

Geol 107 (Sections 3 and 4) Earth Systems Science Spring 2019

Lecture	GEOL 107	MWF 12:20-1:15 pm	SFH 710
Labs	GEOL 107-3L (CRN 30701)	R 8:00-11:05 am	SFH 770
	GEOL 107-4L (CRN 30702)	R 2:30-5:35 pm	SFH 770

Credit Hours: 4 cr (3 cr traditional classroom lecture; 1 cr lab)

Lecture Professor: Dr. Jeffrey Creamer, SFH 2797, jcreamers@fortlewis.edu

Office hours: MWF 9-10am ; W 2:30-4:30pm ; R 11:15-12:10 pm

Expected time commitment (credit hour statement):

The typical student in this 4 credit lecture/lab course should expect to spend 3 hours per week attending class, and 3 hours per week attending lab. In addition, you should expect to spend 6 or more hours per week of concentrated attention on course-related work. The approximate breakdown of this work is listed below:

Lecture	38.5 hours (2.75 hours/week)
Lab	42 hours (3 hours/week)
Final exam	2 hours
Lecture prep (reading, pre-lecture questions, quizzes)	70 hours (5 hours/week)
<u>Lab prep (reading handouts)</u>	<u>14 hours (1 hour/week)</u>
Total	166.5 hours

Catalog description: This course explores the solid earth, the oceans and the atmosphere as an integrated set of systems that act together to control climate, topography and other physical aspects of the natural environment. The lab work includes field trips and the study of rocks, minerals, plate tectonics, ocean systems and weather. There is one semester-long independent project in which students apply the scientific method to understand a local environmental issue.

Required textbooks and equipment:

Earth Science, Tarbuck, Lutgens, and Tasa, 15th edition (Note: older editions are also acceptable, but page numbers for readings will be different)

Lab handouts, handed out in lab and available for studying on Canvas

Canvas

Online materials (pre-lecture questions, lecture powerpoints, lecture quizzes, pre-lab assignments, lab handouts, and instructions for assignments) will be available on Canvas (<https://courses.fortlewis.edu>). If you are not familiar with Canvas, please work through the Student Canvas Orientation (<https://courses.fortlewis.edu/courses/6805>). For technical help with Canvas, contact the 24/7 support hotline at 855-971-1611 or submit a HELP ticket in Canvas.

Course learning objectives:

By the end of this course, you should be able to:

- Evaluate multiple hypotheses based on field observations or other geologic data.
- Predict the effect of human intervention in geologic processes.
- Evaluate potential hazards in a place based on basic geologic knowledge.

General education content and competencies:

This course meets the required content and competency student learning outcomes for the GT Pathways Category SC1 (science with lab).

During the lecture portion of this course, students will:

- Develop foundational knowledge in specific field(s) of science.
- Develop an understanding of the nature and process of science.
- Demonstrate the ability to use scientific methodologies.
- Examine quantitative approaches to study natural phenomena.

During the laboratory portion of this course, students will:

- Perform hands-on activities with demonstration and simulation components playing a secondary role.
- Engage in inquiry-based activities.
- Demonstrate the ability to use the scientific method.
- Obtain and interpret data, and communicate the results of inquiry.
- Demonstrate proper technique and safe practices

By the end of this course, students should be able to:

- Select or develop elements of the methodology or theoretical framework to solve problems in a given discipline.
- Examine evidence to identify patterns, differences, similarities, limitations, and/or implications related to the focus.
- Utilize multiple representations to interpret the data.
- State a conclusion based on findings.
- Explain information presented in mathematical forms (e.g. equations, graphs, diagrams, tables, words).
- Convert information into and between various mathematical forms.

General education signature assignment: "What's in your watershed" report (graded as part of lab grade)

Grading

Lecture

Pre-class assignments.....	5%
Participation and in-class work	5%
Quizzes (total)	10%
Midterm exam	25%
Final exam (Mon. April 22, 9:45-11:45 am).....	25%
Labs.....	30%
Course total.....	100%

Grading scale by % (rounded to the nearest percent):

A 94 to 100	B- 80 to 82	D+ 67 to 69
A- 90 to 93	C+ 77 to 79	D 63 to 66
B+ 87 to 89	C 73 to 76	D- 60 to 62
B 83 to 86	C- 70 to 72	F 0 to 59

Lecture grading

Pre-class assignments

Before each class meeting, do the assigned reading and answer the pre-class questions on Canvas. Pre-class questions will be graded on the following scale: 3 pts (correct); 2 pts (mostly correct or turned in after the deadline); 1 pt (incomplete, mostly incorrect, and/or more than one day late); 0 pts (not turned in). **Pre-class questions are due by midnight of the night before class**

Participation and in-class exercises

Participation includes attending class, being prepared for class, and participating in class discussions and other activities during the lecture period. During each class meeting, I will take attendance in some way: collecting an in-class exercise, calling names from the class list, or having you sign the roster. Your participation grade will be the percentage of total class meetings that you have attended. If you need to miss class due to travel for athletics, music, theatre, academic conferences, graduate school interviews, or family or medical emergencies, please talk to me about how to make up the work that you miss, and I will excuse the absence.

