GUJARAT TECHNOLOGICAL UNIVERSITY
CHEMICAL TECHNOLOGY (36)

Chemical Process Technology

SUBJECT CODE: 2183608
B.E. VIIIth SEMESTER

Type of Course: Chemical Technology

Prerequisite: The students have already undertaken course work with different Unit Operations, Process and Reaction engineering based aspects of various process applications. Basic knowledge of Chemistry is also required

Rationale: The main objective of this subject is to make students aware about the manufacturing procedures of different chemical compounds and their engineering aspects as it is necessary for them to access the potential hazardous which can occur during the processes.

Teaching Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
				Theory Marks			Practical Marks			
L	T	P	C	ESE (E)	PA (M)		ESE (V)		PA (I)	
					PA	ALA	ESE	OEP		
3	0	0	3	70	20	10	0	0	0	100

Content:

Sr. No.	Topic	Teaching Hours	Module Weightage (%)
01.	**Crude distillation:** Petroleum crude characteristics, Natural Gas, Crude distillation, Manufacturing Processes of ethylene, propylene, butanes, benzene, toluene & xylene. Butadiene, & the rest C4 components. Manufacture of synthesis gas from Natural gas, Naphtha and coal.	10	25
02	**Petrochemicals:** Process engineering aspects of manufacture of Methanol & methanol based chemicals such as acetic acid, dimethyl ether, dimethyl carbonate, etc. Ethylene oxide, glycols, vinyl chloride, vinyl acetate, Propylene oxide, hydroformylation of propene to manufacture butyraldehyde. Manufacture of aromatics, terephthalic acid, phthalic anhydride, phenol, nitrobenzene, aniline.	12	25
03	**Inorganic and fertilizer industry.** Manufacturing Processes of Sulphuric acid, Ammonia & Nitric acid, Urea, Chlor alkali (Caustic Soda & Soda ash) Phosphoric acid.	7	15
04	**Sugar, Paints, Pigments:** Manufacturing of Sugar, Paints, different types of pigments such as white, blue, red,	20	15

	yellow, green, brown, etc. Varnishes, Industrial Coatings, printing inks, Polishes etc.		
05	**Fermentation industries :** Industrial alcohol, absolute alcohol, beers, wines and liquors, Manufacturing of Butyl alcohol & Citric acid by Fermentation	6	10
06	**Introduction to industrial gases:** Gases like carbon dioxide, oxygen, nitrogen, hydrogen, rare gases of atmosphere, helium, acetylene, sulfur dioxide, carbon monoxide, nitrogen oxide.	8	10

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
28	**24**	**18**	**16**	**14**	**-**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

1. Chemical process Industries Shreve, Brink & Austin, Mc Graw Hill ,4th Ed., 1984
2. Dryden's outlines of chemical technology for the 21st century, third edition by M Gopala Rao &Marsal Sitting, East-West Press Publications.
3. Chemical Process Technology, J Moulijn, M Makkee and A Diepen, John Wiley & Sons, 2001
4. Encyclopedia of Industrial Chemistry ,Ullmann, VCH, 1996
5. Industrial Organic Chemistry ,Weissermel K &Arpe H.J., Weinheim, 1978
6. Unit process in Organic Synthesis, P.H Groggins, Tata Mc Graw Hill Publishing Company.
7. Pandey G.N., "A Text Book of Chemical Technology", Volume 1 and 2, Vikas Publications
8. From Hydrocarbons to Petrochemicals, Hatch L.F. & Matar S., Gulf Pub. Co., 1981

Course Outcomes:

After learning the course the students should be able:

1. To build a basic knowledge of the process carried out in chemical industry.
2. To review the practical importance and relevance of process takes place in chemical industry.
3. To be able to utilize the technological methods in problem solving in process plant.
4. To study about the salient features of the process.
5. To build a bridge between theoretical and practical concept used in industry.

Open Ended Project fields:-

Students are free to select any topic based on Chemical process industry

List of Open Source Software/learning website:

1. Literature available on Journals, internet
2. NPTEL
3. Delnet

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide.