

PE6312 Enhanced Oil Recovery

Course Content:

General EOR: Displacement Fundamentals, Reservoir Engineering Concepts for EOR, Factors affecting Oil Recovery, Comparative Performance of Different EOR Methods, Screening Criteria and Technical Constraints. Water Flooding Fundamentals. Fractional Flow theory, applications of Fractional Flow in Oil Recovery Calculations, Homogeneous Reservoirs: Buckley Leverett. one-dimensional Displacement, Layered Reservoirs: Styles, Dykstra-Parsons and Johnson Methods. Improved Water-Flooding Processes: Miscible Processes: General Overview of Solvent Methods, Phase Behavior Fundamentals from: Pressure/Temperature and Pressure/Composition Diagrams, Quantitative Representation of Phase Equilibria Processes. Chemical and Polymer Flooding: Polymer Flooding, Rheology of Polymer Solutions, Polymer adsorption and Retention, Micellar-Polymer or Micro-Emulsion Flooding, Properties of Surfactants and Co-Surfactants, Surfactant-brine-oil Phase Behavior, Performance Evaluation. Low Salinity Water Flooding. Nanotechnology for EOR. thermal Processes: Steam injection Processes, Cyclic and Continuous Steam injection, thermal Properties of Fluids and Solids, Steam Properties: Flow Rate and Quality Measurements. Temperature Effect on Reservoir and Fluid Properties, Viscosity Reduction, thermal Expansion, Oil Characterization for thermal Reservoir Simulation, Evaluation of Heat Losses, Prediction of Steam Flood Performance, Cyclic Steam Performance: Marx Langenheim Model, Steam Flood Performance: Goma's Method. Microbial EOR: Well Bore Clean Up, Well Stimulation and Enhanced Water Floods Using Microbes. Environmental and Economics aspects of EOR Methods.

Text Books:

1. **Lake, L.** Enhanced Oil Recovery, Pennwell Publishing Company, 1991
2. **Donaldson, E. C., Chilngarian G. V., and T. F. Yen.** Enhanced Oil Recovery-I, Elsevier Publications, 1985
3. **Latil, M.** Enhanced Oil Recovery, Gulf Publications, 1980
4. **Green, D.W. and G. P. Willhite.** Enhanced Oil Recovery, SPE, 2003

Reference Books:

1. **Carcoana, A.** applied Enhanced Oil Recovery, Prentice Hall, 1992
2. **James, G.** Enhanced Recovery Methods for Heavy Oil and Tar Sands, Gulf Publishing Company, 2009.
3. **Donaldson, E. C., Chilngarian G. V., and T. F. Yen.** Enhanced Oil Recovery II: Processes and Operations. Elsevier Publications, 1989.
4. **Ramirez, W. F.** application of Optimal Control theory to Enhanced Oil Recovery, Elsevier Publications, 1987

Prerequisite:

Reservoir Engineering.