Course Type	Course Code	Name of Course	L	T	P	Credit
OE4	PEO402	Well Performance	3	0	0	9

Course Objective

The objective of the course is to provide the applied knowledge to monitor the production performance of oil and gas wells.

Learning Outcomes

Upon successful completion of this course, students will:

- have a broad understanding of the key drivers of the production performance of an oil & gas well
- have an understanding on how to monitor the performance of the well during production and judge the improvement against the well treatment.
- be able to assess the methods of reservoir management and production optimization.
- be able to interpret the data gathered through production and well testing and characterize the reservoir with proper integration of data.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	**Introduction:** Identification of sub-surface and surface parameters that influence the well performance; Concept of continuity equation, steady state, pseudo-steady state and transient state of flow in liquid system and gas system;	7	Understanding of fluid flow through porous media. It provides idea of the equations that govern the transport phenomena within porous reservoir rocks.
2	**Multiphase Flow and IPR:** Inflow Performance Relationship (IPR) for a single phase and two-phase flow, Generalized Vogel Inflow Performance equation; Future Prediction of reservoir through IPR	8	This unit will help student in understanding the behavior of hydrocarbon liquid flow within reservoir in presence of hydrocarbon gas and water. Students will understand the impact of multiphase flow on well deliverability.
3	**Well test applications in reservoir characterization:** Plots used in well-test (Cartesian, semi-log and log-log plots); Identification of reservoir models, diagnostics on log-log plot for radial, linear, bilinear, and spherical flow; Characterization of reservoirs on properties, shape and size using modern well test methods (working equations and example problems).	9	This will help students to learn how to analyze and interpret the data gathered through pressure transient testing. Students will develop an understanding on the behavior of pressure changes within hydrocarbon reservoirs under different conditions of flow and flow regimes.
4	**FMB/DMB:** Concept of Flowing/Dynamic Material Balance (FMB/DMB) for oil and gas reservoirs.	7	Estimating reserve without shuting-in the well during production
5	**Vertical Lift Performance:** Concept of various flow regime through tubing, Homogeneous and Separated flow models and their application, Gas well deliverability, Non-Darcy flow effects, IPR and VLP in two phase reservoirs and gas reservoirs	6	Understanding about actual flow behavior; Application of various models and their applications in designing tubings. Developing the ability to select various parameters to obtain the optimum well deliverability
6	**Choke Performance:** Types of chokes, Concept of pressure losses through various chokes for multiphase flow, Sonic & Subsonic flow, Gas flow and Joule Thomson Effect	5	Students will learn to analyse the pressure loss across chokes for oil and gas at various flow rates and also temperature effect especially for gas flow.
	Total contact hours:	**42**	

Text Books:

1. Hydrocarbon Reservoir and Well Performance - T.E.W. Nind

References:

1. Advanced Reservoir Engineering - Tarek Ahmed & Paul D. McKinney