20PEB104					GEOLOGY FOR PETROLEUM ENGINEERS					
Teaching Scheme					Examination Scheme					
L	T	P	C	Hours/Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
3	0	0	3	3	25	50	25	-	-	100

COURSE OBJECTIVES

- Demonstrate the fundamentals of origin of earth.
- Enhance skill to perform study of rocks.
- Improve skills to interpret the geological activities.
- Develop skill to identify petroleum potential of an area.

Unit – I **Hours – 7**

The Earth: Introduction to origin, age, internal structure and constitution of earth; introduction to earth's lithosphere, atmosphere, hydrosphere, and biosphere; plate tectonic theory, tectonic elements of continents and oceans; continental drift; concept of isostacy.

Unit – II **Hours – 14**

Crystallography, Mineralogy and Petrology

Crystallography – unit cell, crystal systems, crystal faces, and crystal symmetry; concept of stereographic projection. Mineralogy – classification of minerals, physical and optical properties of rock forming minerals; classification and structure of silicates; brief descriptions of common silicates viz., olivine, pyroxene, amphibole, mica, feldspar and quartz; Concepts of solid solution and binary eutectic; Bowen's reaction series. Petrology – introduction; classification of rock types; formation, classification, texture and structure of igneous, metamorphic, and sedimentary rocks. Description of common Igneous Rocks viz. Rhyolite, Granite, Pegmatite, Basalt, Dolerite, and Gabbro; Sedimentary Rocks viz. Conglomerate, Breccia, Sandstone, Shale, and Limestone; Metamorphic Rocks viz., Slate, Schist, Gneiss, Quartzite, and Marble. Rock cycle; introduction to weathering of rocks with an emphasis on chemical weathering.

Unit –III **Hours – 8**

Structural Geology

Domain of Structural Geology; concepts of strike and dip; parameters controlling deformation of rocks; deformation in rocks – descriptions of folds, joints, faults and their classifications; unconformity; geological maps and sections; map symbols.

Unit – IV **Hours - 10**

Palaeontology and Stratigraphy

Palaeontology – definition of fossils and classification of organisms; evolution of life; nature of fossil records and processes of fossilization; uses of fossils; introduction to different fossil groups' viz. microfossils, invertebrates, vertebrates, and plant fossils. Stratigraphy – Geological Time Scale; principles of stratigraphy; stratigraphic units; concept of stratigraphic columns; stratigraphic correlation. Physiographic divisions of India; Indian stratigraphy – Precambrian basement of Indian peninsula; stratigraphy of type sections viz., Vindhyans, Gondwana, Jurassics, Cretaceous, and Tertiary.

MAX <40 Hrs>

COURSE OUTCOMES

On completion of the course, student will be able to

CO1- Understand and correlate the different earth-processes;

CO2- Differentiate and classify the different minerals and rocks;

CO3- Estimate the bearing of various physico-chemical and mineralogical parameters on the geo-mechanical properties of the rocks;

CO4- Evaluate the petroleum potential of an area based on the different geological structures;

CO5- Analyze the different strata based on its fossil assemblage, and evaluate the petroleum potential based on the physiography and stratigraphy;

CO6- Correlate the various aspects of geology with the petroleum system.

TEXT / REFERENCE BOOKS

1. Read H.H.: Rutley's Elements of Mineralogy
2. Best M.G.: Igneous and Metamorphic Petrology,
3. Sengupta S.M. – Introduction to Sedimentology
4. Hobbs B. E., Means W.D. & Williams P. F.: An Outline of Structural Geology
5. Kumar, Ravindra: Fundamentals of historical geology and stratigraphy of India
6. Raup D.M. & Stanley S.M.: Principles of Paleontology
7. Roy A.K.: Fossils in Earth Sciences
8. Mukherjee P.K.: A Text Book of Geology
9. G.B. Mahapatra: A Text Book of Geology
10. Emiliani C.: Planet Earth: Cosmology, Geology, and the Evolution of Life and Environment

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks: 100 **Exam Duration: 3 Hrs.**

PART A: 10 Questions of 2 marks each-No choice **20 Marks**

PART B: 2 Questions from each unit with internal choice, each carrying 16 marks **80 Marks**