

**Faculty of Engineering & Technology**

**Structural Geology**

**Information :**

**Course Code :** GEO 301      **Level :** Undergraduate      **Course Hours :** 2.00- Hours

**Department :** Department of Petroleum Engineering

**Instructor Information :**

Title	Name	Office hours
Lecturer	Mostafa Abdou Roshdy Ahmed Teama	3
Lecturer	Mostafa Abdou Roshdy Ahmed Teama	3
Assistant Lecturer	YOUSSEF ELSAYED ABDELHAFEZ KANDIEL	
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**Area Of Study :**

Expand the scope of knowledge of the petroleum engineer to include the importance Structural Geology and hydrocarbon entrapment, Understand the kinematic analysis and different rock behavior (Stress-strain relationship), and Identify the different types of deformation (brittle and ductile) and the structuration resulted.

**Description :**

This course examines the fundamental concepts of deformation of the lithosphere. Due to the mobile nature of the Earth's lithosphere, rocks are invariably deformed, showing evidence of the effects of large stresses at all scales, from submicroscopic to regional. A long geologic history on Earth has resulted in many regions showing the cumulative effects of multiple deformation events. It is therefore important to be able to distinguish different geologic structures, describe them fully, understand how they formed, and place them in the context of a broader geologic history. There are few aspects of geology that are not directly impacted by the effects of deformation. This course will provide you with a framework to integrate an understanding of structural geology into all aspects of geologic study.

**Course outcomes :**

**a. Knowledge and Understanding: :**

- 1 - Recognize the orientation of planar and linear structures with a Brunton compass.
- 2 - List the probable type of stress that created a structure.

**b. Intellectual Skills: :**

- 1 - Solve 3-point problems to determine subsurface strike and dip.
- 2 - Compare different types of faults and folds.

**c. Professional and Practical Skills: :**

- 1 - Use stereonet to determine structural information.
- 2 - Construct geologic cross-sections.

**d. General and Transferable Skills: :**

- 1 - Communicate effectively.
- 2 - Collaborate effectively.

**Course Topic And Contents :**

Topic	No. of hours	Lecture	Tutorial / Practical
Plate tectonic theory	3	2	1
Kinematic analysis	6	4	2
Joints	6	4	2
Extensional faults	9	6	3
Compressional faults	9	6	3
Shear faults	3	2	1
Folds	9	6	3

**Teaching And Learning Methodologies :**

Interactive Lecturing  
Problem Solving  
Experiential Learning

**Course Assessment :**

Methods of assessment	Relative weight %	Week No	Assess What
Final exam	40.00		
In Class Quizzes	10.00		
Lab	10.00		
Mid-Term exams	30.00		
Participations	10.00		

**Course Notes :**

PDF files available direct after lectures

**Recommended books :**

- 1) Park, R. G., Foundations of Structural Geology, 2nd Edition. Blackie, USA: Chapman and Hall, New York, 148 p, 1989.
- 2) Hatcher, R. D., Structural Geology, Principles, Concepts and Problems. Merrill Publishing Company, Columbus, 1995, 525p.
- 3) Hatcher, R. D., and Hopper, R. J., Laboratory Manual for Structural Geology. Macmillan Publishing Company, New York, 1990, 217p.
- 4) Hobbs, Means, and Williams, An Outline of Structural Geology, John Wiley and Sons, Inc., New York, 1976.
- 5) Marshak, S. and Mitra, G., Basic Methods of Structural Geology, Prentice Hall, Inc., Englewood Cliffs, New Jersey, 1988.
- 6) Suppe, J., The Principles of Structural Geology, Prentice-Hall, Inc., New Jersey, 1985.
- 7) Ragan, D. M., Structural Geology, An Introduction to Geometric Techniques, Third Edition, John Wiley and Sons.
- 8) Ramsay, J. G., Folding and Fracturing of Rocks, McGraw-Hill Book Company, New York, 1967, 568p.
- 9) Ramsay J. G., and Huber, M. I., The Techniques of Modern Structural Geology, Volume 1: Strain Analysis, Academic Press, New York, 1983.
- 10) Ramsay J. G., and Huber, M. I., The Techniques of Modern Structural Geology, Volume 2: Folds and Fractures, Academic Press, New York, 1983.
- 11) Means, W.D., Stress and Strain, Basic Concepts of Continuum Mechanics for Geologists, Springer Verlag, New York, 1976.