

Pipeline Engineering

- 1.1 Course Number: PE451
- 1.2 Contact Hours: 3 -0- 0 Credits: 9
- 1.3 Semester-offered: 4th Year-Odd
- 1.4 Prerequisite: Introduction to Petroleum Technology
- 1.5 Syllabus Committee Member: Dr. Tushar Sharma

Objective: This course is about the evaluation of the design of the oil and gas pipelines. A test on pipeline is primarily conducted to predict its performance against several operations such as pressure, leakage, joint strength and buckling resulting from seasonal variations. Pressure in pipeline need to remain constant and its maintenance for the same is very complicated to achieve the desired subsurface safety objectives and safe operations.

2. Course Content:

Unit-wise distribution of content and number of lectures

| Unit | Topics | Sub-topic | Lectures |
|------|---|---|----------|
| 1 | Pipeline laying, installation, and design | Objective and scope of pipeline for fluid transportation with special reference to crude oil/gas/refined products. Design of Pipeline: Factors influencing oil, gas and refined products as pipeline design; river crossing; pipe size and station spacing etc. | 8 |
| 2 | Pipeline analysis | Construction of pipelines; materials; project specifications, Stress due to internal and external pressures on pipelines, Static earth load on pipelines. General equipment specifications (Pipes, valves and fittings) & installation of loops etc. Design of Offshore Pipelines – Hydrostatic, hydrodynamic analysis and structural design. Offshore construction. | 10 |
| 3 | Offshore design of pipeline/tubular | Wave hydrodynamics; wave loads according to appearance, time, and origin. Progressive waves, their properties and wave load determination of offshore pipe laying. Solution for Transient Flow. Transmission, Specifications. Underground Storage, Conservation, and temperature variation. Pneumatic pipelines, Positive, negative, and combined pressure systems of pneumatic conveying, system layouts and safety considerations. | 12 |

| | | | |
|---|-------------------------|--|-----------|
| 4 | Pigging and CGD network | Pig launcher and receiver, intelligent pigging, types of pigs. Corrosion protection and control. Hydrates, wax & scale - formation and prevention methods. Introduction to software applications, Construction of offshore pipeline. City distribution network of gas. | 10 |
| | | Total | 40 |

2. Readings

4.1 Textbook:

- a) Petroleum Engineering Drilling & Well Completions:- Carl Gatlin
- b) Liquid Pipeline Hydraulics by E.Shashi Menon SYSTEK Technologies, Inc. Lake Havasu City, Arizona, U.S.A

4.2 Reference books:

- a) Engineering by A First Course of Petroleum Technology:- David AT, Donobue & Karl L Lang.
- b) Introduction to Petroleum Production Vol I, II & III:- Dr. Skinner.

5 Outcome of the Course:

The course will provide students with a profound understanding of the pipeline engineering and its relevant industrial aspects which are essential for its proper implementation. Specifically, the city gas distribution aspect will encourage students to know more about the subject and the pipeline test procedures typically adopted by the petroleum engineers on field.