Course Type	Course Code	Name of Course	L	T	P	Credit
DC	NPEC502	Advanced Well Testing	3	1	0	4

Course Objective
The objective of the course is to provide the applied knowledge of well testing techniques for reservoir characterization
Learning Outcomes
Upon successful completion of this course, students will: • be able to interpret the data gathered through production and well testing and characterize the reservoir with proper integration of data. • be able to understand different interpretation methodology of various types of well testing

Unit No.	Topics to be Covered	Contact Hours (L+T)	Learning Outcome
1	**Background of Transient Pressure Analysis:** Radial Flow Theory, Infinite Acting Radial flow- Ei function solution, Principal of superposition, Radius of Investigation, Wellbore Storage effects, Pressure Drawdown Testing, Pressure Build-up Testing	4+1	Understanding of fluid flow through porous media. It provides idea of the different well test techniques for oil reservoirs.
2	**Pressure Transient Testing for Gas Wells:** Concept of pseudo-pressure and adjusted pressure, pseudo-time and adjusted time, Gas Well Drawdown test – semilog analysis, log log analysis, Gas well build-up test – semilog analysis, log log analysis,	6+2	This unit will help student in understanding the behavior ofpressure response in gas well testing.
3	**Diagnostic Plots for Vertical Wells:** Radial flow – Vertical well IARF, hemi-radial flow, vertical well between intersecting faults, and radial composite reservoir.	6+2	This will help students to learn how to diagnose the flow regimes in reservoir and characterize the reservoir in terms of heterogeneity and boundary effects.
4	**Horizontal wells:** early radial flow, hemi-radial flow and pseudo radial flow	4+1	This will help students to learn how to diagnose the flow regimes in reservoir and characterize the reservoir in terms of heterogeneity and boundary effects.
5	**Hydraulically fractured wells:** Early pseudo radial flow; linear flow – channel reservoirs; spherical flow – limited entry completion, partial penetration; bilinear flow – finite conductivity hydraulic fractures	6+2	This will help students to learn how to diagnose the flow regimes in reservoir and characterize the reservoir in terms of heterogeneity and boundary effects.
6	**Bounded Reservoir behaviour:** Closed boundary, linear boundary – no-flow and constant pressure boundary, Circular boundary – closed and constant pressure boundary, Multiple linear boundaries,	7+2	This will help student in developing the knowledge with the ways to interpret geological boundary effects.
7	**Wellbore phenomena:** Constant wellbore storage, variable wellbore storage, Gas phase redistribution, wellclean-up and changing skin, Type curve matching	4+2	Students will learn about the behavior of pressure response during early time period of a well test.
8	**Well test interpretation workflow:** Data preparation, Review and quality control, convolution-deconvolution, identification of flow regimes, selection of reservoir model, simulation and history matching of pressure response, validation of result	5+2	Students will learn the workflow and steps to interpret a well test.
	Total contact hours:	**42 L+14 T = 56**	

Text Books:

1. Fundamentals of Reservoir Engineering, L.P. Dake, Elsevier, 2010
2. Advanced Reservoir Engineering, Tarek Ahmed, Elsevier, 2004

Reference:

1. Well Testing, John Lee, SPE Text Book Series, Volume 1, 1982