

Course Type	Course Code	Name of Course	L	T	P	Credit
DC	NGLC520	PETROLEUM GEOLOGY	3	0	0	3

#### Course Objective

The objective of the course is about basic principles and applications of petroleum geology

#### Learning Outcomes

The primary objective of the course is

- To introduce the students with the geochemical, origin and accumulation aspects of hydrocarbons.
- Various geochemical methods of hydrocarbon exploration

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	Petroleum: its different states of natural occurrence. Basic concepts of organic geochemistry. Origin of petroleum, Geochemistry and maturation of kerogen; Biogenic and Thermal effect. Distribution of Petroleum in space and time.	10	To know about the Chemical and physical properties of hydrocarbons
2	Petrographic and geochemical methods of Oil Exploration: Petrographic: Microscopic organic analysis, Thermal Alteration Index, Vitrinite Reflectance, Geochemical: Combustion methods (Carbon ratio and Total Organic Carbon), Stable isotope method, Time Temperature Index (TTI), Arrhenius equation, Lopatin's method, Concept of cooking time, Level of Organic Metamorphism (LOM) and Rock Eval Pyrolysis method	8	To Understand the occurrence, origin and generation of petroleum. Formation of Kerogen and how hydrocarbon generates through kerogen maturation. To track various levels of kerogen/organic matter maturation and to use this in hydrocarbon exploration by different petrographic and geochemical methods
3	Introduction to migration of oil and gas: geologic framework of migration; short and long distance migration, primary and secondary migration; geologic factors controlling hydrocarbon migration; forces responsible for migration, migration routes and barriers.	5	Understand various aspects of hydrocarbon migration from source rock to reservoir rocks.
4	Oil field water- characters and classifications	2	Understand composition and characteristic of oil field/formation water and its use in hydrocarbon exploration.
5	Reservoir rocks: general attributes and petrophysical properties. Classification of reservoir rocks - Clastic and Carbonate reservoirs. A brief account on Reservoir Characterization. Blowout problem.	6	Understand various aspects of reservoir rocks
6	Hydrocarbon traps: definition; classification of hydrocarbon traps - structural, stratigraphic and combination; time of trap formation and time of hydrocarbon accumulation. Cap rocks - definition and general properties.	6	Understand principle of hydrocarbon traps and its various types
7	Petroleum Geology of important Indian basins (offshore and onshore).	3	Understand the Proliferous basins of India
8	Introduction to oil and gas exploration with reserve estimation	2	Understand various methods of hydrocarbon exploration and reserve estimation.
	Total	42	

#### Recommended Books:

1. Tissot, B. P., and Walte, D. H., Petroleum Formation and Occurrence. Springer-Verlag, Germany.
2. North F. K., Petroleum Geology. Allen & Unwin Inc., London.

#### Other References:

1. Selley, R. C., Elements of Petroleum Geology. Academic Press, USA.
2. Selly, R. C. and Sonnenberg, S. A., Elements of Petroleum Geology, Elsevier-Academic Press
3. Slatt, R. M., Stratigraphic Reservoir Characterization for Petroleum Geologists, Geophysicists, and Engineers. Elsevier, Hungary