

Petrochemical Processes

- 1.1 Course Number: CH591
1.2 Contact Hours: 3-0-0 Credits: 9
1.3 Semester-offered: 4th Year-odd
1.4 Prerequisite: Organic chemistry, Petroleum Refining
2. **Objective:** The objective of this course is to introduce the scientific and technological principles of organic synthesis and related unit processes of various petrochemical and to familiarize the student with the role of Petrochemical engineer in unit processes used for petrochemical synthesis processes.
3. **Course Content:**

Unit wise distribution of content and number of lectures

Unit	Topics	Sub-topic	Lectures
1	Introduction	Outline of petrochemical Industry and its structure	2
2	Sources of Olefinic and aromatic Hydrocarbons	Steam Cracking, Catalytic reforming, Catalytic cracking, Thermal cracking of paraffin waxes, Oligomerization of light olefins, Paraffin dehydrogenation, dehydration of alcohols.	5
3	Treatment of C ₄ and C ₅ Olefinic cuts	Butadiene extraction from steam cracked C ₄ cuts, Separation of Olefins from C ₄ cuts produced from Stream cracking and catalytic cracking, Upgrading of olefins of C ₅ cuts, Acetylene manufacturing, Ethylene and propylene derivatives: Ethylene Oxide, Ethylene glycol, Vinyl chloride, Propylene and Propylene oxide	10
4	The treatment of aromatic gasolines	Physical methods for separating aromatics, Treatment of the aromatic C ₈ cut, Aromatic conversion processes (Hydrodealkylation, Xylene isomerization, Toluene dismutation), Aromatics products -Benzene, Toluene, Xylene, Ethyl benzene, Cumene, phenol, Bisphenol and Aniline	11
5	Monomers synthesis	Butadiene, Isoprene, Styrene, p-methyl styrene, Chloroprene, Vinyl chloride, Acrylic acid, Adipic acid, Terephthalic acid, Toluene diisocyanate	12
Total			40

4. Readings

4.1 Text Books:

1. A.Chauval, G.Lefebvre,(Ed) Petrochemical Process Volume 1 and 2, Editions Technip (1989)

4.2 Reference Books:

1. Groggins PH, 'Unit Processes in Organic Synthesis', Tata McGraw Hill, 5thEdition, 1995.
2. Chauvel A and Lefebvre G., 'Petrochemical Processes-I' Gulf Publication; 1stEdition, 1989
3. Mall I.D., 'Petrochemical Process Technology', Macmillan India Ltd, 2007
4. Rao M Gopala, Marshall Sittig, 'Dryden's Outlines of Chemical Technology', East West Press; Third edition, 1997.
5. Wiseman P., 'Petrochemicals,' Ellis Horwood Ltd., 1986

5. **Outcome of the Course:** The student will be able to outline the structure of Petrochemical industry and learn production of major petrochemicals starting from feedstocks. They will also be able to understand and explain engineering challenges involved in manufacture of bulk petrochemicals and, explain the processes and process parameters employed in manufacture of monomers for synthesizing polymers which are in domestic and industrial use