

GUJARAT TECHNOLOGICAL UNIVERSITY

CHEMICAL ENGINEERING (COMPUTER AIDED PROCESS DESIGN) (16) PROCESS INTENSIFICATION & INTEGRATION (PII)

SUBJECT CODE: 2741602

M.E. 4TH SEMESTER

Type of course: Major elective-IV (M.E.CAPD)

Prerequisite: Knowledge of different processes used in chemical engineering field

Rationale: Learn about the Process Intensification

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P	C	Theory Marks		Practical Marks				
				ESE (E)	PA (M)	ESE (V)		PA (I)		
						ESE	OEP	PA	RP	
3	2#	0	4	70	30	30	0	10	10	150

Content:

Sr. No.	Content	Total Hrs	% Weightage
1	Definition of Process Intensification.	9	10
2	Expanse of Process Intensification.	9	15
3	Objective of the Process Intensification: Reduce size, energy consumption & waste with improved quality and more quantity.	9	15
4	Focus on Critical Operations like Mixing, Heat & Mass Transfer, and Separation etc.	9	15
5	Case Studies for equipment improvement trends in distillation, heat transfer equipments, fluid transport, fermentation, size reduction etc.	9	15
6	Transforming semi batch processes into continuous processes.	9	15

Reference Books:

1. Chemical engineering & processing: process intensification Journal
2. Perry's chemical engineers handbook, 7th edition, McGraw-Hill, U.S.A. 2000.
3. Innovations for process intensification in the process industry by S.V. Shivakumar, N.Kaistha, D.P.Rao. I.I.T. Kanpur.
4. Process Intensification Using Engineered Fluid Transporting Practical's by Mike Kearney

Course Outcome:

After completing this course the student must demonstrate the knowledge and ability to:

1. Learn about the process Intensification.
2. Understand the energy consumption & waste with improved quality and more quantity.
3. Learn how to focus on Critical Operations like Mixing, Heat & Mass Transfer, and Separation etc.
4. Learn about the equipment improvement trends in distillation.

5. Understand the Process Intensification for heat transfer equipments.
6. Study about Transforming semi batch processes into continuous processes.

List of Tutorials:

Tutorials/Presentation/Practicals based on above topics

List of Open Source Software/learning website:

- <http://depts.washington.edu/>
- <http://cordis.europa.eu/>
- <http://www.rvo.nl/sites/>

Review Presentation (RP): The concerned faculty member shall provide the list of peer reviewed Journals and Tier-I and Tier-II Conferences relating to the subject (or relating to the area of thesis for seminar) to the students in the beginning of the semester. The same list will be uploaded on GTU website during the first two weeks of the start of the semester. Every student or a group of students shall critically study 2 papers, integrate the details and make presentation in the last two weeks of the semester. The GTU marks entry portal will allow entry of marks only after uploading of the best 3 presentations. A unique id number will be generated only after uploading the presentations. Thereafter the entry of marks will be allowed. The best 3 presentations of each college will be uploaded on GTU website.