Geos F455B Field Geology Part 2 (4 Credits) – 2025

Instructors

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Teaching Assistants: TBA

Prerequisites

- Petrology and Petrography (GEOS F214)
- Field and Computer Methods (GEOS F225)
- Tectonics (GEOS F309)
- Structural Geology (GEOS F314)
- Paleobiology and Paleontology (GEOS F315)
- Stratigraphy and Sedimentation (GEOS F322)
- WRTG F111X and WRTG F211X or WRTG F213X
- Firearms and bear safety training (offered separately for UAF students in Spring)
- Junior standing; Permission by Instructor

Location

Elliot Highway and eastern Talkeetna Mountains, Central Alaska; UAF Troth Yeddha' campus (Reichardt 235 and 316)

Meeting time

Meets daily 8:30 am to 5:30 pm (+ hours outside of field work) for a 4-week period.

'Office' Hours

Instructors will be involved during the students' mapping as 'geo-buddies', accompanying them in the field, turning it into their 'office'.

Course type

In person, field

Textbooks

We will supply a field manual for your use, as well as handouts as needed during the course.

Catalog Course description

Sedimentary and volcanic rocks in the eastern Talkeetna Mountains of central Alaska are mapped with state-of-the-art geologic mapping app. You learn how to collect and interpret structural, lithologic and sedimentological data, create geologic maps and write scientific reports. A geologic and tectonic evolution of the study area will be developed.

Department In-depth Course description

Practical experience in mapping folded and faulted sedimentary and volcanic rocks of the Wrangellia Composite Terrane in central Alaska. You will collect and present basic geologic field data, including field mapping of stratigraphic and structural problems using topographic maps and satellite images, in both paper and digital form. The latter is accomplished with a mapping app and a tablet computer. Students will prepare geologic and structural maps and draft an extensive written report that includes a geologic history of the study area. This course requires strenuous hiking off trails in a variety of terrains with up to 1500 feet of elevation gain per day.

Ideally, you already have some experience in geologic mapping in less complex terrains (e.g., Field Geology Part 1). This course attempts to combine and consolidate lab skills you have acquired over the years with field skills and expands existing mapping experience, because you can never see too many rocks. A lot of students have some difficulty with this course. Please don't let that scare you off: most people have also had at least some difficulty in learning to ride a bike or drive a car, too. The task and the weather might be overwhelming at times, but you will adopt to it and develop confidence in your abilities! It is our job to make this

somewhat difficult experience also enjoyable and rewarding. We strongly encourage your feedback in this regard. With your cooperation and feedback, we can all have a good time and learn a great deal.

Course Goals

Although most geologists spend their time on computers in the office or lab, a clear understanding about rocks and the processes that form them and the environment we live in requires some exposure to rocks in the field. As a geologist you learn the best in the field where you are confronted with the complexities of nature, the abundance or lack of data. In the field you are forced to learn how to process field data and document it on a map, decide what material to collect and for which purposes. Furthermore, you will be able to manage your field project in such a way that you accomplish the maximum of the goal that you set at the beginning. Flexibility and the ability to improvise are crucial skills to be acquired, because weather conditions, accessibility in the field or unexpected findings ultimately will change the original plan. And finally, you will always become a better geologist after field work. Every time.

Student Learning Outcomes

By actively participating in this course you will become proficient at

1. Collecting, documenting and managing lithologic, sedimentological and structural data.
2. Using digital mapping devices and apps.
3. Measuring and drafting detailed stratigraphic sections and interpret depositional environments.
4. Identify fossils to determine stratigraphic age and biostratigraphic environments.
5. Making geologic map and cross-sections in faulted and folded sedimentary rocks.
6. Turning a field geologic map into a professional-quality final geologic map.
7. Develop geological and tectonic history of study area.
8. Writing short an extensive geologic report of near-professional quality.
9. Working with others in a (sometimes adverse) field setting.
10. Designing and executing daily field traverses designed to most efficiently create a geologic map.
11. Managing field projects.
12. Practice safety in the field.

