

# STRUCTURAL GEOLOGY IN PETROLEUM EXPLORATION AND DEVELOPMENT

## GEO002

### COURSE DESCRIPTION

The explosion of 3-D seismic has given us an opportunity to map structures in a more detailed manner than ever before. However, making the most realistic geologic interpretation of these structures is only as good as our ability to recognize the fundamental characteristics of the assemblage in which they occur. Only by recognition of the many facets, variations, differences, and similarities of each assemblage with its associated styles and substyles, can confident interpretations be made. This course provides an overview of all hydrocarbon-bearing structural assemblages from the trap to the plate-tectonic scale. The processes that produce the structures and control their variability are explained in terms of basic rock-mechanical principles and physical-model examples.

### COURSE GOAL

To enhance participants' knowledge, skills, and abilities necessary to improve understanding and awareness of structural geology in petroleum exploration and development.

### COURSE OBJECTIVES

By the end of this course, participant will be able to:

- Apply mechanical-stratigraphic concepts to understand and predict trap geometry.
- Use restoration and balance to validate an interpretation and interpret the structural evolution.
- Recognize the structural style or styles of a region from map and cross-sectional expression.
- Distinguish characteristics of each structural style on reflection seismic sections.
- Interpret the mechanics of deformation for each structural style.
- Predict the effects of deformation on reservoir porosity, permeability and continuity.

### WHO SHOULD ATTEND

Exploration and development geologists, geophysicists, engineers, and geoscientific managers.

### COURSE DURATION

5 Working Days

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## COURSE OUTLINES

- Mechanical principles governing folding and faulting.
- Mechanical stratigraphy.
- Predicting structure from stratigraphy.
- Deformation mechanisms.
- Folding vs. Faulting.
- Palinspastic restoration of cross sections.
- Structural validation criteria.
- Sequential restoration and growth history.
- Structural assemblages: families and styles.
- Fault-related folds.
- Regional arches and domes.
- Compaction, dissolution and impact structures.
- Wrench faults: simple, convergent, and divergent.
- Thin-skinned fold-thrust belts.
- Basement-involved contraction.
- Inversion.
- Thin-skinned extension.
- Basement-involved extension.
- Salt sheets.
- Diapirs.
- Exploration problems for each style.
- Plate-tectonic habitats of structural assemblages.
- Effects of structures in reservoirs: joints, stylolites, faults.
- Deformation that enhances or reduces permeability.
- Predicting the effect of fault zones on fluid flow.
- Tectonic synthesis and exploration project.

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