

BASIC STRUCTURAL GEOLOGY AND STRUCTURAL STYLES

GEO001

COURSE DESCRIPTION

This course presents the structural models of common trap forming structures. It provides a strong fundamental background in structural geology of the various tectonic settings. The course covers common structural styles in sedimentary basins as well as the plate tectonics and sedimentary basin formation and classification. It also serves the mechanisms of rock deformation for each structural style.

COURSE GOAL

To enhance the participants' knowledge, skills and abilities necessary for the application of structural geology, plate tectonics, and structural styles in petroleum exploration.

COURSE OBJECTIVES

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

- Be familiar with rock properties, mechanics and stress regimes.
- Understand how structural geology relates to geology.
- Determine objectives of structural geology and scope of application to exploration programs.
- Understand the mechanical principles
- Be aware of the significance of cross – sections.
- Be Aware of the significance of seismic profiles.
- Understand the structural styles and exploration problems for compressional and extensional styles.
- Determine folds types and their description.
- Understand mechanics dynamics and causes of folding Joints.
- Measure the strike and dip of faults.
- Apply the criteria for recognizing faults (reverse vs. thrust faults).

WHO SHOULD ATTEND

All geoscientists and engineers involved in exploration and production.

COURSE DURATION

5 Working Days

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COURSE OUTLINES

1. Introduction

- Course overview and objectives.
- Importance of structural geology in petroleum exploration.

2. Rock Properties, Mechanics, and Stress Regimes

- Understanding rock properties and behavior under stress.
- Introduction to stress regimes and their impact on deformation.

3. Relationship between Structural Geology and Geology

- Connecting structural geology with broader geological processes.
- How structural geology contributes to understanding geological structures.

4. Objectives and Scope of Structural Geology in Exploration Programs

- Identifying goals and applications of structural geology in exploration.
- Improving exploration strategies and decision-making with structural geology.

5. Mechanical Principles

- Materials, forces, and litho-static pressure in rock deformation.
- Calculation of stress and deformation mechanisms.

6. Plate Tectonics and Basin Classification

- Overview of plate tectonic theory and its relevance to structural geology.
- Classifying sedimentary basins based on tectonic settings.

7. Significance of Cross-Sections

- Importance of cross-sections in analyzing subsurface structures.
- Interpreting geological features through cross-sections.

8. Significance of Seismic Profiles

- Role of seismic profiles in subsurface imaging and structural analysis.
- Interpreting seismic data for identifying structures and traps.

9. Structural Styles and Exploration Problems in Compression and Extension

- Understanding different structural styles in compression and extension.
- Challenges and opportunities in exploration associated with these styles.

10. Types and Description of Folds

- Identification and classification of different fold types.
- Describing fold geometry and characteristics.

11. Mechanics, Dynamics, and Causes of Folding Joints

- Understanding mechanics and dynamics of folding joints.
- Exploring causes of folding joints in geological structures.

12. Measurement of Strike and Dip of Faults

- Techniques for accurate measurement of fault strike and dip angles.
- Interpreting fault orientations for structural analysis.

13. Criteria for Recognizing Faults (Reverse vs. Thrust Faults)

- Differentiating between reverse and thrust faults based on criteria.
- Recognizing fault-related structures and their significance in exploration.

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