

University of Arkansas - Fort Smith
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General Syllabus

GEOS 30134 Geological Field Methods

Credit Hours: 4

Lecture Hours: 3

Laboratory Hours: 2

Prerequisite: GEOL 11343/11331 Historical Geology/Lab

Effective Catalog: 2020-21

I. Course Information

A. Catalog Description

Geological mapping on a topographic base, collection and interpretation of field data, and geological report writing.

B. Additional Information

This course is required for the B.S. degree in Geoscience.

II. Student Learning Outcomes

A. Subject Matter

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

1. Use a Brunton compass to accurately measure bearings, strike, and dip in the field.
2. Accurately locate geological features on a topographic map base.
3. Identify various rock types and geological contacts in the field.
4. Record geological data in a field notebook indexed to a field map.
5. Project planar contacts across topography.
6. Project strike and dip into the plane of a cross-section, with accurate adjustments for apparent vs. true dip.
7. Write a basic geological report that includes a description of field data, interpretations, a geological map with legend, and cross-sections.
8. Recognize frequently encountered patterns on published geological maps (i.e. horizontal bedding, homoclinal bedding, faults, folds, and unconformities).
9. Estimate bed thickness from published geological maps.

B. University Learning Outcomes

This course will enhance student abilities in the following areas.

Analytical Skills

Critical Thinking Skills

Students will identify a problem or issue and will research, evaluate, and compare information from varying sources in order to evaluate authority, accuracy, recency, and bias relevant to the problems/issues. The student will generate solutions/analysis of problems/issues evaluated and will assess and justify the solutions and/or analysis.

Communication Skills (written and oral)

Students will communicate proficiently. The student will compose coherent documents appropriate to the intended audience and effectively communicate orally in a public setting.

Global & Cultural Perspectives

Students will reflect upon cultural differences and their implications for interacting with people from cultures other than their own. The students will demonstrate understanding or application of their discipline in a global environment and will demonstrate how their discipline impacts or is impacted by different cultures.

III. Major Course Topics

A. Field and Office Methods

1. Using a Brunton Compass
2. Planning field projects
3. Collaborating in the field
4. Field notes and sketches
5. Locating yourself on a topographic map
6. Accurately measuring and recording bearings
7. Accurately measuring and recording strike and dip
8. Recognizing and mapping different types of geological contacts
9. Projecting planar contacts on topography
10. Stratigraphic vs. vertical thickness
11. Estimating bed thicknesses from geologic maps
12. Apparent dip vs. true dip
13. Projecting strike and dip into the plane of a cross-section

B. Interpreting Patterns on Geologic Maps

1. Surficial deposits
2. Structure contour maps
3. Homoclinal bedding
4. Horizontal bedding

5. Unconformities
6. Fault displacement vs. separation
7. Folds
8. Deducing relative ages

C. Presenting the Results of a Mapping Project

1. Writing a standard geologic report
2. Using figures and sketches effectively
3. Acknowledging the work of others
4. Drafting a geological map with legend
5. Constructing simple cross-sections and stratigraphic columns