AMPE24 NATURAL GAS ENGINEERING

UNIT-1 NATURAL GAS TECHNOLOGY AND EARTH SCIENCE
1.1 Branches of petroleum Industry.
1.2 Sources of Information for natural gas engineering and its applications.
1.3 Geology and earth sciences: Earth sciences-Historical geology, Sedimentation process,
1.4 Petroleum reservoirs, Origin of petroleum. Earth temperatures & pressure,
1.5 Earth temperatures, Earth pressure.
1.6 Petroleum: Natural gas, LP gas, Condensate, & Crude oil.

UNIT-2 PROPERTIES OF NATURAL GASES
2.1 Typical compositions.
2.2 Equations of state: general cubic equations, specific high accuracy equations.
2.3 Use of equation of state to find residual energy properties, gas measurement gas hydrates, condensate stabilization, acid gas treating, gas dehydrations,
2.4 Compressors, process control deliverability test, gathering and transmission, and natural gas liquefaction.

UNIT-3 GAS COMPRESSION
3.1 Positive displacement and centrifugal compressors; fans. Calculation of poser requirements.
3.2 Compressible Flow in Pipes: Fundamental equations of flow: continuity, momentum, elegy equations.

UNIT-4 ISOTHERMAL FLOW IN PIPES
4.1 The Weymouth equation. Static and flowing bottom-hole pressures in wells.
4.2 Fundamentals of Gas flow in porous media: Steady state flow equations.
4.3 Definition of pseudo-pressure function.
4.4 Gas flow in cylindrical reservoirs: general equation for radial flow of gases in symmetrical homogeneous reservoirs.

UNIT-5 NON-DIMENSIONAL FORMS OF THE EQUATION;
5.1 Derivation of coefficients relation dimensionless to real variables.
5.2 Infinite reservoir solution: Pseudo-steady-state solution.
5.3 Gas Well Deliverability Tests: Flow-after-flow tests: prediction of IPR curve and AOF for the well.
5.4 Isochronal tests. Draw down tests: need for data at two flow rates.

References Book:
1. Standard Handbook of Petroleum and Natural Gas Engineering. 2nd Edition. William C Lyons, Gary C Plisga. Gulf Professional Publishing.