

WELL LOGGING

MODULE I

Aims and objectives of well logging. Reservoir formations. Borehole conditions. Fundamental concepts in borehole geophysics physical properties of reservoir rocks. Formation parameters and their relationships: formation factor, porosity, permeability, resistivity, water and hydrocarbon saturations, and movable oil. Archie's and Humbles equations.

MODULE II

Principles, instrumentation, operational procedures and applications of different geophysical logs: S.P., electrical, induction, nuclear, sonic, caliper, temperature, dip and direction. Natural gamma ray spectrometry log, nuclear magnetic log, litho density log, neutron activation technique, thermal neutron decay time log, chlorine and oxygen logs.

MODULE III

Recording, transmission and processing of log data. Formation evaluation for hydrocarbons. Qualitative and quantitative interpretations of well log data. Overlays and cross-plots. Determination of reservoir parameters – porosity, resistivity, permeability, water and hydrocarbon saturation, movable oil. Lithology determination by neutron, density and sonic cross-plots, dual mineral method, triporosity method, litho porosity cross-plot (M-N plot), clean sand and shaly sand interpretations.

MODULE IV

Sub-surface correlation and mapping from log data. Delineation of fractures from logs. Production logging. Well logging for metallic and non-metallic minerals: radioactive and nonradioactive evaporates, coal, sulphur. Borehole geophysics for groundwater exploration. Effective pay thickness of an aquifer. Saline water-fresh water interface from log data. Determination of groundwater flow direction by logs.

MODULE V

Theoretical computations of normal and lateral log responses. Identification and delineation of sub-surface formations from well log data. Calculation of reservoir parameters: formation factor, porosity, permeability, resistivity, water and hydrocarbon saturations, and movable oil. Subsurface correlation of formations and interpretation of field data.

TEXT BOOKS:

-  Standard Handbook of petroleum and Natural Gas Engineering. 2nd Edition. William C Lyons, Gary C Plisga. Gulf Professional Publishing.
-  D.P Helander 'Fundamentals Of Formation Evaluation'
-  Dewan.J.T 'Essentials of Modern Open-Hole Log Interpretation' Pen Well Books, 1983,

ISBN 0878142339.

REFERENCE:

1. Serra.O 'Fundamentals of Well log Interpretation' Volume1. Elsevier Science Publisher, New York, 1984,ISBN 04441327.