

Petroleum Refinery Engineering

CHE-	Subject:	2CH	
443	Petroleum Refinery Engineering	Theory (2)	
Pre- req.	Nil	Category	Elective
Course Contents as per PEC Guidelines 2023-2024			
Introduction; Crude Petroleum Oil, Indigenous and World resources. Composition of Crude Oil, Physical Properties of Crude Oil, Origin of Hydrocarbons, Exploration Techniques, Resource Estimation, Oil Field Development, Well Logging, Oil Production Processes. Feed stock Properties and Processing: Petroleum Products and Test Methods, Crude Oil Analysis, Lubricating Oils and Grease, Characterization of feed stocks and products, Processing Operations in a Petroleum Refinery, Crude Oil Receiving, Crude processing, Desalting of Crude Oil, Distillation and Stripping, Atmospheric Distillation, Stabilization, Amine Absorption. Design Approach: Material and Energy Balances, Measurement of Quantity of Crude Oil and Products, Overall Material Balance, Energy Balance in a Plant, in Heat Exchanger, in a Furnace and Distillation Column, Design calculations for Distillation and Stripping, Processes of Distillation and Stripping, Batch Distillation, Boiling Point and Equilibrium Diagrams, Reactor Calculations, Reactors in Refineries, Design Steps for Crude Pipes , Economic Pipe Diameter, Product Transfer Lines, Gas Transfer Lines, Pumps and Compressors problem Modern Techniques: Modern petroleum processing. Refining operation. Atmospheric distillation, Vacuum distillation, Alkylation, Reforming, Isomerization, Hydro processing, Visbreaking and Coking. Gas Processing and Polymerization, Refinery supporting processes, Solvent Extraction. Auxiliary Operation; Supporting processes of Refinery, Auxiliaries operation of refinery. Use of linear programming techniques to solve refinery blending and production problems. Plant management and economics Environment and Safety: Waste in Refinery, Gas waste management, liquid waste management and solid waste management, Safety analysis of refinery, HAZAN analysis, DOW index, MOND index			

Week /Lecture	Topic
1-2	Introduction; Crude Petroleum Oil, Indigenous and World resources. Composition of Crude Oil, Physical Properties of Crude Oil, Origin of Hydrocarbons, Exploration Techniques, Resource Estimation, Oil Field Development, Well Logging, Oil Production Processes.
3-5	Feed stock Properties and Processing: Petroleum Products and Test Methods, Crude Oil Analysis, Lubricating Oils and Grease, Characterization of feed stocks and product, Processing Operations in a Petroleum Refinery, Crude Oil Receiving, Crude processing, Desalting of Crude Oil, Distillation and Stripping, Atmospheric Distillation, Stabilization, Amine Absorption.
6-8	Design Approach: Material and Energy Balances, Measurement of Quantity of Crude Oil and Products, Overall Material Balance, Energy Balance in a Plant, in Heat Exchanger, in a Furnace and Distillation Column, Design calculations for Distillation and Stripping, Processes of Distillation and Stripping, Batch Distillation, Boiling Point and Equilibrium Diagrams, Reactor Calculations, Reactors in Refineries, Design Steps for Crude Pipes ,Economic Pipe Diameter, Product Transfer Lines, Gas Transfer Lines, Pumps and Compressors problem
9	MID TERM
10-12	Modern Techniques: Modern petroleum processing. Refining operation. Atmospheric distillation, Vacuum distillation, Alkylation, Reforming, Isomerization, Hydro processing, Vis breaking and Coking. Gas Processing and Polymerization, Refinery supporting processes, Solvent Extraction.
13-14	Auxiliary Operation; Supporting processes of Refinery, Auxiliaries operation of refinery. Use of linear programming techniques to solve refinery blending and production problems. Plant management and economics
15-16	Environment and Safety: Waste in Refinery, Gas waste management, liquid waste management and solid waste management, Safety analysis of refinery, HAZAN analysis, DOW index, MOND index
17	Revision
18	End Semester Exam
TEXT AND REFERENCE BOOKS: - W.L. Nelson, Petroleum Refinery Engineering,1991, McGraw-Hill. - MohamedA, Fahim, Taher A. Al Sahhaf, Amal Elkilani, Fundamentals of Petroleum Refining, Elsevier, 2010. - G.D. Hobson, Modern Petroleum technology, Applied Sc. Publisher,1991 - J.H. Garyand G.E Handwerk, Petroleum Refinery Technology Economics, 2001, Dekker - Uttam Ray Chaudhuri "Fundamentals of Petroleum and Petrochemical Engineering"	

