Geos 351W Field Geology (8 Credits) - 2017

Instructors:
Paul McCarthy, Jochen Mezger, Elisabeth Nadin, Rainer Newberry and Michael Whalen; two TAs.

Prerequisites:
Geos 214, 225, 309, 314, 315, 322; Engl 111 and 211 or 213; junior standing; Instructor Permission

Class
Meets daily 8:30 am to 5:30 pm for a 8 week period

‘Office’ Hours
Instructors will be more heavily involved during the students’ 1st 3-4 weeks of the mapping. For the last weeks, instructors will be available to review maps with the students, but the emphasis will be on the student developing independent geologic interpretations.

Textbooks
We will supply a field manual for your use

Course Description
Practical experience in a variety of field settings collecting and presenting basic geologic field data, including field mapping of stratigraphic and structural problems using topographic maps, airborne, and satellite images. Students will prepare geologic maps in a variety of tectonic and lithologic settings and develop written reports detailing the geologic history for several study areas. This course requires strenuous hiking off trails in a variety of terrains with up to 2000 feet of elevation gain per day.

This course is different from most you have taken, as it attempts to combine and consolidate lab skills you have acquired over the years with field skills. Most 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. 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 & feedback we can all have a good time and learn a great deal.

Course Goals
Fundamentally, to become a significantly better geologist (see details below).

Student Learning Outcomes
By actively participating in this course you will become proficient at
1. Making field geologic maps in a variety of different rock types and structures
2. Turning a field geologic map into a professional-quality final geologic map
3. Writing short and also extensive geologic reports of near-professional quality
4. Working with others in a (sometimes adverse) field setting
5. Designing and executing daily field traverses designed to most efficiently create a geologic map
6. Integrating some geophysical data into your geologic mapping.
7. Sketch map geology from a distance

Instructional Methods
Short lectures concerning or reviewing the specific geologic problems to be addressed and the means of addressing them will be given on a semi-daily basis. Instruction on use of particular instruments will be made when appropriate. The bulk of the time will be spent in the field, producing field geologic maps and notes. For the first part of the course an instructor will accompany the students, either in a large or in small groups, to insure that all students understand the various issues and how they are addressed. In the latter part of the class students will map in pairs, as independent from formal instruction as they desire. Regular instructor inspection of field maps and notes will keep students on track. An appropriate amount of time will be devoted after each exercise to final map preparation (as needed) and production of geologic reports. Reports will receive peer
reviews and will be revised after reviews. Instructors will be available on at least a twice-daily basis for consultation concerning geology, map revision, and report-writing.

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 complete the second or subsequent project report will be dropped. An ‘incomplete’ will only be given if a student has completed all field exercises but needs additional time for the final project.

Evaluation
For each mapping project you will turn in at least a clean version your field map and a short geologic report. Each of the major projects will be graded based on:
- Map (and associated graphics) = 33%
- Geologic content of report = 33%
- Writing style (grammar, spelling, organization, clarity of presentation) = 33%
Overall class grade based on a total of 425 points:
- Chena Ridge = 25 points;
- Healy = 100 points;
- Denali = 100 points;
- Limestone Gap = 200 points
A = > 90% > B > 80% > C > 70%; D > 60%

Support Services
To succeed in this course you need to be able to TURN IN REPORTS & MAP ~ ON TIME EVEN WHEN YOU DON'T COMPLETELY UNDERSTAND THE GEOLOGY!!! (Trust us, no one will ever completely understand the geology. That’s why geologists make the big bucks.) The UAF Writing Center has summer hours and provides assistance in all aspects of writing with both walk-ins and by appointment (x5314).

Disabilities Services
The Office of Disability Services implements the Americans with Disabilities Act (ADA), and insures that UAF students have equal access to the campus and course materials. UAF is committed to equal opportunity for all students. If you have a documented disability, please let us know BEFORE THE COURSE STARTS, and we will work with the Office of Disabilities Services to make the appropriate accommodation(s). If you have a specific undocumented physical, psychiatric or learning disability, you will benefit greatly by providing documentation of your disability to Disability Services in the Center for Health and Counseling, 474-7043, TTY 474-7045. (For example: procrastination issues; intense fear of heights, allergies, war injuries that prevent you from climbing steep slopes…).