Instructional Methods

The methods of instruction can be categorized as

a. Short class room type lectures in Fairbanks and in the field (there in office tents) on specific mapping skills, the application and interpretation of structural data (e.g., stereographic projection), stratigraphic sections and specific geologic problems.
b. Field instruction 1: Mapping tools and instruments (compass, GPS, mapping apps) are best introduced and practiced in small groups in the field.
c. Field instruction 2: The purpose of Field Geology Part 2 is to let students acquire skills that allow them to identify and interpret geologic rocks and structures IN THE FIELD. Therefore, teaching them these skills is best done in an outcrop in the field. The instructors will spend most of their time explaining geologic phenomena in front of the small group of 3-4 students they accompany that day. They will also inspect field notes and geologic field map during the day and provide constructive criticism if required.
d. Individual tutoring: After fieldwork is done for the day, students must add the data they collected during that day to their office map and other databases. Instructors will discuss with the student results, problems, and possible strategies for the next day in the field. This type of instruction is important for students to gain confidence in their capability and self-reliance to conduct field work on their own.
e. Group discussion: With increasing independence, and confidence, groups are encouraged to share their day's findings with the rest of the field camp crew. Since none of the groups make identical observations, even if they have covered the same area, it provides a great pool of information and highlights the different perception and expertise of the students and the instructor who accompanies them. It is a great and fun way to promote collaboration. Group discussions are scheduled for each evening following dinner and camp chores, unless fieldwork was too long and tiring.

Course Policies

Completion of all projects and project reports is required for this class. A student who misses class without an adequate reason (e.g., health) will be dropped. **A student who fails to submit geologic map or mapping report for Limestone Gap project will not pass**. An 'incomplete' will only be given if a student has completed all field exercises but has a reasonable cause to be granted additional time to finish.

Evaluation

1. Elliot Highway (40 points)
   - StraboSpot project uploaded to server with complete lithologic and structural data base, annotated photographic documentation, mapped lithologic contacts and faults.
2. Limestone Gap (360 points)
   - Map, cross sections, stratigraphic sections: 50%
   - Geologic content of report: 35%
   - Writing style (grammar, spelling, organization, clarity of presentation): 10%
   - StraboSpot field notes uploaded to server: 5%

$$A = \geq 90\% > B \geq 80\% > C \geq 70\%; D > 60\%$$

Plagiarism/Cheating/Academic Dishonesty

Refer to UAF's Student Code of Conduct: https://uaf.edu/deanofstudents/academic-integrity/

The instructors of this class consider cheating to be the same as stealing—if you didn't go through the intellectual activity needed to create it, then you don't deserve credit for it. We encourage students to work together. We encourage students to ask us questions to help complete assignments. That said, it's important that your written work be your written work, unless specifically attributed to another. (For example, the source of a graphic or a piece of data needs to be given with the graphic/data.) This includes geologic maps and cross-sections. Written work containing material that is identical (or nearly identical) to that of another student and not appropriately cited will be graded with a zero (for the entire work) on the first instance. Repeat offenses will be reported to the Dean of Students for academic conduct violation review.

In our experience, students sometimes commit acts of academic dishonesty by mistake and (or) out of ignorance. Most students recognize that submitting a written assignment written by another constitutes plagiarism. Many do not realize that this includes significant parts of a written assignment, as well as the entire document. Many do not realize that if you provide another student with a copy of your written work (some or all) which is then used verbatim without attribution, the provider is also considered guilty of academic dishonesty. Obviously, intent of the provider is an important mitigating factor, but establishing intent is often difficult. Consequently, WE STRONGLY RECOMMEND: Do not email your written work to another student. The temptation to use it verbatim might become irresistible.

Student protections statement

UAF embraces and grows a culture of respect, diversity, inclusion, and caring. Students at this university are protected against sexual harassment and discrimination (Title IX). Faculty members are designated as responsible employees which means they are required to report sexual misconduct. Graduate teaching assistants do not share the same reporting obligations. For more information on your rights as a student and the resources available to you to resolve problems, please go to the following site: https://catalog.uaf.edu/academics-regulations/students-rights-responsibilities/.

Disability services statement

I will work with the Office of Disability Services to provide reasonable accommodation to students with disabilities.

