	-	5%
2	I cycle test	6 th week since commencement	1 hour	20%
3	Assignment-2	9 th week	-	5%
4	II cycle test	12 th week since commencement	1 hour	20%
5	CPA*(only for those who are absent in 1 st or 2 nd test on valid grounds)	14/15 th week	1 hour	20%
6	End semester examination	16 th week since commencement	3 hour	50%

ESSENTIAL READINGS : Textbooks, reference books Website addresses, journals,etc

TEXT BOOKS:

1. Himmelblau, "Basic Principles and Calculations in Chemical Engineering", 8th Edn., Prentice Hall of India Ltd, India 2012
2. V.Venkataramani, N.Anantharaman and K.M. Meera Sheriffa Begum, 2nd Edn., 'Process Calculations' Prentice Hall of India Ltd, New Delhi. 2013

REFERENCE BOOKS:

3. O. A .Hougen, K. M. Watson and R. A. Ragatz, "Chemical Process Principles", Vol- I, CBS Publishers and Distributors, New Delhi, 1995.
4. B. I. Bhatt, "Stoichiometry", 5th Edn., Tata McGraw Hill Publishers Ltd., New Delhi, 2010.

COURSE EXIT SURVEY (mention the ways in which the feedback about the course is assessed and indicate the attainment also)

- 1) Feedback is planned to be collected twice; once in the mid semester and one at the end of course as soon as classes are over.
- 2) The academic performance of the students will be assessed based on 2 cycle tests (each 20 marks), one final examination (50 marks) and assignments (10 marks).
- 3) Suitable mapping of COs with POs will be made and attainment will be calculated.

COURSE POLICY (including plagiarism, academic honesty, attendance, etc.)

- 1) It is expected that the students will not indulge in any form of malpractice. In the event of any malpractice reported, all those who are involved will forfeit all the marks in that test/examination/assignment. Reappearance /additional assignment will not be given.

ATTENDANCE POLICY (A uniform attendance policy as specified below shall be followed)

- At least 75% attendance in each course is mandatory.
- A maximum of 10% shall be allowed under On Duty (OD) category.
- Students with less than 65% of attendance shall be prevented from writing the final assessment and shall be awarded 'V' grade.

ACADEMIC DISHONESTY & PLAGIARISM

- Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.
- Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.
- The departmental disciplinary committee including the course faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.
- The above policy against academic dishonesty shall be applicable for all the programmes.

ADDITIONAL COURSE INFORMATION

eg.: The Course Coordinator is available for consultation at times that are displayed on the coordinator's office notice board. Queries may also be emailed to the Course Coordinator directly at naraman@nitt.edu

FOR SENATE'S CONSIDERATION

Course Faculty

N. An An 31/7/2019

CC-Chairperson

dandy 31/7/19

HOD

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(N. SAMSUDEEN)

31/7/2019