Continuing Education Program

Surveillance, Data Analytics and Machine Learning for Gas Lift Engineers

Tuesday Jun 3rd, 2025

Instructor: Dr. Rajan Chokshi

Business Impact

This course/workshop aims to give an understanding of surveillance, data analytics, and machine learning workflows as they relate to gas lift wells through practical applications. Field data is employed to clarify workflows related to surveillance, optimization, and data analysis. The participants will assess and extract value from the data sets with the help of easy-to-follow solution scripts. The practical, hands-on approach will enable them to confidently test these techniques on their naturally flowing and gas lifted wells' data.

Course Description

To ensure profitable gas lift well with minimal NPT and failure rates, robust surveillance and optimization are crucial. Real-time data streams from gas lift wells can be challenging to manage with traditional methods. The course bridges gaps by using data analytics, machine learning approaches facilitated by generative AI.

In this hands-on course, the participants learn about surveillance, optimization, data analysis and data science techniques and workflows applied to gas lift wells while reviewing code and practicing. The focus is on developing data-driven models while keeping our feet closer to the underlying oil and gas production principles. After completing the course, participants will have a set of tools and some pathways to analyze and manipulate their data in the cloud, find trends, and develop data-driven models.
Specifically, the following use cases are discussed covering their business impact, code walkthroughs, and solutions:

- Gas Lift well state identification
- Virtual Flow Meters
- Single Point Gas lift
- Reservoir Productivity assessment for unconventional wells

Learning Outcomes

After completing the course, participants will have a set of tools and some pathways to model and analyze their naturally flowing and gas lift wells' data in the cloud, find trends, and develop data-driven models.

Training Method

The course can be taught virtually though the best experience and results are achieved by mutuals interactions in a classroom setting. The classroom settings is also conducive for workshop type outcomes due to increased interactions. The course discusses several business use-cases that are amenable to data-driven workflows. For each use case, the instructor will show the solution using a data analysis technique, with the Python code deployed in the Google cloud. Trainees will solve a problem and tweak their solution.

Who Should Attend?

This Intermediate level course is primarily intended for artificial lift, production and facilities engineers and students to enhance their knowledge base, increase technology awareness, and improve the facility with different data analysis techniques applied on large data sets.

Prerequisites

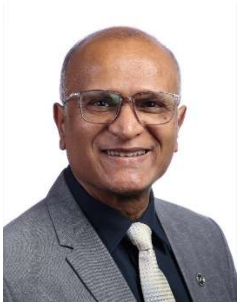
- Understanding of petroleum production concepts and specifically gas lift design and operations.
- Knowledge of Python is not a must but preferred to get the full benefit.
- Trainees will need to bring a computer with a Google Chrome or Edge browser and a Google email account (available for free). We will use the Google Collaboratory environment available in Google-Cloud for hands-on exercises.

Course Content

- Digital Oilfield
  - Digital Transformation and Oilfields
  - Key technologies for digital oilfields
  - Oilfield System Data Verification and Management
- Digitalization in Gas Lift and production optimization
  - Gas Lift Surveillance approaches
  - Optimization approaches
  - AI/ML infused Gas Lift management
- Data types in Production Domain: Streaming (Real-time or time-series) vs. Static (non-streaming)
  - Data Processing Challenges
  - Data Basics: Cleaning, filtration, and regulation
  - Best practices on data exploration analysis
- AI, ML and Deep Learning – Brief and Incomplete primer
  - Data Analytics Lifecycle
  - Bias-Variance-Complexity Tradeoff
  - Data Preparation
  - Model Types
  - Role of Domain Knowledge
  - Training & Evaluating Model
  - Toolsets
- System Setup & Checks
  - Google CoLab – Why do we need it?
  - Pull datasets & codebase from the GitHub repository.Case studies
- Problem statement
  - Data requirement
  - Using generative AI in Colab
  - Case study 1 – Gas Lift state identification with downhole data/ Gradient curve predictions

- Case study 2 - VFM using Choke Pressure Drop from offshore gas lift asset
- Optional - Case study 3 - VFM with pressure drop across tubing — PDP to WHPf
- Case study 4 — reservoir productivity assessment for unconventional well
- Review Case study 5 (No hands-on) — multi-well optimization from Alaska

Instructor Profile



Dr. Rajan Chokshi brings almost 40 years of expertise in artificial lift, real-time production optimization, software development, and management.
He is currently engaged in projects related to artificial lift optimization, multi-phase flow calculations, failure prediction, virtual flow meter development, emission reduction, and competency management. Chokshi has a varied employment background in the oil and gas industry, working for different types of companies including national oil companies, major corporations, independent companies, service providers, and technology firms. He has collaborated on over fifteen papers for the Society of Petroleum Engineers (SPE), holds three patents, and has conducted many webinars and training courses for SPE.
In addition to conducting professional workshops globally, he has taught courses at various prestigious universities, including Texas Tech, Missouri S&T, the University of Southern California, and the University of Houston. He has been recognized twice as a distinguished lecturer by SPE and generously dedicates his time to reviewing technical papers, actively contributing to various SPE technical committees, and serving on the Board of Directors for the Artificial Lift Research and Development Council (ALRDC).
Dr. Chokshi holds a Bachelor's and Master's in chemical engineering from the Gujarat University and IIT-Kanpur, India, and a Ph.D. in Petroleum Engineering from the University of Tulsa, USA.