

Petrochemical Engineering

CHE-445	Subject: Petro Chemical Engineering	2CH	
		Theory (2)	
Pre- req.	Nil	Category	Elective
Course Contents as per PEC Guidelines 2023-2024			

Introduction of Natural Gas: Composition and properties, natural gas liquids, gas condensate, gas hydrates, other types of gases

Petroleum derivatives: Composition and properties, Opportunity Crude Oil, High Acid Crude Oil, Foamy Oil, Tight Oil, Other Petroleum- derived Feedstocks, Heavy Oil, Extra Heavy Oil, and Tar Sand Bitumen, Naphtha

Other Feedstocks: Coal, Oil Shale, and Biomass, Waste

Gas Streams Feedstock Preparation: Gas Streams from Natural Gas, Natural Gas Liquids and Liquefied Petroleum Gas, Gas Streams from Crude Oil, Acid Gas Removal, Recovery of Condensable Hydrocarbon Derivatives, Water Removal, Nitrogen Removal, The Claus Process

Petroleum Streams Feedstock Preparation: Refinery Configuration, Cracking Processes, Thermal Cracking Processes, Catalytic Cracking Processes, Dehydrogenation Processes, Dehydrocyclization Processes, Streams from Coal Gas and Coal Liquids, Oil Shale Gas and Shale Oil and Biogas and Bio-liquids.

Feedstock Preparation by Gasification: Gasification Chemistry, Gasification Processes, Gas, Liquid, Solid Production

Hydrocarbon Sources and Raw materials; their characterization, availability and pricing. Processes for the production of ethylene, acetylene, and other monomers, Petroleum in Monomers, Polymers, Plastics, Pharmaceuticals

Chemicals from: Paraffin Hydrocarbons, Olefin Hydrocarbons, Aromatic Hydrocarbons, Non-hydrocarbons, Fischer-Tropsch Process

Processes: Processes for the production of ethylene, acetylene, and other monomers, Polymerization of monomers into useful plastics, Synthesis gas production, separation and purification, ammonia synthesis. TX production. Separation and purification.

Weekly plan

Week /Lecture	Topic
1	Introduction of Natural Gas: Composition and properties, natural gas liquids, gas condensate, gas hydrates, other types of gases
2-3	Petroleum derivatives: Composition and properties, Opportunity Crude Oil, High Acid Crude Oil, Foamy Oil, Tight Oil, Other Petroleum-derived Feedstocks, Heavy Oil, Extra Heavy Oil, and Tar Sand Bitumen, Naphtha
4	Other Feedstocks: Coal, Oil Shale, and Biomass, Waste
5-7	Gas Streams Feedstock Preparation: Gas Streams from Natural Gas, Natural Gas Liquids and Liquefied Petroleum Gas, Gas Streams from Crude Oil, Acid Gas Removal, Recovery of Condensable Hydrocarbon Derivatives, Water Removal, Nitrogen Removal, The Claus Process
7-8	Petroleum Streams Feedstock Preparation: Refinery Configuration, Cracking Processes, Thermal Cracking Processes, Catalytic Cracking Processes, Dehydrogenation Processes, Dehydrocyclization Processes, Streams from Coal Gas and Coal Liquids, Oil Shale Gas and Shale Oil and Biogas and Bio-liquids.
9	MID TERM EXAM
10-11	Feedstock Preparation by Gasification: Gasification Chemistry, Gasification Processes, Gas, Liquid, Solid Production
12-13	Hydrocarbon Sources and Raw materials; their characterization, availability and pricing. Processes for the production of ethylene, acetylene, and other monomers, Petroleum in Monomers, Polymers, Plastics, Pharmaceuticals
14	Chemicals from: Paraffin Hydrocarbons, Olefin Hydrocarbons, Aromatic Hydrocarbons, Non-hydrocarbons, Fischer-Tropsch Process
15-16	Processes: Processes for the production of ethylene, acetylene, and other monomers, Polymerization of monomers into useful plastics, Synthesis gas production, separation and purification, ammonia synthesis. TX production. Separation and purification.
17	Revision
18	End Semester Exam
TEXT AND REFERENCE BOOKS: - James G. Speight, Handbook of Petrochemical Processes, CRC Press, 2019 - Austin George T. Shreve's Chemical Processes Industries McGraw-Hill, 6th Ed. 1997. - Meyers, Handbook of Petrochemical Production Processes, 2005, McGraw-Hill. C. Waddams, Chemicals from Petroleum, John Murray, 1963 S. Strelzoff, Technology and Manufacture of Ammonia, 1982, InterScience Publishers. - Kirk Othmer, Encyclopedia of Chemical Technology, 1999, Intouse Publishers.	