ASUAF advocacy statement

The Associated Students of the University of Alaska Fairbanks, the student government of UAF, offers advocacy services to students who feel they are facing issues with staff, faculty, and/or other students specifically if these issues are hindering the ability of the student to succeed in their academics or go about their lives at the university. Students who wish to utilize these services can contact the Student Advocacy Director by visiting the ASUAF office or emailing asuaf.office@alaska.edu.

Student Academic Support

- Communication Center (907-474-7007, uaf-commcenter@alaska.edu, Student Success Center, 6th Floor Room 677 Rasmuson Library)
- Writing Center (907-474-5314, uaf-writing-center@alaska.edu, Student Success Center, 6th Floor Room 677 Rasmuson Library)

- UAF Math Services (907-474-7332, uaf-traccloud@alaska.edu)
  Drop-in tutoring, Student Success Center, 6th Floor Room 677 Rasmuson Library)
  1:1 tutoring (by appointment only), Chapman 210
  Online tutoring (by appointment only) available
  https://www.uaf.edu/dms/mathlab/, available at the Student Success Center
- Developmental Math Lab (Gruening 406, https://www.uaf.edu/deved/math/)
- The Debbie Moses Learning Center at CTC (907-455-2860, 604 Barnette St, Room 120, https://www.ctc.uaf.edu/student-services/student-success-center/)
- For more information and resources, please see the Academic Advising Resource List https://www.uaf.edu/advising/students/index.php

Student Resources

- Disability Services (907-474-5655, uaf-disability-services@alaska.edu, Whitaker 208)
- Student Health & Counseling **[6 free counseling sessions]** (907-474-7043, https://www.uaf.edu/chc/appointments.php, Gruening 215)
- Office of Rights, Compliance and Accountability (907-474-7300, uaf-orca@alaska.edu, 3rd Floor, Constitution Hall)
- Associated Students of the University of Alaska Fairbanks (ASUAF) or ASUAF Student Government (907-474-7355, asuaf.office@alaska.edu, Wood Center 119)

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For more information, contact:

UAF Office of Rights, Compliance and Accountability
1692 Tok Lane, 3rd floor, Constitution Hall, Fairbanks, AK 99775
907-474-7300 uaf-orca@alaska.edu

University Sponsored Off-Campus Programs and Research Activities.
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1. UA is an AA/EO employer and educational institution and prohibits illegal discrimination against any individual: www.alaska.edu/nondiscrimination.
2. Incidents can be reported to your university's Equity and Compliance office (listed below) or online reporting portal. University of Alaska takes immediate, effective, and appropriate action to respond to reported acts of discrimination and harassment.
3. There are supportive measures available to individuals that may have experienced discrimination.
4. University of Alaska's Board of Regents' Policy & University Regulations (UA BoR P&R) 01.02.020 Nondiscrimination and 01.04 Sex and Gender-Based Discrimination Under Title IX, go to: http://alaska.edu/bor/policy-regulations/.
5. UA BoR P&R apply at all university owned or operated sites, university sanctioned events, clinical sites and during all academic or research related travel that are university sponsored.

   For further information on your rights and resources visit the student placement guidelines page of the equity and compliance site.

COURSE SCHEDULE

Overview

Day 1	Welcome; Bear safety training; firearms safety (online); setting up Weatherport
Day 2	Introduction to StraboSpot, Chena Ridge outcrops (Fairbanks)
Days 3-5	Elliot Highway traverse: Fox – Livengood; Project upload (Fairbanks)
Day 6	Morning off; afternoon: preparation for departure
Day 7	Departure for Sheep Mt. early morning; arrival Sheep Mt. late afternoon
Day 8	Flying into Limestone Gap, setting up camp
Day 9	Introduction hike
Days 10/11	Stratigraphic section measurement
Day 12	Drafting stratigraphic section (office day)
Days 13-22	Field mapping (incl. one day off)
Day 23	Demobilizing camp
Day 24	Return to Fairbanks
Day 25	Day off (Fairbanks)
Days 26-28	Finishing maps and cross sections; End of Field Camp Deadline for written report 1 week later

1. PREPARATION FOR GEOLOGIC MAPPING

Sites: Chena Ridge, Elliot Highway, UAF Troth Yeddha' campus, Fairbanks

Time: 6 days

Objectives

1. Safety in the field; setting up a remote field camp.
2. Refresher in geologic mapping procedures and report writing
3. Introduction to digital mapping and project management.

