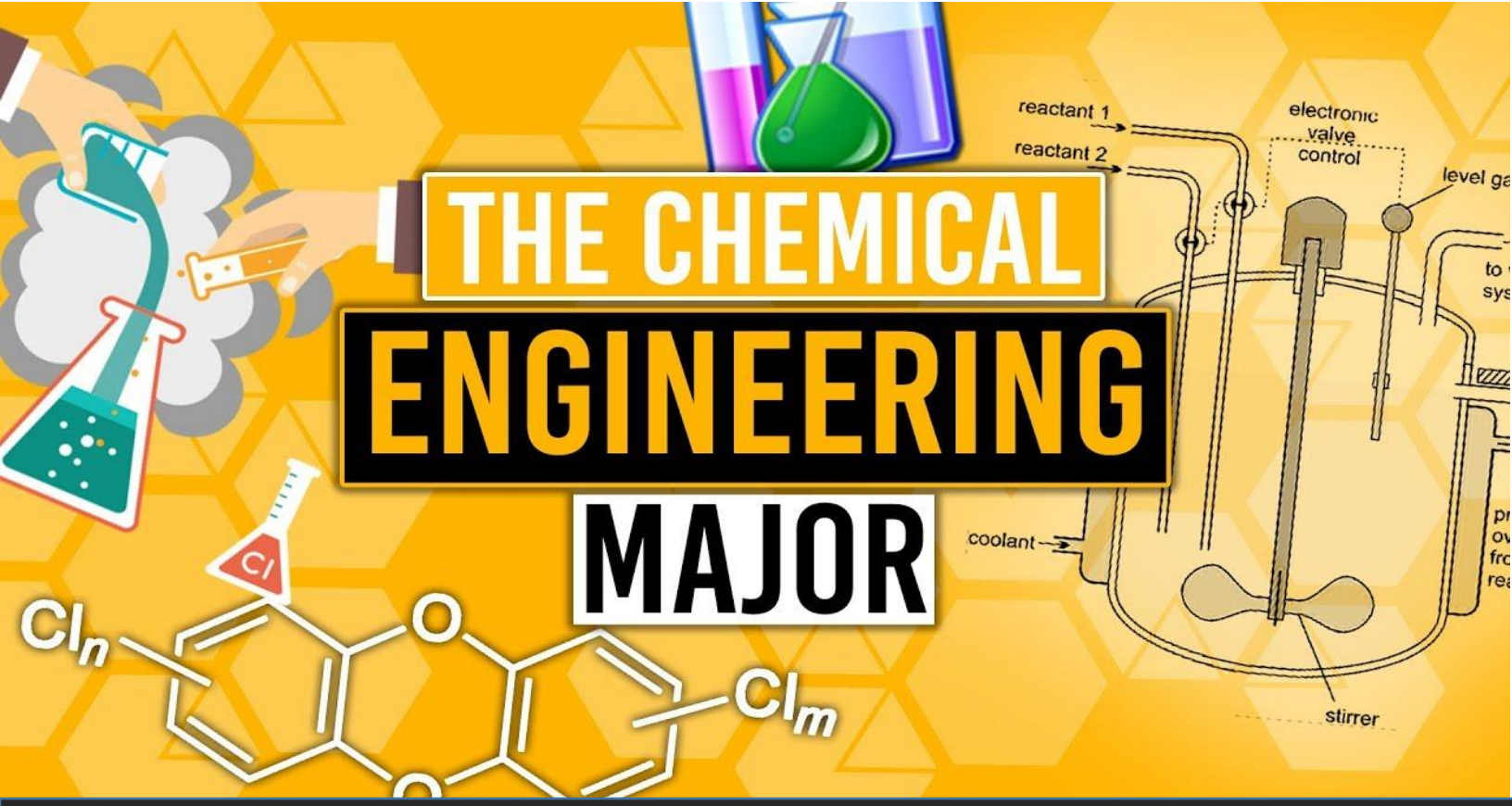

Gas Production Engineering

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Training & Consultancy

Gas Production Engineering

Introduction:

The rapidly increasing worldwide demand for natural gas as an energy source requires expertise in gas engineering technology. Incorporating a balance between theory and application, the course emphasis is on training the candidates for immediate application of acquired techniques to field problems. They will learn the latest methods for calculating gas well performance from reservoir to sales. Reservoir performance covers the fundamentals of reservoir gas flow and details the best methods for testing wells, according to the time and money available. The importance of flow regime and non-Darcy flow on test design and interpretation is emphasized for new wells and for the possibility of improving the performance of older wells. Also discussed are performances of tight formations, horizontal wells, fractured wells, and methods for estimating gas reserves. Calculate and determine the effect of each system component on total well performance, which permits optimum sizing of tubing, flow lines, separators, and compressors.

Formation damage, gas well de-watering, hydrate formation, water influx, and abnormal reservoir pressure problems are reviewed. Relate reservoir and well performance to time, as well as calculate cash flow and compression requirements. Discuss the best procedures to predict when liquid loading will make a well nonproductive. Field gas processing, including dehydration and condensate recovery, is briefly reviewed. Gas production is emphasized, although an overview on field gas processing is presented.

Who Should Attend?

Production, reservoir, and facilities engineers and others involved in gas production, transportation, and storage including field supervisors.

Course Objectives:

By the end of this course delegates will be able to:

- Apply proven techniques to field problems which increase profitability
- Calculating gas well performance, from the reservoir to the sales line
- Optimize gas well production
- Relate reservoir and well performance to time
- Predict when a well will die due to liquid loading

Course Outline:

Gas Properties

- Real gas behavior equations of state
- Impurities
- Mixtures
- Phase behavior dew point
- Retrograde behavior
- Flash calculations
- Classifying gas reservoirs

Reservoir Performance

- Gas well testing flow after flow
- Isochronal

- Stabilized inflow performance
- Turbulence and skin effects
- Perforation effects
- Tight well analysis
- Horizontal wells
- Hydraulically fractured wells

Reserve Calculations

- Plots
- Energy plots
- Water influx
- Abnormal pressure effects
- Diagnostic testing based on production data

Flow in Pipes and Restrictions

- Pressure loss tubing
- Flow lines
- Chokes
- Safety valves
- Effects of liquids-liquid loading
- Liquid removal methods
- Multiphase flow correlations
- Erosional velocity

Compression

- Types of compressors
- Compressor selection reciprocating and centrifugal
- Effects of variables
- Capacity and horsepower

Total System Analysis

- Tubing and flowline size effects
- Perforating effects
- Relating deliverability to time
- Evaluating compressor installations
- Analyzing injection wells

Flow Measuring

- Orifice metering design
- Accuracy
- Troubleshooting

- Other metering methods

Condensate Reservoir

- Reservoir types, wet gas
- Retrograde
- Reserve estimates
- Laboratory simulation
- Gas cycling

Field Operations Problems

- Interpreting P/Z plots
- Hydrate formation