Course Type	Course Code	Name of Course	L	T	P	Credit
DC9	PEC302	Petroleum Production Operations	3	1	0	11

Course Objective

The objective of the course is to familiarize the students with field processing of crude oil and gas, develop PI and IPR of wells, diagnose & solve well problems, design sand control, learn well servicing and stimulation techniques and finally learn about the digital oil fields.

Learning Outcomes

Upon successful completion of this course, students will have the ability to :
-design basic field processing systems of crude oil and natural gas.
-design tests for calculating PI and IPR of wells
-diagnose and solve production problems and to design simple gravel pack operations
-have the basic knowledge of well servicing, well stimulation, digital oil fields and SCADA

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	**Introduction to Field Processing of Oil & Gas**: Flash and stage separation of oil & gas, oil & gas, Demulsification, dehydration, stabilization and desalting of crude oil. Dehydration and desalting of gas. Special problems in oil and gas separation. Removal of suspended solid & water from oil & gas. Scrubbers and wash tank. Safety features in oil and gas separation system.	6	Knowledge of field processing of crude oil and natural gas and the ability to design basic equipments such as separators, dehydration units, heater treaters, desalters etc.
2	**Production Testing**: PI & IPR of artificial lift wells, production testing - back pressure test, flow after flow test & isochronal test, surface layout, test design & analysis of test data. Production characteristics of Horizontal and multilateral wells.	6	Ability to do production testing of oil and gas wells for constructing IPR for both horizontal wells and vertical wells with or without lift assistance.
3	**Well Production Problems, Diagnosis and mitigation**: Scale formation, paraffin deposition, formation damage, water production, gas production, sand deposition, corrosion problem etc.	7	Ability to understand, diagnose and fix various production problems.
4	**Sand Control**: Sand control techniques, Formation Sand Size analysis, optimum gravel - sand ratio, gravel pack thickness, gravel selection, gravel packing fluid & gravel pack techniques.	6	Ability to design basic gravel packing parameters and get familiar with the operations.
5	**Well Servicing & Workover**: Workover system, workover rigs and selection, rig less workover including Endless/ Coiled tubing unit, minor & major workover jobs-diagnosis & remedial measures water shut off and gas shut off- Chemical treatment and conformance control. Wire-line operations, Workover & completion fluids - types & selection, Formation damage, Workover planning & economics.	7	Learn various workover rigs, and methods for various solving various production issues.
6	**Well Stimulation Techniques**: Type & description of stimulation techniques, Matrix acidizing, Acid fracturing. Hydraulic fracturing, Multistage Fracturing. Wave technology & microbial stimulation.	6	Understand and design basic stimulation techniques such as acidizing, and fracking.
7	Introduction to Digital oil field, Satellite oil fields and SCADA.	4	Understand digital oil fields and SCADA systems.
	Total contact hours:	**42**	

Text Books:

1. Petroleum Production Handbook : Bardly
2. Petroleum Production Handbook, Vol. 1 : T. C. Frick
3. Production Operations Vol. 1 and 2 : Allen Roberts
4. Principle of Oil well Production : T. F. W. Nind

Reference Books:

1. Production Optimization using Nodal Analysis : H. Dale Beggs
2. Petroleum Production Systems : Economides et al.
3. Production and Transport of Oil & Gas : Szilas