

**ENV 120/GEO 120**  
**Geochemistry of the Environment**  
**SPRING 2012**

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Office hours: T 11-12, F 10:30-11:30

**Lecture** MTWF 1:30-2:20, Nobel 105

**Lab** T 2:30-5:20, Nobel 306 and 123 (check weekly schedule)

**Assigned books**

*An Introduction to Environmental Chemistry 2<sup>nd</sup> ed.*, Andrews et al.

*Earth: Portrait of a Planet 3<sup>rd</sup> ed.*, Marshak (Paper or e-book)

This interdisciplinary course provides an introductory understanding of the environment from a physical science perspective. This course focuses on the chemical interactions and geologic processes that shape the environment we know. Fundamental chemistry concepts such as kinetics and equilibria help students understand connections among rock, water, air and life, while geology skills, like understanding the importance of time and connecting geologic features with the processes that form them, help students interpret the past conditions and future possibilities of a given landscape.

This course is required for the Environmental Studies major and minor. The course counts as a prerequisite for:

- all upper-level Geology courses, in place of GEO 111
- CHE 246: Environmental Chemistry, in place of CHE 107
- BIO 245: Conservation Biology, in place of BIO 101 for Environmental Studies majors only

This course is organized around two themes. In the first part of the semester, Earth's climate will be the unifying theme as we answer questions like, What is the Earth made of? What factors control global climate? And, how have those factors changed over geologic and human-scale time? In the second part of the semester, we will turn our attention to water, asking questions like, What determines the chemical composition of lakes, rivers and groundwater? What geologic materials make up our local landscape, and how does that affect our water quality? And, how are human activities changing natural waters?

**COURSE POLICIES**

**Mutual respect:**

We will start and end class on time, strive to make class time engaging and productive, make assignments and exams fair and reasonable, return assignments and exams in a timely manner, and be accessible outside of class to answer questions or help with projects. In return, we expect you to: be ready to start class on time, let us know as soon as possible if you will miss class or lab, turn in assignments on time, be alert and responsive in class and lab, and to work together with your classmates to further each other's learning experience.

**Late assignments:**

I place a high premium on turning in labs and assignments on time. Late assignments will be docked 10% per day, with a maximum late period of three days. On the other hand, we are sympathetic to physical and mental illness if you are under a doctor's care, and in such cases will work with you develop alternate plans.

### **Academic honesty:**

Scientific advancement is based on trust, so to make this world better for humanity and for yourself, please be worthy of that trust. We have a zero-tolerance policy for cheating and academic dishonesty. If you cheat on an exam, plagiarize the work of another person, or present work that is not entirely yours as if it was, you will automatically receive a zero for that assignment and will be referred to the Office of the Provost. Repeated or serious instances of academic dishonesty will result in failure of the course.

Scientific advancement is also based on cooperation, but always with the understanding that each person will receive due credit for their contribution. Although some assignments will be done in groups, you are responsible for submitting your own, original answers unless otherwise indicated. If you have any questions or concerns, PLEASE ASK US or refer to the policy of Gustavus:

[https://gustavus.edu/general\\_catalog/current/acainfo](https://gustavus.edu/general_catalog/current/acainfo) As a student of Gustavus, you implicitly agree to abide by this honor policy, and we will assume that the work you do is your own until we are given reason to suspect otherwise.

### **Disability:**

We will make every effort to accommodate any physical, mental and learning disabilities that students may have. Some aspects of this class involve moderate levels of physical exertion, but we will make as many changes as we are able, if necessary. Please talk to us as early as possible if you have any concerns about your ability to succeed in this class! Following is the college's policy, to which we adhere completely.

"Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act (1990) work together to ensure 'reasonable accommodation' and non-discrimination for students with disabilities in higher education. A student who has physical, psychiatric/emotional, medical, learning or attentional disability that may have an effect on the student's ability to complete assigned coursework should contact the Disabilities Services Coordinator in the Advising Center, who will review the concerns and decide with the student what accommodations are necessary. Disability Services Coordinator Laurie Bickett (x6286) can provide further information.

## **COURSE REQUIREMENTS AND GRADING**

**Grading:** Your final grade will be determined by:

<i>Quizzes</i> (6)	30% (5% each)
<i>Exams</i> (2)	30%
<i>Lab</i>	25%
<i>Homework</i>	10%

**Lecture exams:** There are two exams during the semester (Mar. 23 in class and Friday May 18 @ 8 am). Exams will cover material presented in lectures, labs, readings, and homework.

**Quizzes:** Feb. 17; Mar. 2,16; Apr 13, 27; May 11

**Labs:** Some labs will be done in the field, others will be done in a lab room. In all cases, it will be difficult or impossible to "make up" a missed lab, so please plan to attend all lab sessions. Due dates for lab assignments are firm and will be listed at the top of each.

**Extra Credit:** Attend lectures and lab sessions, keep up with reading assignments, ask questions, and hand in your work on time. If you do all of this, you will succeed in this course and won't have time or need for extra credit.

## **OTHER RESOURCES**

We will maintain a Moodle page where the class schedule and reading assignments will be posted and frequently updated. Please check it often! Moodle items will include:

- Syllabus, including updates of assignments, due dates, etc., as the semester progresses
- Week-by-week readings assignments
- Links to other online resources that may help with your studying and research
- Maps, articles, etc. that we discuss in class and that you may want to explore further

To access Moodle, go to:

<http://moodle.gac.edu/>

<b>Week of</b>	<b>General class topic for the week</b>	<b>Lab location</b>	<b>Lab title</b>	<b>Textbook assignment</b>	<b>Quizzes and Exams</b>
2/6	Elements in Earth	GIS lab	What is Geochemistry?	IEC 1 and PP 2	
2/13	Chemist's Toolbox and Earth Systems	306	Heat It Up: Greenhouse Gases	IEC 2	2/17: Quiz 1
2/20	Climate and Plate Tectonics	306, 123	The Insides and Outsides of Minerals, Pt.1	PP 3	
2/27	Plate Tectonics and Equilibrium	306, 123	The Insides and Outsides of Minerals, Pt.2	IEC 3.1-3.4 and Box 3.6	3/2: Quiz 2
3/5	Rock Cycle and Silicate Minerals	123	Rocks and Rolls	IEC 4.1-4.2	
3/12	Weathering Processes	TBA	Alternative Energy	IEC 4.3-4.4, Box 4.3	3/16: Quiz 3
3/19	Carbon and Climate	TBA	Groundwater Tastes Great (or Not)	IEC p.239-262, PP 23.3, 23.5	3/23: Exam 1
3/26	Landscape Processes	Field	Water Chem I: Anions	IEC 4.6 and PP 22, 7.4-7.7	
4/2	<i>Spring break</i>				
4/9	No class 4/9 Water and Pollution	306	Water Chem II: Cations	IEC 5 and handouts	4/13: Quiz 4
4/16	Lakes	Field	Water Chem III: Lakes	TBA	
4/23	Sediments	Field	Seven Mile Project I	PP 7.1-7.2, 7.4-7.7	4/27: Quiz 5
4/30	Rivers <i>5/2 MAYDAY schedule</i>	Field	Seven Mile Project II	PP 17	
5/7	Rivers and Groundwater	123	Seven Mile Project III	PP 8	5/11: Quiz 6
5/14	Earth Systems	TBA		TBA	
	<b><i>FINAL EXAM FRIDAY MAY 18 8-10am in our classroom</i></b>				