

16PL306 PETROLEUM PRODUCTION ENGINEERING



Hours Per Week :

L	T	P	C
3	-	-	3

Total Hours :

L	T	P	WA/RA	SSH/HSB	CS	SA	S	BS
45	-	-	20	15	-	2	5	5

Course Description and Objectives:

Reservoir fluids, efficient flow to the surface without damaging the reservoir dynamics/drive mechanisms. Various surface equipment's for process oil and gas after flow from wells.

Course Outcomes:

The student will be able to:

- Fundamental concepts in petroleum production engineering.
- Sick well identification and remedial stimulation operations.

SKILLS:

- ✓ Application of suitable artificial lifts on reservoir energy depletion
- ✓ Crisis management

UNIT - 1

L-9

Petroleum production system over all view: Production from various types of reservoir based on drive mechanisms field development method, Properties of Oil GOR, density, viscosity, pour point, properties of gas specific gravity, compressibility, molecular weight, calorific value, formation volume factor.

UNIT - 2

L-9

Reservoir deliverability: Flow regimes - transient, steady state, pseudo steady state IPR for various types of wells, Well bore performance – single & multiphase liquid flow in oil wells, single phase & mist flow in gas wells; Choke performance – sonic & subsonic flow, single & multiphase flow in oil & gas wells; Well deliverability nodal analysis, Well decline analysis.

UNIT - 3

L-9

Artificial lift methods-I: Sucker rod pumping system- Selection of unit and types of unit, Load & power requirements, Performance analysis, electrical submersible pumps principle design & operation, hydraulic piston pumping, progressive cavity pumping, plunger lift, hydraulic jet pumping.

UNIT - 4

L-9

Artificial Lift Methods-II: Gas lift system evaluation of potential compression requirements, study of flow characteristics, principles of compression, types of compressors, selection of gas lift valves, types of valves, principles of valve operation, setting & testing, design installations.

UNIT - 5

L-9

Production Stimulation: Well problem identification- sick well analysis, Matrix acidizing-Design for sandstone & carbonate reservoirs, Hydraulic fracturing – formation fracture pressure, geometry, productivity of fractured wells, hydro-fracture design, selection of fracturing fluid, proppant, post frac evaluation.

Production Optimization : Self flowing wells, wells on gas lift, wells on sucker rod, separator, pipeline network, gas lift facilities, producing fields.

TEXT BOOKS:

1. Petroleum Production Engineering: A Computer Assisted Approach, Boyun Guo, William C. Lyons, Ali Ghalambor, Elsevier Science & Technology Books, 2007.
2. Petroleum Production Systems, M.J. Economides, A. Daniel Hill & C.E. Economides, Prentice Hall, 1994.

TEXT BOOKS:

1. Production Technology I-II, Institute of Petroleum Engineering, Herriot Watt University.
2. The Technology of Artificial Lift Method, Vol. 1, Brown E., Pennwell Books, 1977.

ACTIVITIES:

- Identify formation damage and find remedial methods to bring the well back into production
- Screen, design and operate artificial lifts on reservoir pressure depletions.