Activities

Hands-on wherever possible.

1. Conducting field work in a safe way.
2. Review (outdoor, on-site instruction wherever practical)
   a. Field identification of major rock types and structures
   b. Effective note-taking and sampling strategies.
   c. Use of digital mapping tool (StraboSpot).
   d. Measuring, recording, and plotting structural data using a Brunton compass and stereonet (as a backup in case digital mapping is not possible).
   e. Report writing: organization, sentence structure, and conciseness.
3. Guided 2.5-day mapping activity along the Elliot Highway from Fox to Livengood to become familiar with digital mapping.
4. **Closure: Uploading Elliot Highway StraboSpot project**

Modes of Instruction

- The first day starts with introduction of participants, camp regulations and policies, followed by safety training (bear safety, online firearms safety). In the afternoon, practical aspects of life in a remote camp are addressed, including setting up and taking down a WeatherPort tent.
- On the second day, students are introduced to the StraboSpot app and practice its application in selected outcrops on Chena Ridge (Fairbanks). We will review geologic data acquisition and reporting procedures in outcrops. The day finishes off with a discussion on composing a geologic report.
- 2.5-day mapping of various geologic units along the Elliot Highway and at Wickersham Dome. Discussion of various structural features and lithologic properties will be held at the appropriate outcrops in the field. At the end of the last day, mapping project will be uploaded to the StraboSpot server and students write a short report.

2. INDEPENDENT GEOLOGIC MAPPING

Site: Limestone Gap, south-central Talkeetna Mountains

Time: 18 days, including travel, mobilization and de-mobilization (12 full days of fieldwork)

Objectives

1. To prepare, with minimal assistance, a geologic map at a scale of 1:15,000 of a 13-16 square kilometer area in a region of relatively good exposures, simple stratigraphy, and moderately straightforward structure.
2. Practice digital mapping and project management.
3. To experience geologic field mapping in a relatively remote and primitive camp setting.
4. To acquire materials for writing a short geologic report on the region.

Activities

1. Fly in via single-passenger fixed-wing aircraft and set up camp.
2. Orientation to stratigraphy of region—Mesozoic marine sedimentary rocks and early Tertiary bimodal volcanic rocks.
3. Measure and describe stratigraphic section in the field area. Measured sections will be compiled and turned in for instructor feedback.
4. Introductory mapping exercises to familiarize students with structural style and approach to geologic observations, mapping, and note-taking. These will be turned in for instructor feedback.
5. Main mapping exercise: mapping on foot in groups of 3-4 from base camp with instructor oversight of progress. Students do not have to stay in the same group throughout the mapping project. However, for safety reasons, students are required to go out in groups of at least two persons.
6. Students will map with a tablet (provided to the students) using the StraboSpot app.
7. Compilation of daily traverses onto base map at camp.
8. Creating a structural database using StraboSpot and Stereonet apps. Identification of map area scale structures (folds and faults); development of a tectonic model of the mapping area.
9. Report writing during periods of inclement weather.
10. Take down camp and fly out via fixed-wing aircraft.
11. **Closure: Written report with maps and cross sections.** (Fairbanks)

Modes of Instruction

- The first day will introduce the students to most of the rock types encountered in the field. A detailed discussion of the rocks and lithologic units will take place in the appropriate outcrops.
- The majority of teaching will take place in the form of discussion within mapping groups in outcrops in the field. This can add up to 2 hrs. each day.
- Due to the more individual nature of the mapping project, the discussion of findings with the whole group will be forfeit.
- 1-2 hrs. lectures on the interpretation of regional structural data, the regional tectonics of the Talkeetna Mts. and central Alaska, the concept of terranes in plate tectonics, and the preparation of detailed geologic reports will be held following dinner at the appropriate time.
- Structural, stratigraphic and sedimentological aspects and problems will be addressed in the appropriate outcrops during the day.