



## Rock Mechanics and Wellbore Stability

Rock Mechanics is the science of deformation of rocks and stability of structures in rock formations such as wellbores and underground mines and storage caverns. It is based on the study of the mechanical properties of rocks and modelling the stress fields in rock formations.

This 5-day course is designed for drilling, completion and production engineers as well as exploration geologists and research and development staff of oil companies. It covers the problems related directly or indirectly to the wellbore instability. The goal is to provide to the participants the ability to a rough assessment of wellbore stability on the basis of relevant field and laboratory testing data and to decide when the wellbore instability or sand production risks warrant a dedicated investigation.

The course begins with the basic concepts of deformation and mechanical behaviour of rocks and gradually focuses on the specific problem of borehole stability. It ends by case-studies of determination of the mud density allowing to safely operate and the conditions of wellbore breakout and hydraulic fracturing.

The course covers the following topics:

- Basic concepts and models of mechanical behaviour of rocks: elasticity, plasticity, pore pressure, effective stress and poroelasticity.
- Models of rocks strength and failure: Mohr-Coulomb, Mises and Drucker-Prager criteria
- Methods and techniques of laboratory testing to determine rock properties
- Models and techniques to obtain and apply earth stress data
- Determination of stress fields around boreholes and how to assess the wellbore stability
- Effects of formation pressure and mud properties on wellbore stability

The participants will receive a detailed course manual including all presented material, up-to-date reference lists on the topics covered in the course and an Excel program for basic borehole stress and stability calculations