

## **FIELD GEOLOGY**

### **GEY 3120 Course Description and Syllabus – Fall 2018**

- Instructor:** Leslie Kanat, Ph.D.
- Contact:** Phone: (802) 635-1327, FAX: (802) 635-1461  
Email: les.kanat@northernvermont.edu  
Course web page: <http://kanat.jsc.vsc.edu/gey3120>
- Office hours:** Scheduled office hours are from 8:30 to 9:30 a.m. on Tuesday through Thursday; otherwise, stop in anytime or schedule an appointment.  
Location: 307 Bentley.
- Meetings:** Monday, 8:30 to 11:30, in Bentley 108  
Tuesday and Thursday, 10:00 to 11:15, in Bentley 108
- Texts:** i) Sokkia Engineer's Field Book (No. 8152-30).  
ii) Other essential reading material will be on reserve in the Willey Library.

### **Course objectives and goals**

The primary objectives of this course are to allow the student to experience how sedimentology, stratigraphy, and structural geology are applied to situations regarding the interpretation of ancient environments and the evolution of orogenic belts. The student will be introduced to geologic features of various sedimentary environments recorded in the rock record in hope of developing a better understanding of how various stratigraphic sequences originate. We shall discover how the interplay of sedimentation rates, sea-level fluctuations, and tectonics result in the rock sequences and rock types observed in a stratigraphic column. In addition, students will gain experience in i) constructing, interpreting, and using structural geological maps; ii) recognizing, measuring, and synthesizing structural fabrics in the field; iii) deciphering geological history from field observations; and iv) synthesizing field observations with petrogenesis. One of the principal activities this semester will include an elucidation of the French Hill Greenstone in Johnson, VT.

This course should provide opportunities for students to enhance their understanding of geology, and acquire geological field experience. Knowledge gleaned from this work is applicable to mining, civil engineering, and groundwater pollution. Special emphasis will be placed on the geology of Vermont.

### **Content to be covered**

There is no single textbook required for the material covered in this class. There are, however, many books and journal articles on reserve in the library (see the course web page for a list of the items on reserve). Stay current with the material on reserve in the library.

The order in which the material will be covered is outlined below. Please note that the time allotted for each content area is not specified. We are breaking from the tradition of the two lectures and one lab sequence, instead, we will do what is necessary, when it is necessary, in order to cover the material.

Those of you that have been in other classes of mine know that I expect a lot out of you and I place a great deal of responsibility on you – I cannot do your learning for you. This class is structured around you doing the work rather than me talking to you about the concepts. There will certainly be lectures (yet, hopefully not), however, most of the material will be learned on your own or within small groups. The workload may be deceiving, so do not delay starting your work – the deadlines will come sooner than you expect.

<b>Topic</b>	<b>Required Content Knowledge</b>
Topographic maps	map symbols, contour lines, GPS, compass, declination, ratio and bar scale, pace, cross-sections, vertical exaggeration, trigonometry
Sedimentary rocks	classification schemes, petrogenesis, sieve analysis, grain size statistics sedimentary environments (terrestrial, transitional, marine)
Stratigraphy	correlation, Walther's Law
Petrology	preparation of thin sections, petrographic microscope, mineral identification, rock textures
Metamorphic rocks	classification schemes, petrogenesis, foliated, massive
Igneous rocks	classification schemes, petrogenesis, intrusive, extrusive
Geological maps	strike, dip, apparent dip, symbols, interpretation, cross-sections
Rock fabrics: identification	planar: bedding, cleavage, crenulation cleavage, axial planar cleavage, cleavage refraction linear: bedding-cleavage intersection lineation, fold axes faults: terminology, cross-sections
Rock fabrics: interpretation	synthesis: stereonet
Rock fabrics: theory	normal and shear stress, strain, tensors, elongation, rotation, translation
Putting it all together	all above

### **Plagiarism**

Students at Northern Vermont University are expected to be honest in all their academic work. Acts of dishonesty for which a student may be disciplined include, but are not limited to, receiving or providing unauthorized assistance on coursework or plagiarizing the work of others in for any assignment. The American Heritage Dictionary defines plagiarism in the following way: "To steal or use (the ideas or writings of another) as one's own." You are responsible for knowing what specific acts constitute plagiarism. If you are unsure, then consult me, or read the Undergraduate Catalogue. Academic dishonesty in any form is prohibited and unacceptable.

