PEA
PETROLEUM ENGINEERS ASSOCIATION

IAF | IAS ACCREDITED | ISO 9001:2015 CERTIFIED | MSME

3 Days Online Course On
Advanced Data Interpretation in Reservoir Engineering Using Python

Class Description:

This advanced course delves into the methodologies and Python libraries essential for data interpretation in reservoir characterization of unconventional reservoirs. Through a series of detailed sessions, real-world case studies, and hands-on examples, you'll acquire the expertise to navigate the complexities of contemporary reservoir management confidently.

Claudia Molina

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Value Proposition:

On module One, we will leverage Python for multidisciplinary data analysis, providing a high-level view of the data. This approach will enable you to conduct exploratory data analysis at a large scale, extracting valuable insights using Python's powerful capabilities.

On module Two, we will dive deep into the use of rate and pressure transient analysis (RTA and PTA) for unconventional reservoirs. By coupling the field-scale insights gleaned on the first day with well-level analysis through RTA and PTA concepts, you will be equipped to make informed decisions and optimize reservoir performance effectively.

Participants will gain comprehensive knowledge of both fundamental and advanced concepts, learning to integrate diverse data types—such as pressure, rate, and formation data for enhanced reservoir characterization and performance analysis.

Learning Outcomes:

- Mastery of advanced data integration and interpretation techniques in reservoir engineering.
- Ability to validate and control data quality for accurate reservoir characterization.
- Fundamentals of python coding for exploratory data analysis to identify and overcome data gaps.
- Understanding of benefits and setbacks of pressure-transient and rate-transient analysis for reservoir characterization.
- Insight into real-world applications and emerging trends, enhancing strategic decision-making in reservoir management.

Target Audience:

- Reservoir engineers, petroleum engineers, geoscientists, well test engineers, production engineers, and data scientists/analysts in the oil and gas industry
- Mid to senior-level professionals seeking advanced knowledge and skills in multi-disciplinary data interpretation.
- Individuals aiming to learn fundamentals of python coding for exploratory data analysis to identify and overcome data gaps.
- Individuals aiming to learn RTA and PTA concepts for reservoir characterization.

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Format:

This class can be delivered in-person or online. Participants will engage in interactive discussions and practical examples throughout the course. The goal is to equip them with advanced skills for effective data integration and interpretation in unconventional reservoir scenarios.

Prerequisites:

- Basic understanding of reservoir engineering principles.
- Experience with fundamental data interpretation methods in upstream O&G.
- Familiarity with fundamental geological and fluid properties for reservoir evaluation.
- Familiarity with python programming

● LIVE

45:00

Class Outline:

Module 1: Integration and Interpretation Techniques, 4hrs

Session 1: Fundamentals of Data Integration Sources & Quality of data

- Importance of integrating pressure, rate, and formation data
  - Challenges and benefits
  - Sources of data
- Gathering reliable data from well tests and reservoir monitoring
  - Quality control and validation
  - Exploratory data analysis concepts

Practice: Exploratory Data Analysis (EDA) in Python and Colab

☕ **Break** (15 mins)

Session 2: Data Integration and Interpretation Techniques

- Integrating formation and fluid data with well test results
- Bottomhole pressure and multiphase rate data measurements.
- Overview of bottomhole pressure correlations.

Practice: Bottomhole pressure calculation examples in Python

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Module 2: Integration and Interpretation Techniques, 4 hrs

Session 3: Pressure-Transient Analysis (PTA)

- Overview of PTA for unconventional reservoirs.
- Use cases: Drawdown and buildup tests.

Rate-Transient Analysis (RTA)

- Overview of RTA for unconventional reservoirs.
- Forecasting production behavior using RTA methods

☕ **Break** (15 mins)

Integrated Pressure-Rate Analysis

- Combining PTA and RTA for comprehensive reservoir characterization
- Case study 1: 'Pressure buildup in unconventional reservoirs: friend or foe?.

Group discussion: Insights from examples and use cases, key issues and opportunities

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Session 4: Real-World Applications, Emerging Trends and Future Developments

- Lessons learned and best practices
- Future developments in reservoir interpretation
- Wrap- up

Instructors Bio:

Claudia Molina brings over 20 years of expertise in engineering, business, and data science to the upstream oil and gas sector, including expertise on characterization of complex reservoir systems. Claudia has a profound understanding of subsurface dynamics, specializing in evaluating new technologies to optimize production processes. In prior roles, she concentrated on application of numerical and data-driven modeling solutions for efficient reservoir management, including 3D numerical modeling, RTA and PTA methods for unconventional reservoir systems. Claudia holds a Master's degree in Data Science from Harvard University, along with degrees in Petroleum Engineering and a Master of Business Administration (MBA) from the University of Oklahoma. Her diverse educational background and extensive professional experience make her a leading expert in the field of reservoir engineering and data-driven production optimization.

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