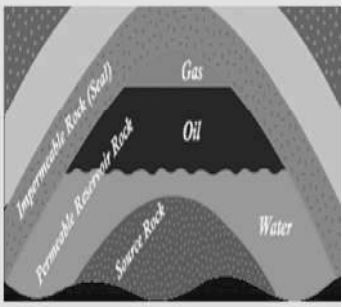
19PE201 PETROLEUM GEOLOGY



SOURCE:
http://www.sjvgeology.org/geology/oil_geology.html

Hours Per Week :

L	T	P	C
3	1	-	4

Total Hours :

L	T	P
45	15	-

WA/RA	SSH/HSH	CS	SA	S	BS
30	45	-	-	5	5

COURSE DESCRIPTION AND OBJECTIVES:

This is a basic course in petroleum geology. The students will be exposed to different source, reservoir and cap-rocks, characterization of reservoir rocks, classification of reservoir pore space, permeability, migration and entrapment, temperature-pressure conditions for the generation of oil and gas from sediments.

COURSE OUTCOMES :

Upon completion of the course, the student will be able to active the following outcomes :

COs	Course Outcomes	POs
1	Analyze different source rocks from which hydrocarbons are generated	2
2	Apply the knowledge of concepts learnt in fundamentals of geology & identify the various hydrocarbon bearing structures.	1
3	Identify the migration, entrapment and accumulation of hydrocarbons	2
4	Interpret sedimentary basins of India	3
5	Interpret the accumulation zone & the exact extent of basins and subsequently the reservoir extent.	3
6	Design GME Cycle of the Krishna-Godavari basin, Cambay basin and Mumbai offshore basin with using appropriate software.	5

SKILLS:

- ✓ *Discern about origin of source rocks, formation of good source rocks, different characterization of reservoir rocks, classification, nomenclature and different source of reservoir rocks, pore space, porosity and its types.*
- ✓ *Gain knowledge of how and why fluid hydrocarbons migrate from a source rock to reservoir rock, entrapment and accumulation of hydrocarbons.*

UNIT- I **L-9, T-3**

SOURCE ROCKS: Definition of source rock; Organic rich sediments as source rocks; Nature and type of source rocks- Claystone / shale; The process of diagenesis, catagenesis and metagenesis in the formation of source rocks; Evaluation of petroleum source rock potential; Limestone as source rocks; Subsurface pressure temperature conditions for the generation of oil and gas from the source sediments; Oil window.

UNIT- II **L-9, T3**

RESERVOIR ROCKS : Characteristics of reservoir rocks; Classification and nomenclature-clastic reservoir rocks, carbonate reservoir rocks; Unconventional, fractured and miscellaneous reservoir rocks, marine and non-marine reservoir rocks; Concept of Shale oil; Reservoir pore space; Porosity- primary and secondary porosity, effective porosity, fracture porosity; Permeability- effective and relative permeability; Relationship between porosity, permeability and texture; Cap rocks-definition and characteristics of cap rocks.

UNIT- III **L-9, T3**

HYDROCARBON MIGRATION : Geological framework of migration and accumulation; The concept of hydrocarbon migration from source beds to the carrier beds; Carrier beds to the reservoir; Free-path ways for migration; Short distance and long-distance migration; Evidence for migration; Oil and gas seepages.

UNIT- IV **L-9, T3**

ENTRAPMENT OF HYDROCARBONS : Entrapment and accumulation of hydrocarbons; Classification and types of traps- structural; Stratigraphic and combination type of traps; Traps associated with salt domes.

UNIT-V **L-9, T3**

SEDIMENTARY BASINS : Origin and classification; Types of basins and their relationship to hydrocarbon prospects; Tectonic classification; Stratigraphic evolution and hydrocarbon accumulations of the following basins: Krishna-Godavari basin, Cambay basin and Mumbai offshore.

TEXT BOOK:

1. A. I. Levorsen, “Geology of Petroleum”, 2nd edition, CBS, Publishers, 2006.

REFERENCE BOOKS:

1. Richard, C. Selley, “Elements of Petroleum Geology”, 2nd edition, Elsevier, 1997.
2. Sedimentary basins of India - ONGC bulletin.
3. Caineng Zou et al. “Unconventional Petroleum Geology”, 2nd edition, Elsevier, 2013.