

Course Type	Course Code	Name of Course	L	T	P	Credit
DC	NGPC538	<b>Reservoir Geophysics and Deep-Water Imaging</b>	3	0	0	3

#### Course Objective

Knowledge on fundamentals of reservoir geophysics. Knowledge on reservoir architecture and its properties towards computation of the geological model. Knowledge of advanced geophysical interpretation. Knowledge of deepwater reservoir architecture and challenges. Knowledge on Marine Controlled Source Electromagnetic tool and its advantages for hydrocarbon exploration.

#### Learning Outcomes

The primary objective of the course is to introduce fundamental and advanced aspects of reservoir geophysics and deep water imaging study and use of geophysical tool/application towards the study of the reservoir and deep water.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	Introduction to reservoir geophysics: Definition, elements and types; Petrophysics: fluid properties, stress conditions, fluid flow in two and three dimensions, radial and spherical flows, generalized Darcy's law, phase behaviour: P-T & P-V diagrams.	5	Knowledge on reservoir geophysics and its parameters
2	Introduction advanced seismic study for reservoir geophysics: Introduction to multi component seismic survey and utilization of shear wave output in complementing pressure wave outputs. Application of 3D and 3C seismic data in reservoir studies.	6	Advanced seismic portfolio for identify and characterize the reservoir.
3	VSP and passive seismic: acquisition, processing and interpretation, Zero Offset VSP, Walkaway VSP, Faroffset VSP and 3D VSP; Introduction to Passive Seismic study.	5	Analysis through well bore seismic for reservoir characterization
4	Cross well seismic tomography and reservoir management with case studies: Use of cross hole seismic tomography and AVO in reservoir management. Reservoir Geophysics Study for LRLC and Condensate reservoir. Case studies of 4D seismics in reservoir management. Case study on pore-scale displacement mechanism in carbonate rocks for reservoir modelling.	6	Seismic tomography and thin bed reservoir characterization
5	Introduction to Deepwater Imaging: Introduction.	5	Knowledge on Deepwater environment

6	Deep water depositional model and exploration strategy: Deepwater Depositional System, Deepwater Challenges and Strategy, Problems associated with Seismic in Deep Water Imaging, Quantitative Risk for Deepwater exploration.	6	Development of Deepwater environment and strategy for Deepwater exploration
7.	Marine Controlled Source Electromagnetic (MCSEM): Physics of MCSEM, EM Boundary Condition and Attenuation, Numerical Studies and Case Studies, Principles of Marine Magnetotelluric and Case Studies.	5	Knowledge on Marine Controlled Source Electromagnetic towards Deepwater exploration
8.	Case study: (a) Deplete Clastic & Carbonate Reservoir, (b) Case study: Sub-Basaltic layer.	4	Reservoir Geophysics study for various
<b>Total Classes</b>		<b>42</b>	

#### Text Books

1. Cosse, R., Basics of Reservoir Engineering
2. Craft, B. C and Hawkins, M., Applied Petroleum Reservoir Engineering.

#### Reference Books

1. Muskat, Flow of Homogeneous Fluids
2. William, D., McCain, Jr., The Properties of Petroleum Fluids.
3. Sheriff, R.E., Reservoir Geophysics
4. Muskat, Flow of Homogeneous Fluids
5. William, D., McCain, Jr., The Properties of Petroleum Fluids.