GEOL A137: INTRODUCTORY FIELD GEOLOGY

Item	Value
Curriculum Committee Approval Date	12/08/2021
Top Code	191400 - Geology
Units	4 Total Units
Hours	108 Total Hours (Lecture Hours 54; Lab Hours 54)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	No
Basic Skills	Not Basic Skills (N)
Repeatable	No
Open Entry/Open Exit	No
Grading Policy	Standard Letter (S), • Pass/No Pass (B)

Course Description

Provides intensive field experience in application of field geology equipment, methods, techniques and maintenance procedures. Emphasizes a "hands-on" approach to the interpretation of geologic data in the field. Includes use of Brunton compass and tape, aerial photos, global positioning system, and geographical mapping. PREREQUISITE: GEOL A105 or GEOL A105H or GEOL A110. Transfer Credit: CSU.

Course Level Student Learning Outcome(s)

1. Investigate geologic features and processes using directed lab assignments.
2. Investigate geologic features and processes in the field using geologic field mapping techniques and instrumentation.
3. Collaborate in teams to produce geologic field products (maps, cross-sections, strat colums, etc).

Course Objectives

- 1. Identify and catalog about 100 rocks
- 2. Apply geologic and scientific concepts learned in the classroom to field oriented geologic situations
- 3. Solve and a geologic field problem that includes the fundamentals of compass and tape traverses
- 4. Create a geologic map using geologic surveying equipment and field notebooks
- 5. Use geologic surveying equipment in the field
- 6. Design and construct a geological structure map and cross-section
- 7. Create a stratigraphic section that uses procedures and descriptions of stratigraphy and fossil analyses
- 8. Calculate and produce topographic data by using the global positioning system and laser rangefinder
- 9. Construct a topographic map for field measurements
- 10. Construct, read and interpret geologic maps and field measurements
- 11. Statistically plot, document and interpret field geological processes by use of field notebook analyses
- 12. Diagram a structural contour map
- 13. Generate and create geologic field notes and maps of rock outcrops, geologic processes and tectonics based on evaluation, documentation, construction and analyses of field observations

Lecture Content

Introduction to Field Geology What is Field Geology and Why is it Important? What Makes a Successful Field Geologist? How Do You Learn Field Geology? Field Safety and Etiquette Understanding Geologic Maps Components of a Geologic Map Interpreting Geologic Maps Base Maps Map Projections and Datums Geographic Coordinate Systems or Map Grids Commercially Available Base Maps Creating Your Own Base Maps Interpreting Geology from Base Maps Measuring and Mapping Structures Planar Structures Linear StructuresIntroduction to field geology and geologic mapping Subsurface Mapping Techniques Underground Mapping Drilling and Logging Core Geophysical Surveys Presenting Geologic Field Data Communicating Results Formatting a Geologic Map Hand-drafted Maps Digital Geologic Maps Geographic Information Systems (GIS) Applied to Geologic Mapping Writing a Geologic Report

Lab Content

Tools and Techniques in the Field Essential Field Equipment Digital Field Equipment Other Field Equipment Geologic Mapping Methods and Procedures Preparation and Reconnaissance Locating Planning and Carrying Out Traverses Observing and Recording Data Plotting Data on Your Map in the Field Compiling Your Map Creating Cross Sections Step 1. Locating a Cross Section Line Step 2. Creating a Topographic Profile Step 3. Projecting Data from Map to Cross Section Step 4. Interpreting Structures Step 5. Reassessing Initial Interpretations Step 6. Proofreading Step 7. Finalizing a Cross Section Mapping Sedimentary Rocks How to Approach Mapping an Outcrop of Sedimentary Rocks Describing Sedimentary Rocks in the Field Naming Sedimentary Rocks in the Field Naming Sedimentary Map Units Making Field Measurements in Sedimentary Rocks Mapping Igneous and Metamorphic Rocks How to Approach Mapping an Outcrop of Igneous Rocks Describing Igneous Rocks in the Field Naming Igneous Rocks in the Field Naming Igneous Map Units Making Field Measurements in Igneous Rocks How to Approach Mapping an Outcrop of Metamorphic Rocks Describing Metamorphic Rocks in the Field Naming Metamorphic Rocks in the Field Naming Metamorphic Map Units Measuring and Mapping Features in Metamorphic Rocks Mapping Surficial Deposits Types of Surficial Deposits Types of Surficial Geology Maps Techniques for Mapping Surficial Deposits

Method(s) of Instruction

- Lecture (02)
- Lab (04)
- Field Experience (90)

Instructional Techniques

Field experience, field trips, lab lectures, independent study, practical exercises, and hands-on approach complemented by videos, photos (powerpoints presentations), and geological surveying equipment. Field and lab demonstrations.

Reading Assignments

Students will spend approximately two hours per week on readings assigned from textbook(s) and handouts.

Writing Assignments

Students will spend approximately two hours per week on the following: Written assignments that analyze and critically evaluate field geology in different regimes Individual note-taking field notebooks for each field problem

Out-of-class Assignments

Students will spend approximately two hours per week on: Readings assigned from textbook(s) Complete various field exercises and problem solving exercises Complete a geologic field map that includes geologic mapping techniques using geological surveying equipment Complete a geologic field problem that includes measurements of stratigraphic sections and fossil collecting

Demonstration of Critical Thinking

Completion of a geological map field problem using geological surveying equipment Completion of a geological stratigraphic section using stratigraphic measurements and fossil identification Completion of a final geological map using all geologic data and geological surveying equipment appropriate to the field class Completion of a structural geoogical map and cross-section

Required Writing, Problem Solving, Skills Demonstration

Creation of a geologic field notebook for each geologic field problem Completion of various field exercisees and problem-solving geological exercises in classroom

Eligible Disciplines

Earth science: Master's degree in geology, geophysics, earth sciences, meteorology, oceanography, or paleontology OR bachelor's degree in geology AND master's degree in geography, physics, or geochemistry OR the equivalent. Master's degree required.

Textbooks Resources

1. Required Coe, A. L.. Geological Field Techniques, 1st ed. Wiley-Blackwell, 2010 Rationale: . 2. Required Lisle, R. J., Brabham, P., Barnes, J. W.. Basic Geological Mapping, 5th ed. Wiley, 2011

Other Resources

1. Geologic rock hammer, 10x hand lens, field bag, rapidograph pens, Rite in the Rain All-Weather geologic notebook