PetroSkills

Introduction to Geomechanics for Unconventional Reservoirs - IGUR

COURSE

About the Course

This course provides an overview of petroleum geomechanics and its applications for development of unconventional plays. It is presented in three sections: (i) fundamentals of petroleum geomechanics, (ii) geomechanical characterization, stress modeling and building mechanical earth models, and (iii) geomechanical modeling for unconventional plays.

Target Audience

Geoscientists, petrophysicists, engineers, or anyone involved in unconventional reservoir development.

You Will Learn

- Essentials of rock mechanics concepts such as stress and strain tensors, rock constitutive models, and failure criteria
- To review lab measurement reports to understand mechanical rock properties and to understand the application of this data to case studies
- The key geomechanical parameters of shales
- The origins of pore pressure generation and pressure prediction and measurement methods for unconventional plays
- The processes of multi-source data collection (from cores, logs, lab and field tests, drilling, seismic, microseismic, etc.) for characterization of rock properties and in-situ stresses and building Mechanical Earth Models (MEMs)
- To analyze and interpret the geomechanical aspects of image logs, mini-frac and DFIT tests, and drilling and completion reports
- To use different methodologies to measure/estimate in-situ stress components
- To apply geomechanical modeling to unconventional plays
- Practical approaches for drilling and mud window design
- The basic principles of hydraulic fracture design
- To characterize natural fractures and use discrete fracture network (DFN) modeling to account for their influence on hydraulic fracturing operations
- About modeling and monitoring of fault reactivation and seismicity induced by hydraulic fracturing and waste fluid disposal
- The application of data analytics and machine learning for optimization of drilling, completion, and production in unconventional plays

Course Content

- Introduction to petroleum geomechanics
- Stress and strain tensors
- Deformation models and failure criteria
- Laboratory measurement of elastic and strength rock properties
- Mechanical behavior properties and key geomechanical aspects of shale plays (fractures, brittleness, and anisotropy)
- In-situ stresses and plate tectonics in the earth
- Effective stresses and the role of pore pressure in geomechanics
- Origins of pore pressure generation and different pore pressure measurement and calculation methods
- Review of different data sources for geomechanical characterization and the concept of integrated characterization
- Image log analysis and fracture characterization
- Construction of 1D and 3D mechanical earth models (MEMs) and their key characteristics
- Vertical stress characterization
- Introduction to Minifrac/DFIT analysis and key recorded pressures
- Basics of Integrated In-situ stress estimation (SHmax) using field tests, wireline logs, image logs, and seismic data
- Poroelastic modeling
- Frictional equilibrium and stress polygon
- Drilling history matching and borehole stability
- Data uncertainty analysis for geomechanical analysis
- Basic principles of hydraulic fracturing analysis and design
- Natural fracture characterization and DFN modeling
- Induced seismicity risk during hydraulic fracturing
- Introduction to data analytics and machine learning for drilling/completion/production optimization of unconventional plays

Product Details

Categories: Upstream

Disciplines: Petrophysics Unconventional Resources

Levels: Foundation

Product Type: Course

Formats Available: In-Classroom

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In-Classroom Format

9 Sep '24	13 Sep '24	-	Course	In-Classroom (in Houston)	$4,710.00