



College of Science

Department of Earth Sciences

Course Code: ERSC3021

Course Title: Structural Geology I

General Information

Number of Credits:	3
Instructional Format:	2 hours lectures + (2 + 2) labs
Contact Hours/Week:	6
Prerequisite:	ERSC2101 Introduction to Geology
Co-requisite:	
Assessment:	Mid-term exam, labs, field report, final exam
Grading (A–F, Pass/Fail):	Grading A-F
Textbook:	Park, R.G. 1997. Foundations of Structural Geology
References (optional):	

1. Course Description

Introduction to the main topics of the structural geology: stress and strain, faults, folds, joints, foliation and lineation. Lab classes will include stereographic projection, geometric problems, construction of cross sections.

2. Course Objectives

- Know the basics of stress and strain
- Differentiate the different types of structures
- Application of structures
- Application to the geology of Oman

3. Learning Outcomes

- Understand the difference and relationship between stress and strain.
- Know different types of structures (faults, folds, and joints), their basic nomenclatures and geometries, how to classify and describe them, and why they form.
- Identify the types of features associated with the faults.
- Know the types of structures covered by the term "foliation" and define the geometrical relationship between foliations and folds.
- Know what an active fault is, how to recognize it, and what features indicate its activity.

Knowledge and Understanding

- Understand the relationship between stress and strain
- Know & describe different types of structures
- Understand the applications of structures

Skills (Thinking)

- Using the geological compass
- Recognize structures in the field
- Using stereographic projection
- Using the geological map

4. Assessment

Lab exercises (20%), Mid-term exam (20%), Field report (20%), and Final exam (40%) .

Assessment Criteria

Learning outcome:	Assessment criteria				
	A	B	C	D	F
By the end of the course, students will be able to:					
1. Use and interpret the notion of joint and conditional distributions	Clear ability to recognize environmental hazards and suggest suitable remediation technique	Able to recognize environmental hazards and suggest suitable remediation technique	Satisfactory Ability to recognize environmental hazards and suggest suitable remediation technique	Having difficulty to recognize environmental hazards and suggest suitable remediation technique	Unable to recognize environmental hazards and suggest suitable remediation technique
2. Differentiate between stress and strain, and their basic applications	Competent to understand the impacts of shortages in natural resources	Able to understand the impacts of shortages in natural resources	Satisfactory understanding of the impacts of shortages in natural resources	Struggle to understand the impacts of shortages in natural resources	Incapable to understand the impacts of shortages in natural resources
3. Identify different types of faults and folds in theory and in the field	Easy to identify the precursors of geological hazards.	Can identify the precursors of geological hazards.	Satisfactory ability to identify the precursors of geological hazards.	Struggle to identify the precursors of geological hazards.	Hard to identify the precursors of geological hazards.
4. understanding of basic concepts in structural geology, including the use of the compass and the Schmid'net	Very able to assess the quality of water, soil and air and advise the public accordingly	Able to assess the quality of water, soil and air and advise the public accordingly	Could assess the quality of water, soil and air and advise the public accordingly	know how to assess the quality of water, soil and air but can't advise the public	Cannot assess the quality of water, soil and air
6. Basic interpretation of structural maps and cross sections	Having the skill to take necessary precautions to mitigate geo-hazards	Having the knowledge to take necessary precautions to mitigate geo-hazards	Satisfactory ability to take necessary precautions to mitigate geo-hazards	Having difficulty to take necessary precautions to mitigate geo-hazards	Incapable to take necessary precautions to mitigate geo-hazards

5. Course Structure

The course is designed to be delivered in one semester of 15 weeks with 6 contact hours per week (2 theoretical and 4 practical). The course weight is 3 credit hours.

6. Topics

Unit	Topics	Sections	Lectures/Weeks
1	Stress & Strain		1-3
2	Normal faults		4-6
3	Reverse faults		7-8
4	Strike-slip faults		9-10
5	Folds		11-12
6	Joints		13
7	Foliations and lineations		14

7. Lab/tutorial content

Week	Content
2	Compass readings
3	Compass Measurements
4	Stereographic projection (introduction)
5	Stereographic projection (apparent and true dip)
6	Stereographic projection (folds)
7	Stereographic projection (fault slip)
8	Stereographic projection (stress)
9	Maps and cross sections
10	Folds and folding
11	Joints and veins
12	Seismic profile