16PL401 HEALTH, SAFETY AND ENVIRONMENTAL ENGINEERING

Hours Per Week :

L	T	P	C
3	1	-	4

Total Hours :

L	T	P
45	15	-

WA/RA	SSH/HSH	CS	SA	S	BS
15	45	-	-	5	5

Course Description and Objectives:

Knowledge of environment issues and all related Acts.Knowledge of drilling fluids and its toxic effects with environment.

Course outcomes:

The student will be able to:

- Treatment of produced water and makeup water and its disposal as per state pollution control board norms.
- Knowledge of oil mines regulations and proper implementation in drilling & production mines as per Act.

SKILLS:

- ✓ *Knowledge of Hazop in drilling rigs & production installations*
- ✓ *Knowledge of disaster management to fight any fire accident at drilling rig/ production installation/production platform.*

ACTIVITIES:

- *Case study on safety regulations of drilling operations.*
- *Case study on safety regulations of storage tanks.*

UNIT - 1 **L-9, T-3**

Introduction to environmental control in the petroleum industry: Overview of environmentalissues- A new attitude.

Drilling and production operations: Drilling- Production- Air emissions.

The impact of drilling and production operations: Measuring toxicity- Hydrocarbons- Salt-Heavy metals- Production chemicals- Drilling fluids- Produced water- Nuclear radiation- Air pollution- Acoustic impacts- Effects of offshore platforms- Risk assessment.

Environmental transport of petroleum wastes: Surface paths- Subsurface paths- Atmosphericpaths, Planning for environmental protection.

Waste treatment methods: Treatment of water- Treatment of solids- Treatment of air emissions- Waste water disposal: surface disposal.

UNIT - 2 **L-9, T-3**

Oil mines regulations: Introduction-Returns, Notices and plans- Inspector, management andduties- Drilling and work over- Production- Transport by pipelines- Protection against gases and fires- Machinery, plants and equipment- General safety provisions- Miscellaneous-Remediation of contaminated sites- Site assessment-Remediation process.

UNIT - 3 **L-9, T-3**

Toxicity, physiological, asphyxiation, respiratory, skin effect of petroleum hydrocarbons and their mixture- Sour gases with their threshold limits- Guidelines for occupational health monitoring in oil and gas industry. Corrosion in petroleum industry- Additives during acidizing, sand control and fracturing

UNIT - 4 **L-9, T-3**

Classification of fires- The fire triangle- Distinction between fires and explosions- Flammability characteristics of liquids and vapors- Well blowout fires and their control- Fire fight equipment- Suppression of hydrocarbons fires.

UNIT - 5 **L-9, T-3**

Hazard identification- Hazard evaluation- Hazop and what if reviews- Developing a safe process and safety management- Personal protection systems and measures.Guidelines on internal safety audits (procedures and checklist) - Inspection & Safe practices during electrical installations- Safety instrumentation for process system in hydrocarbon industry- Safety aspects in functional training-Work permit systems.

TEXT BOOKS:

1. Environmental Control in Petroleum Engineering, John C. Reis, Gulf Publishing Company, 1996.
2. Application of HAZOP and What if Reviews to the Petroleum, Petrochemical and Chemical Process Industries, Dennis P. Nolan, Noyes Publications, 1994.

REFERENCE BOOKS:

1. Guidelines for Process Safety Fundamentals in General Plant Operations Centre for Chemical Process Safety, American Institute of Chemical Engineers, 1995.
2. Guidelines for Fire Protection in Chemical, Petrochemical and Hydrocarbon Processing Facilities, Centre for Chemical Process Safety, American Institute of Chemical Engineers, 2003.