



D411: Mechanical Stratigraphy, Stress and Geomechanics (*Distance Learning*)

Tutor(s): Alan Morris and Kevin Smart

3 Days

Competence Level:
Skilled Application



Virtual Course

Summary

Business Impact: We will explore the importance and application of **stress and geomechanical analyses** to energy exploration and production in both conventional and unconventional reservoirs, with emphasis on **well design, borehole stability, and hydraulic fracturing**.

This course will apprise course participants of key concepts in fracture characterization and analysis, stress, and geomechanics. Participants will develop the skill sets necessary for planning and evaluating a fracture and geomechanics study.

Learning Outcomes

Participants will learn to:

1. Characterize mechanical stratigraphy based on lithostratigraphy and other information, such as outcrop observations, core analysis, and traditional well logs.
2. Evaluate the basics of fractures, stress analysis and geomechanics, including the interrelationship between stress and strain in the context of geomechanical rock behavior.
3. Methods of evaluating fault stability

Duration and Training Method

This is a virtual classroom course divided into five approximately three-hour webinar sessions with a mixture of lectures, discussions, and computer-based exercises. Participants will spend additional time between sessions working on exercises so that total time is equivalent of a traditional three-day classroom course.

Who Should Attend

The course is intended for exploration, development and production geoscientists and reservoir and production engineers whose focus is on unconventional resources and/or conventional fractured reservoirs.

Prerequisites and Linking Courses

Participants should have a familiarity with basic structural geologic principles prior to taking this class, such as is offered in N138 (Structural Interpretation in Petroleum Exploration and Development).

This is a classroom version of Nautilus field course N266. As the two courses use similar material and software, individuals should consider attending one or the other, but not both.

Related courses include:

- N381 (Influence of Tectonics and Mechanical Stratigraphy on Natural Deformation in the Permian Basin)
- N364 (Fracture Architecture, Sedimentology and Diagenesis of Organic-rich Mudstones of Ancient



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Upwelling Zones with Application to Naturally Fractured Reservoirs (California, USA))

- N371 (Natural Fractures and Production in Different Reservoir Lithologies, Examples and Analogs from the San Juan Basin (New Mexico and Colorado, USA))
- N379 (Application of Geomechanics to Reservoir Characterization, Management and Hydraulic Stimulation (Wyoming, USA))

Course Content

- Session 1 – Mechanical Stratigraphy and Fracture Basics
 - Lecture
 - Interactive Exercises
- Session 2 – Stress Analysis
 - Lecture
 - Exercises (outside of session)
- Session 3 – Stress Analysis
 - Interactive Discussion Exercises
- Session 4 – Geomechanics
 - Lecture
 - Exercises (outside of session)
- Session 5 – Geomechanics
 - Interactive Discussion Exercises