Quizzes

There will be quizzes every other week (unless otherwise noted), to give you quick feedback about whether you have mastered the course material. Most will be given on Canvas, posted on Wednesday morning and due before class on Friday. All quizzes will be open-book and untimed.

Your quiz grade will also include an assignment to come to the instructor's office hours during the first two weeks of the semester.

Exams

There will be two exams in this course. The mid-term exam will be Wednesday, February 20 during the regular class meeting time. The final exam will be Monday, April 22, 9:45-11:45 am. All exams will be held in the normal lecture classroom.

Lab grading

Labs will involve hands-on exercises (both inside and outside). Lab handouts will be available on Canvas. Your total lab grade will be incorporated into the grade for the lecture section; you will only receive one grade for this class. **All students must pass the lab in order to pass Geology 107. A failing grade in the lab section will result in an F in the class, regardless of your performance on quizzes and exams.**

Pre-lab assignments

Several of the labs will require using math skills that you may or may not have mastered already. In order to make the most of lab time, you will complete pre-lab assignments that give you practice using the types of math that will be used during lab. You will have access to online math tutorials that give geologic examples and practice problems dealing with unit conversions, graphing, slopes, and rearranging equations. Then, before coming to lab, you will take a short online quiz to test your use of these skills. Each quiz will consist of four to five questions, and you will be allowed to try each question (with different numbers) until you are satisfied with your grade.

There will also be pre-lab assignments to prepare for the activities during the labs in Week 4 and Week 5.

Labs

Each week, you will have an assignment to complete during lab. Handouts for lab (including separate descriptions and answer sheets for some labs) are available on Canvas. Labs are designed to be completed (and in many cases,

graded) during the 3-hour lab period. **You are expected to attend all labs.** In some cases, you will need to complete the final portion of the assignment outside of lab and bring it back to class the following week.

Course policies

Cell phones, computers, and other electronic devices in class

You may use a cell phone as a calculator or to do web searches during labs and in-class discussions. **You may not use a cell phone for any purpose during an exam.** Please **turn off the ringer on your cell phone during class.** If you are on call for some kind of emergency, please set your cell phone to "vibrate" and leave the classroom if you need to take a call.

You may use a computer or other device to take notes during class, and to find information during in-class exercises. However, be prepared to put all devices away if you are asked to. **Keep in mind that some studies have shown that students learn better when they take notes by hand, rather than on a computer.**

MP3 players should not be used during class; all students are expected to be participating in class while they are in the room. **MP3 players are not allowed during exams.**

Academic honesty

Academic dishonesty includes all forms of unethical or illegal behavior which affects a student's academic standing, including, but not limited to, cheating on exams, plagiarism, forgery of academic documents, falsification of information on academic documents, or unauthorized access to computer files containing academic information. Academic dishonesty may result in sanctions ranging from a lowered grade on a particular assignment to an "F" in the class and report submitted to the Office of the Vice President of Academic Affairs.

The policy on academic integrity by students can be found at:

<https://wiki.fortlewis.edu/display/POL/Section+1.+--+Academic+Integrity+by+Students+-+Excerpt?preview=/42764150/61935275/AcademicIntegritybyStudents.pdf>

Accommodation of disabilities

Fort Lewis College is committed to providing all students a liberal arts education through a personalized learning environment. If you think you have or you do have a documented disability which will need reasonable academic accommodations, please call the Director of Disability Services, 280 Noble Hall, 970-247-7459, for an appointment as soon as possible.

Course Withdrawal Information

Withdrawal from Course – The last day to withdraw from FLC classes with a grade of "CW" (course withdrawal) is Friday, March 22. This is a college-wide deadline that is not negotiable.

To withdraw from this course, go to the Registrar's Office, Room 160, Miller Student Services Building before the course withdrawal deadline. They will help you through the process. You do not need my signature on the course withdrawal request form.

Starting Fall 2013, students have a life-time limit of three individual course withdrawals from FLC courses. If you have withdrawn from classes before Fall 2013, these will not count towards your lifetime limit. Also, withdrawing entirely from a semester (all classes) does not count against your lifetime "CW" limit. Semester withdrawal is handled under a different policy and procedure. Please refer to the Academic Policies section of the Fort Lewis College Catalog of Courses for more information about course and semester withdrawal policies and procedures.

