

Subject Code: 1ET4060604	Subject Title: Petroleum Refinery Engineering
Pre-Requisite	--

COURSE OBJECTIVE

- To provide the concept of petroleum refining and explain the different methods of petrochemical reactions and their applications
- To provide the importance of various refining processes and their applications
- To explain the significance petrochemicals productions

TEACHING AND EVALUATION SCHEME:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)			
Lecture	Tutorial	Practical	Credit	Theory		Practical	
				University Assessment	Continuous Assessment	University Assessment	Continuous assessment
3	-	2	4	60	40	20	30

COURSE DETAILS

Unit	Topics and Sub-topics	Lecture Hours	Weightage %
1	Furnace and Types of Furnaces for refining process.	06	10
2	Types of crudes, crude composition Characteristics and classification–Crude oil properties. IS 1448: Standard –Testing of Petroleum crude–Products: Specifications and their Significance	10	25
3	Pre-treatment of crude for Refining–Dehydration and desalting– Atmospheric distillation, Vacuum distillation of residue products– Treatment techniques for vacuum distillates with different processes like solvent extraction –DE asphalting, dewaxing, hydro fining, catalytic dewaxing and clay contact process– Production of lubricating oils. Hydro cracking, principles, process requirements, product yields and qualities and residue-cracking –Hydrotreating – Sulphur removal, hydro finishing	10	25
4	Thermal cracking – Processes, operating parameters, feed stock selection and product yields, Advantages –Types and functions of secondary processing – Visbreaking – Processes, operating parameters and advantages–Coking –Operating parameters and advantages. Fluid catalytic cracking –processes, operating parameters, feed stock selection and product yields –Advantages	08	20
5	Principle, Processes, Operating Parameter and advantages of Reforming – Isomerisation – Alkylation – Polymerization. Asphalt manufacture, Air blowing technology, Bitumen Types and their properties, Acid gas removal and sulphur removal techniques.	08	20

Practical's /Experiments

1. Study of Various Furnaces used for refinery
2. Study of Standards for Testing of Petroleum crude–Products
3. Study of Pre-treatment process for crude oil before refinery.
4. Study of thermal cracking process of crude oil.
5. Study of various process for removal of unwanted items from crude oils

COURSE OUTCOMES

On completion of the course, student will be able to

CO1 - Introductory information about origin, exploration and production of petroleum crude and understand their properties with the help of standard testing protocols.

CO2- Recognize various primary crude processing techniques like distillation, de-asphalting, hydrocracking, hydrotreating, and their supporting processes.

CO3- Recognize various secondary thermal cracking, catalytic cracking and reforming and coking and their supporting processes.

CO4- Understanding the process technologies for reforming, isomerization, alkylation and polymerization unit process.

CO5- To understand and evaluate various residue processing schemes.

CO6- To apply the finishing processes to petroleum products for meeting the market specifications in view of fuel quality and environmental regulations.

TEXT/REFERENCE BOOKS

1. Dr. B.K. Bhaskara Rao, Modern Petroleum Refining Processes (5th Edition)
2. Dr. B.K. Bhaskara Rao, A Text Book on Petrochemicals.
3. Marshall Sitting, Dryden's Outlines of Chemical Technology