THE FEDERAL UNIVERSITY OF TECHNOLOGY, AKURE

Department of Applied Geology

AGY 312 – Structural Geology

COURSE PARTICULARS

Course Code: AGY 312
Course Title: Structural Geology
No. of Units: 3
Course Duration: Two hours of theory and three hours of practicals per week for 15 weeks.
Status: Compulsory
Course Email Address:
Course Webpage:
Prerequisite: PHY 101, AGY 205, AGY 208

COURSE INSTRUCTORS

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COURSE DESCRIPTION

This course is designed to teach students the geometrical features of main structural elements, the forces and processes involved in rock deformation, their resultant effects and how to appreciate and interpret the structural features and their evolution in time.

COURSE OBJECTIVES

The objectives of this course are to:

- introduce students to the principles of rock deformation, the geometries of the main structural elements
- teach students how to interpret these structures in terms of the deformational processes and evolution in time

COURSE LEARNING OUTCOMES / COMPETENCIES

Upon successful completion of this course, the student will be able to:

- appreciate the geometry of structural elements
- appropriately describe geological structures
- understand the processes which produced these structures
- interpret the structures in terms of the development with time
- relate the minor structures to the major, larger scale structures

GRADING SYSTEM FOR THE COURSE

This course will be graded as follows:

Tests and assignments	40%
Final Examination	60%
TOTAL	**100%**

GENERAL INSTRUCTIONS

Attendance: Every student is required to attend all lectures and practicals. Records of attendance will be taken and those who do not meet the Senate approved requirements in this respect will not be allowed to sit for the final examination.

Academic Integrity: Students are expected to maintain academic intergrity. Acts of dishonesty in assignments, examinations, or other academic activities are not allowed and will be visited with appropriate university sanctions.

Assignments: Students are expected to submit assignments as scheduled. Failure to submit an assignment as at when due will earn you zero for that assignment. Only under extenuating circumstances, for which a student has notified any of the instructors in advance, will late submission of assignments be permitted.

Code of Conduct in Lecture Rooms and Laboratories: Students are to switch off their mobile phones during lectures. Eating and drinking are not allowed in the lecture rooms and laboratories.

READING LIST

[1]Hatcher, R.D. *Structural Geology*. 2nd Edition. Prentice Hall

[1]Twiss, R.J. and Moores, E.M. *Structural Geology*, 2nd Edition, W.H. Freeman and Company

Park, R.G. *Foundations of Structural Geology*. 2nd Edition. Blackie.

Davis, G.H. and Reynolds, S.J. *Structural Geology of Rocks and Regions*. 2nd Edition. Wiley

Ramsay, J. G. and Huber, M.I. *The techniques of modern Structural Geology*, vols 1 and 2. Academic Press.

1- Available in the University Library

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Week	Topic	Remarks
1	Introduction. The scope of structural geology. Factors influencing rock deformation. Force and stress, units of force and stress. Stress on a plane, stress at a point.	During this first class, the expected outcomes from the course will be discussed.
2	Principal stresses, hydrostatic stress, deviatoric stress. Mohr's circle for stress, failure envelope Effect of pore fluid pressure	
3	Rheology. Stress-strain relations Elasticity Plastic and viscous deformation	
4&5	Brittle structures, Fractures. Faults: normal, reverse,, strike-slip Low angle and listric normal faults, roll-over anticlines Strike slip fault systems	Some practical exercises will be given

	Joints and veins	
6&7	Ductile structures Folds- geometry and nomenclature Fold systems, superposed folding and fold interference patterns. Mechanisms of folding	
		Mid-semester test
8&9	Tectonic fabrics- foliations and lineations Deformation mechanisms-fracture, cataclasis Crystal plasticity, creep, recovery and recrystallization	

10 & 11	Ductile shear zones- geometry and fabric development, microstructures Shear fabrics and strain distribution Determination of strain and displacement Shear sense, kinematic indicators	Practical exercises and assignments will be given to students
12 & 13	Thrust and fold systems Geometry of thrusts and associated folds Sequence of thrusting, imbricate systems and duplexes Cross-sections	
14&15	Structural Analysis Principles of stereographic projection. Stereographic analysis of planar and linear structural elements. Fracture-orientation diagrams- rose diagrams and strike histograms	These will mainly involve practical exercises. Some appropriate structural software will be introduced.