

Faculty of Engineering & Technology

Rock Mechanics

Information :

Course Code : MAN 301

Level : Undergraduate

Course Hours : 2.00- Hours

Department : Department of Petroleum Engineering

Instructor Information :

Title	Name	Office hours
Associate Professor	Ashraf Fahmy Mohamed Ismael	7
Teaching Assistant	Akram Rabie Hamed Ragheb Tobar	

Area Of Study :

The course aims to familiarize the 3rd year students with the Stress analysis, strain analysis, stress strain relations, some important problems in rock mechanics, rock behavior and loads, theories of rock failures.

Description :

Ability to bear stresses ,compressive strength, tensile strength, deformation response to stresses, elastic moduli, Poisson's ratio, principal stresses, in-situ stress regime, total-stress and effective stress, temperature effects, nature and origin of pore pressure, faulting and folding, tectonics, regional structural analysis, regional and localized stress, stresses around boreholes, overburden stress, horizontal stresses, mini-frac tests, formation testers, other pressure transient techniques, and tool deployment unconfined compression, triaxial compression, hydrostatic compression, poly-axial, multi-stage triaxial, thick-walled cylinder, direct tensile strength, indirect (Brazilian) tensile strength, direct shear, uniaxial strain (compaction), and quick look (rock hardness) and scratch tests, geological/mapping methods, wireline logging techniques, anelastic strain recovery, differential strain curve analysis, acoustic anisotropy.

Course outcomes :

a. Knowledge and Understanding: :

- 1 - Explain mechanical and physical properties for different types of rocks.
- 2 - Describe laboratory and in-situ tests for different types of rocks.
- 3 - List methodologies of solving rock engineering problems and data collection.

b. Intellectual Skills: :

- 1 - Review appropriate solutions for engineering problems based on analytical thinking.
- 2 - Apply a creative and innovative way in rock failures problem solving and design.

c. Professional and Practical Skills: :

- 1 - Apply knowledge of mathematics, science, information technology, design, business context and engineering practice integrally to solve engineering problems.
- 2 - Merge the engineering knowledge, understanding, and feedback professionally to improve design, products and/or services.

d. General and Transferable Skills: :

- 1 - Work in a team.
- 2 - Deal with others according to the rules of professional ethic.

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Rock as a Material	4	2	2
Rock as a Material	4	2	2
Analysis of Stress and Strain	4	2	2
Analysis of Stress and Strain	4	2	2
Laboratory Testing of Rocks	4	2	2
Geological Aspects of Petroleum Related Rock Mechanics	8	4	4
Deformation and Failure of Rock	4	2	2
Geological Aspects of Petroleum Related Rock Mechanics	8	4	4
Deformation and Failure of Rock	4	2	2
Stresses Around Boreholes.	8	4	4
Borehole Failure Criteria.	8	4	4

Teaching And Learning Methodologies :

Interactive Lecturing
Discussion
Problem Solving

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
Assignment	15.00		
Final Exam	40.00		
Mid- Exam	25.00		
Participation	10.00		
Quizzes	10.00		

Course Notes :

Handouts for lectures and lecture notes

Recommended books :

*Fundamentals of Rock Mechanics.

Periodicals :

Onepetro

Web Sites :

www.spe.org

