

Geos 212 'Geology of Alaska' (3 credits) Fall '05

Syllabus and course description

Meets: Thursday evening 6-7:30 pm (NatSci 235) + Saturday (9/3-10/1) field trips

Prerequisites: Geos 101 or equivalent

Instructor: Rainer Newberry Nat Sci 328 x6895 ffrn@uaf.edu home: 479-0140

Course Readings: There is little material available at this level on the geology of Alaska. You will need an introductory geology textbook (any) as a reference. I can loan you one if you don't have one; please ask.

Course Materials: You will need to bring to every class (1) a hand lens, (2) a cheap knife, 3. a 3-hole hard-bound binder for course handouts and maps. On Saturdays you will need to supply your lunch & snacks and wear/bring appropriate clothing.

Course description: This course is designed to acquaint (undergraduate) students with the geology and geologic resources of Alaska primarily through direct visual observations. A secondary goal is to better understand the nature of geological investigations as 'detective work' in which broad-scale inferences are drawn from (usually limited) field data. As such, the course is built around 5 all-day field excursions, to occur Saturday Sept 3, 10, 17, 24, and Oct 1, with preparation and follow-up lectures/discussions Thursday 6-7:30 pm (Sept 1 to December 8). IT IS CRITICAL THAT STUDENTS IN THE CLASS POSSESS SOME GEOLOGIC BACKGROUND, typically equivalent to our Geos 101 or Geos 120.

Course Goals:

1. To provide students with a visceral understanding of Alaskan Geology in Central Interior Alaska.
2. To give students a feeling for Alaskan geology outside of Central Interior Alaska.
3. To provide an understanding of the limitations to our knowledge of Alaskan geology.
4. To provide a basis for understanding Alaskan known and potential mineral, fuel, and water resources.
5. To give students an understanding of surficial processes and materials in Arctic climates.

Student Learning outcomes. As a result of taking this class a student can:

1. read and understand a geologic map
2. reliably recognize major minerals in hand specimen
3. recognize major rock types as they occur in the field
4. recognize major geologic structures
5. understand the basis for geologic resource estimations
6. apply general geologic knowledge to a specific area and (or) phenomena

Instructional methods: The basic modes of instruction will be through (1) interactive lecturing and (2) direct observations of geologic maps, landforms, structures, and materials.

Course policies: It is vital that you participate in the 5 field trips. If you absolutely can't make one, let me know in advance and we'll work out some alternative exercise. We'll try leave promptly at 9am, so prompt arrival at the back of the NatSci bldg on Saturday mornings is essential. The field trip write-ups and geologic materials descriptions need rapid feedback, so it's important to get them in on time. I reserve the right to dock points for grossly late material.

Evaluation: Students taking the course will (1) prepare weekly >2-page summaries of the field excursions; (2) prepare a weekly classification and description of a geologic material collected on the previous week's field trip; and (3) present a final oral (or written) report on some aspect of Alaskan geology. There will be no tests, quizzes, or examinations. I will grade geology majors separately from non-geo majors; with higher expectations from the

former. Basis for grade: 5 weekly field trip write-ups = 50%, 5 geologic material descriptions = 25%, final report = 25%.

Weekly rock description: Make sure you locate samples you pick up on a map! I will provide location information as needed. Take one of your samples and describe it in enough detail to categorize it both generally (igneous, metamorphic, sedimentary) and specifically (e.g., granodiorite vs. basalt vs. sandstone). This will probably involve identification of specific minerals in the rock. Write down your results and be prepared to discuss your identifications with the class.

Weekly field trip write up: At least 2 pages, double-spaced, normal margins and font. This should not be a diary listing of the various stops, but rather should describe interpretations about some aspects of the geology we examined on the field trip based on your observations, not simply rote repetition of 'fact'. For example, what is the evidence that the climate in Interior Alaska was significantly warmer and wetter >10 million years ago? What is the evidence that the Alaska Range is a geologically young feature? How do we recognize glacial limits and approximately where are they?

Final project: You should begin working on this within a week or two of the end of field trips. Make sure you consult with me early on concerning the topic and available resources.

Support Services: feel free to work with staff at the Writing Center (8th floor, Gruening, 474-5314).

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 me know within the first two weeks of class, and I will work with the Office of Disabilities Services to make the appropriate accommodation. 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.

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/advising/learningresources/>

Schedule of Classes: subject to change depending on weather and geologic events during the semester.

Day	Date	Topics
Thrs	1 Sept	Intro; Subduction, collision, extension as primary tectonic processes; overview of Fbx geology
Sat	3 Sept	Fbx geology; faults & folds; metamorphic, plutonic, & volcanic rocks; geologic deductions
Thrs	8 Sept	Sediments and sedimentation; faults and faulting; collisions & terranes; igneous environments
Sat	10 Sept	Fbx to Livengood: sedimentary rocks & sed basins; what is a terrane?; placer mining
Thrs	15 Sept	Glaciers, glaciation, glacial sediments & glacial landforms; terranes & faults
Sat	17 Sept	Fbx to Paxton: meta-igneous rocks; major faults, glaciers & glaciation; young sed & deformation
Thrs	22 Sept	Coal, Oil, and Gas; intro to radiometric dating; ophiolites and collisions
Sat *	24 Sept	Fbx to Denali Park: Tertiary sed, volcs, & coal; young deformation; turbidites & glaciers
Thrs	29 Sept	Recap of igneous rocks--nomenclature & origins, resource implications
Sat	1 Oct	Ft Knox & Fbx to Chena Hot Springs: types and origins of granitic rocks—resource implications
Thrs	6 Oct	Geology of the Anchorage area—S-Central Alaska; Coal, Oil, and gas
Thrs	13 Oct	Northern Alaska, part I: continental margins, collisions, & ophiolites
Thrs	20 Oct	Northern Alaska part II: the Prudoe Bay supergiant Field and other oil & gas considerations
Thrs	27 Oct	Seward Peninsula: one of the world's largest blueschist terranes and subsequent metamorphism
Thrs	3 Nov	Western Alaska, another kettle of fish
Thrs	10 Nov	SE Alaska: bigggg glaciers & faults
Thrs	17 Nov	Alaskan groundwater hydrology and intro to mineral resources
Thrs	1 Dec	Alaskan resources
Thrs	8 Dec	student presentations (+ Sat Dec 17, if needed)

* I'd like to go down Friday nite, if the class agrees, as that will give us more time for geology.