If you are the first in your family to attempt a four-year college degree, and/or eligible for Pell grants, you have opportunities for tutorial and other forms of support from the office of Student Support Services. I will collaborate with the Office of Disabilities and/or the Office of Student Support Services to make your educational experience in my class as positive as possible. Check the following website for further information.
http://www.uaf.edu/sss/
COURSE SCHEDULE

I. PREPARATION FOR INDEPENDENT FIELD MAPPING

Sites: Fairbanks vicinity and Healy

Time: 12 days (7 days at Healy)

Objectives
1. Geologic, field, and writing assessments w/ remedial instruction as required.
2. Knowledge of greater Fairbanks area and Healy/Suntrana area geology.
3. Practice mapping and writing—with feedback—in a semi-independent setting.
4. Understanding strategy for mapping larger (>1 field day) areas.

Activities
Hands-on wherever possible, including examination of writing styles.
1. Review/remedial (outdoor, on-site instruction wherever practical)
   A. Short written report on first day’s geological exercise.
   B. Pace measurement; pace and compass navigation.
   C. Measuring, recording, and plotting structural data using a Brunton compass and stereonet.
   D. Field identification of major rock types and structures.
   F. Use of various-scale topographic maps: navigating, point location, TRS, & UTM coordinates.
   G. Effective note-taking strategies.
   H. Use of airborne and satellite imagery and geophysical maps.
2. Semi-independent mapping activities (1- to 7-day day mapping exercises, all with a short report, at least one of which will be revised after peer and faculty review). Mapping will be at scales from 1:5,000 to 1:25,000.
3. Closure: Reports for all projects. Some daily reports for Healy as well as an overall report.

II. SEMI-INDEPENDENT GEOLOGIC MAPPING

Sites: Denali National Park & Preserve (mapping) and Fairbanks (report writing)

Time: 14 days (10 full days at Denali)

Objectives
1. To better understand the geology of complex regions.
2. To work as a team in mapping the geology of an area.
3. To work with some faculty supervision/assistance in geologic mapping.

Activities
1. Prepare a geologic map at 1:25,000 of a 6-10 km² portion of the Denali area. The ‘office map’ will be compiled nightly from the day’s field work. Participate in nightly discussions concerning the geologic hypotheses and conclusions yielded by the various mapping groups.
2. Using the map and field notes, prepare a report on the geology of the Denali study area. The first draft will be peer-reviewed and then revised. It will be graded based on both its geologic content and its writing style. The report will include an abstract, introduction, results, discussion, and conclusions and will contain information on the structure and stratigraphy.
3. Students will meet individually with an instructor to discuss their writing skills during the trip to or from Fairbanks to Denali.
III. INDEPENDENT MAPPING

Site: Limestone Gap, south-central Talkeetna Mountains

Time: 22 days, including mobilization and de-mobilization (18 full days of field mapping)

Objectives
1. To prepare, with minimal assistance, a geologic map at a scale of 1:12,000 of a 6 x 6 km area in a region of relatively good exposures, simple stratigraphy, and moderately straightforward structure.
2. To experience geologic field mapping in a relatively remote and primitive camp setting.
3. 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 pairs from base camp with instructor oversight of progress every few days.
6. Compilation of daily traverses onto base map at camp.
8. Take down camp and fly out via fixed-wing aircraft.

IV. FINAL REPORT

Site: Fairbanks (or other, at student discretion)

Time: 5 days (suggested); up to 10 days allowed for completion of final report

Objectives
1. To write an extensive geologic report, in US Geologic Survey Professional Paper or journal article style, as both an indication of geologic understanding and of competency in professional writing.
2. To complete a final copy of a geologic map, cross-section, and stratigraphic column in professional format and of professional quality.
3. To integrate geologic notes, map, and cross-section into a coherent and consistent picture.
4. To demonstrate an ability to use peer- and instructor-feedback in creating a final product.

Activities
Students have 10 days to complete the final report, maps, and other products. An instructor is available on a regular basis for the first 5 of these days, to provide feedback and assistance. All materials other than the report may be prepared electronically or on Mylar; the report must be a word document that receives feedback before the final version is presented.