| Course Type | Course Code | Name of Course | L | T | P | Credit |
|---|---|---|---|---|---|---|
| DC4 | PEC206 | Elements of Petroleum Production Engineering | 3 | 0 | 0 | 9 |

| **Course Objectives** |
|---|
| The objective of this course is to give an Introduction to Petroleum Production Operations with an emphasis on the basic knowledge of petroleum production systems and operations. |
| **Learning Outcomes** |
| Exposure of the oil field equipment related to the surface production systems.<br>Exposure to the well completion, activation and ability to handle the production problems. |

**COURSE CONTENT:**

| Unit No. | Topic | Contact Hrs | Learning Outcome |
|---|---|---|---|
| **1.** | **Introduction to Petroleum Production System** | **4** | To learn about the basics of Petroleum Production systems, Operations and related factors |
| **2.** | **Well Equipment:** Christmas tree, valves, hangers, flow control devices, packers, tubular and flow lines. Surface and subsurface chokes. | **5** | To know about the equipment related to petroleum production systems.<br>Learn about the role of different valves and control systems including flow lines for production of crude oil and gas |
| **3.** | **Well Completion:** Well completion Methods, Perforating Oil & Gas Wells - Conventional and Unconventional techniques viz. through tubing and tubing conveyed underbalanced perforating techniques, type size and orientation of perforation holes. Smart wells- intelligent completions. | **7** | Able to know the basics of well completion design and related influential parameters.<br>Understand the modern well completions techniques for hassle free production operations. |
| **4.** | **Well Activation and Self flow potential:** Well activation methods, use of compressed air & liquid Nitrogen. | **4** | Able to know about the different techniques and their comparative effectiveness for activation of well before starting the production. |
| **5.** | **Production System Analysis:** PI & IPR of self-flowing wells. Single and Multiphase flow in tubing and flow-lines. Sizing, selection and performance of Tubing, chokes and surface flow lines. Production Optimization – Nodal System analysis. | **7** | Know about the influential parameters for production of oil & gas.<br>Able to analyses optimum production rate, flow line size, choke size though nodal analysis |
| **6.** | **Gathering and collection of oil and gas:** GGS, CTF and GCS - layout, sequential treatment, and safety features. | **5** | Understand how crude oil and gas are to be collected, What are the different processing to be performed before sending crude to the refinery. |
| **7.** | **Storage of Petroleum and Petroleum Products:** Types of storage system, Storage tanks and their API & ASTM codes, Specification, maintenance and operation of tank batteries. Vapour recovery system. | **4** | Able to learn about how petroleum and petroleum products should be stored.<br>Know to design storage tanks for Petroleum and its products |
| **8.** | Surface Facilities for Water handling and injection system, Gas compression and injection system. | **3** | Know how water/gas to be processed, stored and utilized for injection purpose. |
| **9.** | Metering and measurements of oil and gas. | **3** | Able to know the methods of measuring the quantity of oil and gas specially during storage and before dispatch. |
| | **Total contact hours** | **42** | |

**Text Books:**

i. Production Engineering: Drilling and well completion : Carl Gatlin
ii. Principle of Oil well Production : T. F. W. Nind
iii. Production Operation Vol 1 and 2 : Allen Rebort

**Reference Books:**

i. Petroleum Production Handbook : Bardly
ii. Petroleum Production Handbook, Vol 1 : T. C. Frick
iii. Petroleum Production Engineering, A Computer Assisted Approach – Guo, Lyons & Ghalambor
iv. Production Optimization using Nodal Analysis : H. Dale Beggs
v. Petroleum Production Systems : Economides et al.