Lecture and lab schedule

Date	Lecture/lab topics	Reading assignment (textbook)
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Week 1	Lab: The Process of Earth Science	
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Jan 7 M	Introduction to course	Ch. 1 (p. 4-21)
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Jan 9 W	Earth systems; intro to the atmosphere	Ch. 16 (p. 486-496)
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Jan 11 F	Temperature in the atmosphere	Ch. 16 (p. 497-515)
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Week 2	Lab: Weather	
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Jan 14 M	Moisture, clouds, & precipitation	Ch. 17 (p. 518-549)
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Jan 16 W	Wind	Ch. 18 (p. 552-575)
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Jan 18 F	Weather systems	Ch. 19 (p. 578-605)
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Due: quiz on Canvas; visit professor's office hours

Week 3	Lab: Topographic maps	
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Jan 21 M	Ocean currents & regional climate	Ch. 15 (p. 452-456); Ch. 18 (p. 569-570); Ch. 20 (p. 608-620) ; Ch. 10 (p. 330-332)
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Jan 23 W	Module Day #1: reservoirs & pathways of water cycle	Ch. 9 (p. 268-270); additional links on Canvas
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Jan 25 F	Module Day #2: Drainage basins, water year, water budgeting	Links on Canvas
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Week 4	Lab: Watersheds & aquifers	
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Due: pre-lab jigsaw assignment

Jan 28 M	Snow, rivers, and groundwater	Ch. 9 (p. 288-290)
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Jan 30 W	Rivers & landscapes	Ch. 9 (p. 270-287)
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Feb 1 F	Module Day #3: flipped classroom/analyzing hydrologic data	Links on Canvas
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Due: quiz on Canvas

Week 5	Lab: What's in your watershed?	
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Feb 4 M	Module Day #4: Local water resources and challenges	
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Feb 6 W	Module Day #5: Stakeholder exercise	
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Feb 8 F	Groundwater	Ch. 9 (p. 288-290)
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Week 6	Lab: Groundwater	
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Feb 11 M	Groundwater	Ch. 9 (p. 291-300)
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Feb 13 W	Landslides	Ch. 8 (p. 252-262)
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Feb 15 F	Deserts	Ch. 10 (p. 330-340)
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Due: quiz on Canvas

Week 7	Lab: Earth surface processes field trip	
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Feb 18 M	Glaciers	Ch. 10 (p. 307-326)
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Feb 20 W	<i>Mid-term exam</i>	
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Feb 22 F	Intro to plate tectonics & Earth's interior	Ch. 1 (p. 17-19; 21-25); Ch. 4 (p. 99-108)
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Week 8	Lab: Minerals	
Feb 25 M	Minerals	Ch. 2 (p. 32-43)
Feb 27 W	Minerals: silicates	Ch. 2 (p. 44-48)
March 1 F	Minerals: non-silicates	Ch. 2 (p. 48-55)
	<i>Due: quiz on Canvas</i>	

Spring Break

Week 9	Lab: Plate tectonics	
March 11 M	Igneous rocks: composition	Ch. 3 (p. 58-66)
March 13 W	Igneous rocks: melting and crystallization	Ch. 3 (p. 67-69); Ch. 6 (p. 188-190)
March 15 F	Igneous rocks: tectonics	Ch. 6 (p. 190-195)
	<i>Due: quiz on Canvas</i>	

Week 10	Lab: Igneous rocks	
March 18 M	Volcanoes	Ch. 6 (p. 162-183)
March 20 W	Earthquakes	Ch. 5 (p. 128-151)
March 22 F	Minerals & weathering	Ch. 8 (p. 234-251)

Week 11	Lab: Sedimentary & metamorphic rocks	
March 25 M	Sedimentary rocks	Ch. 3 (p. 69-74)
March 27 W	Sedimentary rocks and depositional environments	
March 29 F	Metamorphic rocks	Ch. 3 (p. 75-89)
	<i>Due: quiz on Canvas</i>	

Week 12	Lab: Bedrock geology field trip #1	
April 1 M	Geologic structures	Ch. 7 (p. 202-215)
April 3 W	Geologic time	Ch. 11 (p. 348-360)
April 5 F	Geologic time	Ch. 11 (p. 361-371)

Week 13	Lab: Bedrock geology field trip #2	
April 8 M	Interpreting geologic history	
April 10 W	Plate tectonics and Earth through time	Ch. 12 (p. 374-389)
April 12 F	Tectonic history of the Rockies	Ch. 7 (p. 214-227)
	<i>Due: quiz on Canvas</i>	

Week 14	Lab: Rock & Mineral Exam	
April 15 M	Tectonics and climate	Ch. 10 (p. 326-330)
April 17 W	Climate change: past and present	Ch. 20 (p. 621-630)
April 19 F	Wrap-up/review	

April 22 M	Final Exam	
9:45-11:45 am		