

FYIPGP

Course Code :AOCHM-C-01

Nature of the Course : Add On Course in Chemistry

Title of the course :Introduction to Petroleum Technology

Total Credits : 2

Distribution of Marks : 60% (End Semester) : 40% (Internal Assessment)

COURSE OBJECTIVES:

1. To develop a basic idea of petroleum technology processes.
2. To describe the role of chemistry involved in the overall processes of petroleum technology.
3. To familiarize students with upstream, midstream, and downstream operations of petroleum technology.
4. To emphasize on learning different industry terminology of petroleum process and petroleum products.
5. To impart knowledge on environmental pollution related to petroleum processes and its management strategies.

UNITS	CONTENTS	L	T	P	Total Hours
I	Petroleum upstream process: Introduction to Crude oil and Natural gases. Composition and properties of Crude oil and Natural Gas. Upstream process - survey, exploration, and drilling. Well stimulation/completion and fracking. Drilling fluid/mud types and uses. Cementing and casing in drilling process. Enhanced Oil Recovery. Concept of gathering, transportation and storage of crude oil and natural gases.	11	0	0	11
II	Petroleum downstream process: Crude pre-treatment processes. Refining of crude oil. Fractional distillation and product profiling. Cracking processes – thermal and catalytic cracking. Process parameters and feed stock quality. Reforming, isomerization etc. and other catalytic upgradation of refining products. Olefins and aromatics. Benzene, Toluene, Xylene (BTX) products.	11	0	0	11

III	Environmental pollution related to petroleum processes: Types of pollution arising from petroleum process. Ground water pollution arising from: – the escape of petroleum, chemicals or fluids, or the cross contamination of aquifers, due to inadequate well design or well failure. • Surface water and Soil contamination from spills or leaks from storage tanks holding potential pollutants, drilling muds bit etc. Air pollution such as methane and other harmful gases emission, venting, flaring, accidents etc. Prevention strategies and pollution control.	8	0	0	8
Total		30	0	0	30

Where, **L: Lectures** **T: Tutorials** **P: Practicals**

MODES OF IN-SEMESTER ASSESSMENT: (IA=40% of Total Marks)

- **Two Internal Examination**
- **Others**
 - o **Home Assignment**
 - o **MCQ**
 - o **Seminar presentation on any of the relevant topics**

COURSE OUTCOMES:

At the end of this course, student will be able to:

- CO1: Understand the basics of petroleum production technology and crude processing techniques.
- CO2: Understand the role of drilling fluid and cementing in upstream process.
- CO3: Analyze the change in the crude oil behaviour from reservoir to storage in refinery system.
- CO4: Analyze different parameters for upgradation of refining products.
- CO5: Apply the knowledge in identifying types and sources of pollution in petroleum industry.
- CO6: Evaluate the role of chemistry in mitigating environmental and safety aspects in petroleum industries.

Cognitive map of course outcomes with Bloom's Taxonomy:

Knowledge Dimension	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual		CO1, CO2				
Conceptual			CO5	CO3, CO4	CO6	
Procedural						
Metacognitive						

SUGGESTED READINGS:

1. Håvard Devold, Oil and gas production handbook An introduction to oil and gas production, transport, refining and petrochemical industry. 2013.
2. James G. Speight “The Chemistry and Technology of Petroleum”, 4th edition, CD&W Inc. Laramie, Wyoming 2007
3. Meyers, R.A., “Handbook of Petroleum Refining Processes”, 4th Edition, McGrawhill Education (2016).