

Teaching Scheme					Petroleum Refinery Engineering (22PCM212T)					
					Examination Scheme					
L	T	P	C	Hours/Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
2	0	0	2	2	25	50	25	--	--	100

**COURSE OBJECTIVES**

- Understand various petroleum feed stocks and refining processes.
- Explain the different methods for the petrochemical processes and their applications.
- Understand primary and secondary processing techniques.

**UNIT I: Petroleum crude and products characterization****6 Hr.**

Types of crude, composition and its characteristics; Crude oil properties. Standards and testing of petroleum crude and its products; Specifications and their significance.

**UNIT II: Processing of petroleum and treatment techniques****8 Hr.**

Pre-treatment of crude: Dehydration and desalting; Distillation: Atmospheric and vacuum; Treatment techniques: Solvent extraction, deasphalting, dewaxing, hydrofining, catalytic dewaxing and clay contact process; Production of lubricating oils; Hydro-treating.

**UNIT III: Thermal and catalytic cracking****7 Hr.**

Thermal cracking, visbreaking, coking: Processes, operating parameters, feed stock selection and product yields; Fluid catalytic cracking and hydro-cracking: Processes, operating parameters, feed stock selection and product yields.

**UNIT IV: Up-gradation of refining products****7 Hr.**

Principle, processes, operating parameter and advantages: Reforming, isomerisation, alkylation and polymerization. Asphalt manufacturing and air blowing technology; Bitumen types and their properties; Acid gas removal, desulphurization and other impurities removal techniques.

**Max. 28 Hr.****COURSE OUTCOMES**

On completion of the course, student will be able to

**CO1:** Recognize diversity of petroleum crude and know their properties.

**CO2:** Understand various primary crude processing techniques.

**CO3:** Classify and compare various secondary and their supporting processes.

**CO4:** Familiar with various refinery processes.

**CO5:** Analyse the process up-gradation technologies.

**CO6:** Evaluate various residue processing methods.

**TEXT/REFERENCE BOOKS**

1. Gary, J.H., Handwerk, G.E. and Kaiser, M.J., "Petroleum Refining: Technology and Economics", 5<sup>th</sup> Edition, CRC Press (2007).
2. Fahim, M., Al-Sahhaf, T. and Elkilani, A., "Fundamentals of Petroleum Refining", 1<sup>st</sup> Edition, Elsevier B.V. (2010).
3. Coker, K.A., "Petroleum Refining Design and Applications Handbook", Volume 1, 1<sup>st</sup> Edition, Wiley-Scrivener Publishers (2018).
4. Meyers, R.A., "Handbook of Petroleum Refining Processes", 4<sup>th</sup> Edition, McGrawhill Education (2016).

**END SEMESTER EXAMINATION QUESTION PAPER PATTERN**

**Max. Marks: 100**

Part A: 10 Questions each carrying 5 marks

Part B: 5 Questions each carrying 10 marks

**Exam Duration: 3 Hr.**

50 Marks

50 Marks