Instructor: Professor David L. Kimbrough
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Class time T 930-1110 Th 930-1210: CSL 422
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Teaching Assistant: Cheryl Johnson; Office GMCS

**Required Texts:**
- The Rise and Fall of San Diego by Patrick L. Abbott. Darling Corporation.
- “Rite in the Rain” all-weather Geological Field Book No., 540F J.L.

**Recommended Texts:** Geologic Dictionary and/or American Geological Institute Glossary of Geology

**Other required materials:** appropriate field gear, day pack; handlens

**Course overview** Geological Sciences is the study of the origin, history, and structure of the Earth and other planets and the processes that have shaped them since the origin of the solar system. It, like all other broad scientific disciplines such as Physics, Chemistry, and Biology, encompasses diverse “specialties”. The interdisciplinary diversity of geology is reflected by the different emphases offered in conjunction with the Bachelor of Science degree at San Diego State University: General Geology, Engineering Geology, Geochemistry, Geophysics, Hydrogeology, Marine Geology and Paleontology.

This course introduces you to knowledge and skills necessary to all the sub-disciplines of the Geological Sciences. There are two main components to the course: (1) field geology and map interpretation; fundamentally, all geologic understanding is based on spatial (map) data. Evidence comes from the nature, distribution and relationship of rock types in the field, and (2) applied mathematics aimed at building quantitative literacy in the geosciences.

This course employs an inquiry-based pedagogy. This approach allows you to engage in independent thinking and problem solving, and gain an understanding of how scientists study the natural world. You will be an active participant in your learning and develop skills necessary to conduct scientific activities. This will involve collaborative learning with your fellow students, just as science requires teamwork. You will address scientific questions; gather evidence, formulate explanations, evaluate alternatives, and justify explanations.

**Philosophy of Curriculum and Instruction**
- The student is best served by a curriculum that includes a broad diversity of field experiences.
- Learning experience should be active, cooperative, and demanding.
You learn best in a setting that minimizes travel and logistics and maximizes time in the field.
You learn more effectively by working with fellow students in groups.
To develop competence you must: a) have a foundation of factual knowledge, b) understand facts and ideas in the context of a conceptual framework, and c) organize knowledge in ways that facilitate retrieval and application.

Learning outcomes

- Develop a familiarity with basic field methods (use of compass, topographic maps, GPS, taking field notes), rock and mineral identification from hand specimens, and the basics of stratigraphy, sedimentation, and structure applied to construction of a geologic history for an area.
- Communicate the major geologic events in an area based on map and stratigraphic data you collect in the field.
- Geologic map interpretation and construction of cross-sections.
- Accurately record field data, and describe and sketch outcrops.
- Apply mathematics to analysis and problem-solving.
- Gain an appreciation for the nature of scientific inquiry.
- Learn and practice the tools for skeptical thinking – be able to construct and understand a reasoned argument and recognize a fallacious or fraudulent argument.

Field Trips
Field trips to investigate local geology are a required part of the course. Some of these will be local trips made during scheduled class time. Three weekend trips are scheduled:
- Sept 25  Stewart Mine, Pala pegmatite district
- Oct 16 Anza-Borrego State Park, Split Mountain
- Nov 12-14 Rainbow Basin, Mojave Desert

Grading
- Grades will be based on class attendance and participation, homework assignments, labs, exams and a research project.

Research Project
An independent research project and class presentation on some aspect of the local geology is a required part of this course. This project is designed to (1) familiarize you with basic research methods in earth sciences (2) give you experience making presentations (3) highlight interesting aspects of local geology, and (4) get more practice writing. Requirements:
- Writeup:
  One thousand words (not including maps, figure captions, and references)
- In-class presentation:
  10-15 minute Powerpoint presentation to the class
- Research Sources:
  Must include hardcopy materials from the library (books, reports, maps etc) including at least two articles from peer-reviewed professional journals
  Information/data/images from the WWW is fine but must be properly referenced.
Fieldtrip information

Field trips are an essential part of the geologic learning process that help develop conceptual skills for solving geologic problems, and fieldtrips are therefore a required part of this class. Understanding the modes of formation of rocks & minerals and their relationship to one another in the context of landscape evolution and the extended geologic history of a region is at the core of the geological sciences. The most successful geologists are in general those with the strongest field skills, which explains the strong field emphasis of the SDSU program as well as just about every other top program across the country.

The purpose of each field trip including instructional outlines will be provided to you separately prior to each trip.

Your safety and health on field trips is a primary concern. You must have proper clothing and shoes and eye protection, and provide sun protection, water and food or snacks for yourself. Additional details including necessary geology field gear will be provided separately. Emergency contact information should someone need to contact you while you are on a trip: (Department Office: (619)594-5586 or SDSU public safety: (619)594-1991)