Course Type	Course Code	Name of Course	L	T	P	Credit
DC	NGPC541	Formation Evaluation -Practical	0	0	2	1

Course Objective
Formation evaluation deals with characterization of subsurface rocks in terms of petrophysical properties such as rock type, mineral composition, porosity, water saturation, permeability combining wireline logs and laboratory measurement. Understand the difference in interpretation technique for clastic and carbonate, coal and mineral ore deposits. Petrophysical evaluation of complex and heterogeneous reservoir is also considered. Advanced tool such as NMR, cross-dipole sonic interpretation. Learn the concept of plugin development for petrophysical interpretation.
Learning Outcomes
Upon successful completion of this practical course, students will be able to Perform formation evaluation of subsurface reservoir in terms of petrophysical properties. Further calibration of log-derived porosity and permeability with core measurements. Understanding NMR log interpretation and role of different porosity component. Mineral composition of subsurface rock formation.

Unit No.	Details of Lectures	Lectures Hrs.	Outcome
1.	Calculation of porosity from density-neutron combination and calibration with core measurement	2	Calibrated porosity of conventional reservoirs
2.	Perform multi-mineral analysis with least-square inversion technique	2	Mineral composition
3	Interpretation of dip meter data with rose plot, histogram and azimuth frequency plot for structural and depositional environment	2	Dip meter log interpretation
4.	Interpretation technique of shaly-sand formation	4	Basic petrophysical properties

5.	Interpretation of carbonate formation	**2**	Basic petrophysical properties
6.	Permeability estimation based on linear and non-linear technique and calibration with core measurement	**4**	Continuous profile of permeability profile
5.	Derive NMR porosity (total, effective) from spin echo-train datasets. Then evaluate permeability from core-calibrated NMR porosity.	**4**	Porosity and permeability estimation from NMR log
6.	Identification of coal from basic logs and describe their physical properties with histogram	**2**	Interpretation of Coal
7.	Anisotropy analysis from cross-dipole sonic log	**2**	Advanced sonic log interpretation
8.	Well to seismic tie, elastic logs, and cross-plotting techniques	**4**	Understanding the concept of well-to-seismic tie, elastic logs
	Total	**28**	

Text Books

1. Bateman, R, M., Open Hole Log Analysis and Formation Evaluation.
2. Bateman, R, M., Cased Hole Log Analysis and Reservoir Performance Monitoring
3. Coates, G.R., Xiao, L. and Prammer, M.G. (1999). NMR Logging Principles and Applications

Reference Books

1. Brock, J., Open Hole Log Analysis
2. Ellis, D. V., Well Logging for Earth Scientists
3. Helander, D. P., Fundamentals of Formation Evaluation.
4. Vaish, J. P., Geophysical Well Logging: Principles and Practices