

## **Petroleum Engineering**

**Petroleum Exploration :** Classification and description of some common rocks with special reference to clastic and nonclastic reservoir rocks. Origin, migration and accumulation of Petroleum. Petroleum exploration methods.

**Oil and Gas Well Drilling Technology:** Well planning. Drilling method. Drilling rigs Rig operating systems. Drilling fluids function and properties, Mud hydraulics, casing design and cementing operations. Drill bit types and their applications. Application of horizontal, multilateral, extended reach, slim wells.

**Reservoir Engineering:** Petrophysical properties of reservoir rocks. Coring and core analysis. Reservoir fluid properties. Phase behaviour of hydrocarbon system. Flow of fluids through porous media. Water and gas coning. Reservoir pressure measurements. Reserve estimation & techniques.

**Petroleum Production Operations:** Well equipments. Well completion techniques. Well production problems and mitigation. Well servicing & Workover operations. Workover & completion fluids. Formation damage. Well stimulation techniques. Artificial lift techniques. Field processing of oil & gas. Storage and transportation of petroleum and petroleum products. Metering and measurements oil & gas. Pressure vessels, storage tanks, shell and tube heat exchangers, pumps and compressors, size reduction ,centrifuge and cyclones; filtration, agitation and mixing; conveying of solids.

**Offshore Drilling and Production Practices:** Offshore oil and gas operations & ocean environment. Offshore fixed platforms, Offshore mobile units, Station keeping methods like mooring & dynamic positioning system. Offshore drilling from fixed platform, jack-up, ships and semi submersibles. Use of conductors and risers. Offshore well completion. Deep water applications of subsea technology.

**Petroleum Formation Evaluation:** Evaluation of petrophysical of sub-surface formations: advantages and disadvantages of SP, resistivity, radioactive, acoustic logs and types of tools used. Evaluation of CBL/VDL, USIT, SFT, RFT. Production logging tools, principles, limitations and applications. Casing inspection tools (principles, applications and limitations), Formations micro scanner (FMS), NMR logging principles.

**Oil and Gas Well Testing:** Diffusivity equation, derivation & solutions. Radius of investigation. Principle of superposition. Horner's approximation. Drill Stem Testing. Pressure Transient Tests: Drawdown and build up-test analysis. Wellbore effects. Multilayer reservoirs. Injection well testing. Multiple well testing. Interference testing, Pulse testing, well-test analysis by use of type curves. Gas well testing.

**Enhanced Oil Recovery Techniques:** Basic principles and mechanism of EOR, EOR methods: Chemical flooding, Miscible flooding, Thermal recoveries (steam stimulation, hot water & steam flooding, in-situ combustion), Microbial EOR.

**Health Safety and Environment in Petroleum Industry:** Health hazards in Petroleum Industry: Safety System: blow down systems. Gas detection system. Fire detection and suppression systems. Impact of drilling & production operations on environment, Offshore oil spill and oil spill control. Waste treatment methods.