

20PEB225					Well Log and Formation Evaluation					
Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs/Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
3	0	0	3	3	25	50	20	--	--	100

COURSE OBJECTIVES

1. To provide the concept of various direct and indirect logging techniques, associated tools and techniques
2. To provide physical principles governing the mechanism of individual logging techniques and interpretation of the geology, mineralogy and petrophysical properties
3. To explain the limitations and capabilities of logging tools and well log analysis to the upstream petroleum industry

UNIT 1 Introduction to Formation Evaluation, Mud Logging, and Coring**12 Hrs.**

Introduction to petroleum formation evaluation: Borehole Environment, Invasion, Symbols and abbreviations used; Temperature and pressure changes, Logging tool characteristics, Mud logging, Hydrocarbon staining on the cuttings, Lithology, and texture of cutting samples, Coring techniques, and analysis; Processes of recording and representation (Log charts with tracks). Correlation of core and logging data. Indirect Methods: LWD/MWD & Wireline Logging, Instruments/Tools details.

UNIT 2 Open Hole Logging**12 Hrs.**

Tool physics, measurement principles and data interpretation of the following including quantitative and qualitative analysis techniques: Calliper log; Electrical logs – SP and Resistivity logs (conventional, induction and micro devices), Radioactive Logs – Gamma Ray (natural and spectral), Neutron, Density and Elemental capture spectroscopy logs; Sonic Logs.

UNIT 3 Special Logs**8 Hrs.**

Nuclear Magnetic Resonance Principles, Porosity and permeability estimation, fluid identification, Image Logs Principles, Fracture detection and Geological interpretation, Dip Meter Logs, Vertical Seismic Profile

UNIT 4 Quantitative and Quantitative Analysis**7 Hrs.**

Quantitative and Quantitative Analysis methods for lithology, shale volume, and Porosity, Sandy shale analysis, Overlay techniques for hydrocarbon estimation

Max. 39 Hrs.**COURSE OUTCOMES**

On completion of the course, student will be able to

CO1 - Understand the fundamental principles governing the formation evaluation techniques and correlate their significances to petrophysical properties.

CO2: Differentiate various direct and indirect well logging tools and techniques.

CO3: Infer and validate the well log data for formation evaluation.

CO4: Interpret the formation in terms of rock and fluid characteristics and petrophysics.

CO5: Evaluate the well integrity and reservoir performance.

CO6: Integrate well log data with seismic data for addressing complex reservoir static models.

TEXT/REFERENCE BOOKS

1. Malcom Rider, Second Edition, 2002: The Geological Interpretation of well logs, Rider French Consulting limited
2. Oeberto Serra & Lorenzo Serra, 2004: Well logging - data acquisition and applications, Edition Serralog, France
3. Jordan J R and Campbell F. L., SPE, New York, 1986: Well Logging Vol. 1 and 2
4. Ellis, D. V. and Singer, J. M. 2nd edition, 2007: Well logging for Earth Scientist, Springer
5. Toby Darling, Well logging and Formation Evaluation, Gulf Professional Publishing, Elsevier Science<Book-2>

END SEMESTER EXAMINATION QUESTION PAPER PATTERN**Max. Marks: 100**

Part A/Question: <Short Notes, Problems, Numerical>

Part B/Question: <Justification, Long answers, Interpretation >

Exam Duration: 3 Hrs

<5-7 > Marks (each)

<8-10> Marks (each)