Course Type	Course Code	Name of Course	L	T	P	Credit
DP	NGPC535	Well Logging -Practical	0	0	2	1

Course Objective

Well logging subject deals with measurement of physical properties of subsurface rocks traverse along depth using many tools. Quality control of wireline logs. These physical properties such as radioactive level (gamma-ray, natural gamma-ray spectrometry), bulk density, compressional velocity, shear velocity, neutron porosity are useful for interpretation of rock type/lithology, porosity, formation water resistivity, water saturation.

Learning Outcomes

Upon successful completion of this practical course, students will be able to

Digital log format, basic quality control of different well logs, utilization of charts for property estimation, perform interpretation of lithology, depositional environment, compute porosity, water saturation, definite reservoir flag, calculate net to gross (NTG) and volumetric reserve estimation.

Unit No.	Details of Lectures	Lectures Hrs.	Outcome
1.	Open digital log file and note down relevant header information, basic plot of well log data with scales	2	Understanding of Basic well logs
2.	Perform quality control of basic wireline logs with conventional and data-driven methods	4	Quality control of logs
3	Estimate volume of shale (V_{shale})/ volume of clay (V_{clay}) from gamma-ray and neutron-density combination	4	Volume of shale calculation
4.	Compute porosity from neutron, sonic and density logs, and compare their responses	2	Porosity estimation
5.	Use overlay techniques to identify hydrocarbon types and their contacts (Gas & Oil, Oil & Water). Adopt cross-plotting technique to apply shale correction on computed porosity	4	Overlay technique
6.	Formation Water Resistivity with different methods	2	Apparent Rw calculation

5.	Water Saturation calculation of a clean subsurface formation	2	Water saturation
6.	Bed thickness, invasion, borehole dimeter and adjacent bed correction to resistivity logs (Latero and induction) with empirical charts and estimate true formation resistivity (R_t)	2	Invasion correction
7.	Reservoir flag definition and net-to-gross (NTG) calculation with deterministic and probabilistic method.	2	Concept of Cut-off
8.	Lithology identification from GR, resistivity, neutron, density, and sonic logs	2	Lithology classification with basic logs
9.	Volumetric reserve estimation of a hydrocarbon field	2	Reserve calculation
	Total	28	

Text Books
1. Bateman, R, M., Open Hole Log Analysis and Formation Evaluation.
2. Serra, O., Fundamentals of Well Log Interpretation
3. Bateman, R, M., Cased Hole Log Analysis and Reservoir Performance Monitoring

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