### **Field and laboratory work**

Students are expected to have the physical and cognitive ability to participate in a variety of field and laboratory activities. These activities include walking, climbing, and carrying packs over uneven and variable terrain. Students will be outside in a variety of weather conditions for extended periods of time (yet, once the snow covers the ground, fieldwork ends). Students may be participating in unsupervised activities in the lab (using rock saws), or in the woods away from trails or roads.

Students should be able to identify, recognize, and manage hazards and alert others to the risks they present. Examples of field hazards may include, but are not limited to, falling rock, loose rock, unstable surfaces, rugged steep and uneven terrain, cliff edges, moving water, and potentially hazardous animals and insects (primarily ticks). Each student must conduct a thorough tick check after every field excursion.

Geology is essentially a field science. The course will incorporate local field trips and some day-long and weekend field trips. Part of the requirements for this course is participation in the 110<sup>th</sup> Annual Meeting of the New England Intercollegiate Geological Conference from 11 to 14 October 2018 in Lake George, NY (see <http://neigc.org>). We may camp, or share rooms, for this conference.

If you have any concerns about your ability to participate as a contributing member of the class, then please discuss them with the instructor. Questions about your ability to meet the requirements of the course, as outlined above, should be immediately brought to the attention of the instructor to discuss whether accommodations are possible, or curricular options are necessary.

### **Accommodations**

Students with a documented disability who require accommodations should acquire an Academic Accommodations Form from Academic Support Services (Dewey 123, phone 635-1264).

## **Assessment**

- 10% Quizzes – some will be surprise quizzes at the start of class, whereas others will be announced.
- 20% Participation in lecture, laboratory, and field work. Some of the assignments will not be formally assessed but I will keep track of how well you accomplish the goals.
- 15% Participation in the NEIGC (at the end of Fall Break).
- 40% Materials submitted in conjunction with class activities. You will receive grading rubrics from some of these assignments, whereas for others, you may not.
- 15% Final exam: 10:15 a.m. on Wednesday, 19 December 2018. This will be a comprehensive, cumulative, hands-on, open-book, written exam.

## **Other things to keep in mind**

- Please come to class a few minutes early so that everyone is ready to start on time – be prepared for all classroom, laboratory, and field sessions.
- All material submitted for a grade must be presented in a professional form – no grades are dropped.
- Assignments are due at the beginning of the class period. For each calendar day (24-hour period) an assignment is late it will be down graded by 10% – weekends and holidays included.
- There is no distinction between the Monday, Tuesday, or Thursday, meetings; we will do what is necessary in order to accomplish our goals. Always come to class dressed appropriately – we could be in the lab or the field on any given day.
- I do not usually take attendance, but I do expect you to make up all work prior to the next class. Find out from another student what you missed and learn the material. There is no opportunity to make-up missed laboratories or field work.
- All activities and assignments will be posted on the course web page; grades will be posted on Moodle.
- Numerous books and journal articles are on reserve in the library – please see appropriate list on the course web page and spend time in the library.
- Additional field trips will be scheduled throughout the course; some may be on weekends. I will give you as much advance notice as I possibly can – please keep a calendar for assignment due dates and field trips.
- Field work will take place in all sorts of weather conditions – please dress appropriately.
- Useful supplies: 0.3 mm pencil, calculator, colored pencils, eraser, metric ruler, and tracing paper.
- Compasses and hand lenses will be made available to you for the semester; handheld GPS receivers will be made available as needed.
- Field notes should be of the highest quality – please see appropriate handout.
- Please expect a lot of short quizzes throughout the semester – some will be short and offered at the start of class.