



# GEOL 1470 Environmental Geology

<http://web.mac.com/sukismaglik/CWC>

(the last three characters must be in caps)

Fall 2011 T & TH 11:30 a.m. - 2:20 p.m. Room: MH 163

**Instructor:** Suki Smaglik Phone: 855-2146 E-mail: [ssmaglik@cw.edu](mailto:ssmaglik@cw.edu)

**Office:** MH 162 **Hours:** MW 11:00 am - 12:20 pm (W in Tutor Lab); T 3:15 - 5:15 pm

**Lab Assistant:** Lance Murakami E-mail: [lmurakam@cw.edu](mailto:lmurakam@cw.edu)

**Textbook:** *Living with Earth*, 1e by Hudson (ISBN 9780131424470)

**Lab Manual:** *Investigations in Environmental Geology*, 3e  
by Foley et. al. (ISBN 978013142064X)

**Other required materials:** 4x6 lined index cards; 10x hand lens (loupe) or magnifying glass (available at the bookstore for ~\$7; 2-inch, 3-ring binder with clear insert cover; colored pens/pencils; transparent ruler; scientific calculator.

**Course web site:** ANGEL will NOT be used. You will find course materials at the URL listed above.

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**About this course:** Environmental geology is the study of the interactions between humans and their geologic environment: rocks, water, air, soil, life. Humans are impacted by Earth processes, and by their activities have an impact on Earth. This introductory-level course will use physical geologic principles (rocks, minerals and plate tectonics) as a foundation for the study of these environmental interactions. This course will explore issues relating to these interactions: natural hazards such as earthquakes, volcanoes, floods, storms; natural resources including water, soil and energy; climate change; human population; pollution and environmental policies. Laboratory exercises will apply geologic principles to environmental problems. Prerequisites: MATH 1000 and ENGL 1010, or above. Field Trip required. 4 cr. (3 lect., 3 lab) LSCI

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**ASSIGNMENTS AND GRADING:**

Homework	20%	Includes writing assignments, pre-lab work, TMYN, etc.
In-class work:	25%	Includes labs and other unannounced in-class work
Exams:	25%	Four exams of various value.
Quizzes:	10%	Questions on readings, given each week
M&A	<u>10%</u>	Motivation & Attitude - includes attendance.
Total:	100%	

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**Instructional Methodology:** Hybrid Online & Classroom: Interactive Lecture/Discussion, Guided Inquiry Activities, Applied Geology Exercises, Field Trip(s).

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### Course goals:

- To excite the student about the world around us and to help the student gain a better understanding of the way Earth works.
- To explain geology in an integrated scientific format that allows the student to develop critical thinking skills.
- To help the student understand why science is important and how the scientific method can be applied to their lives.
- To encourage the student to become an informed and responsible citizen of the planet.

*Note: Learning objectives for individual chapters/topics are given on the text website.*

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### GENERAL COURSE OUTLINE: (NOT EQUALLY DIVIDED)

Part 1: The Earth System and Living With Earth

Part 2: Earth Materials and Processes

Part 3: Geologic Hazards and Resources

Part 4: Resource Use and Environmental Impact

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Cartoon by Mike Keefe, the Denver Post, 5/15/082008, viewed online 10/24/08 at Daryl Cagle's Professional Cartoonist's index <http://www.cagle.com/politicalcartoons/pccartoons/archives/keefe.asp?Action=GetImage>

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**Student Attributes:** Central Wyoming College wants students completing course work to possess particular student attributes. (For definitions of attributes, see p. 6 of CWC 2011-2013 Catalog). This course contributes the following toward attaining these attributes.

**A. Critical Thinking:** GEOL 1470 students are required to formulate and submit critical thinking questions weekly. They are also required to analyze and synthesize data collected in laboratory settings and to draw appropriate conclusions regarding the nature of the experiment.

**B. Self-directed learning:** GEOL 1470 students must direct their learning of course materials by establishing a learning strategy, based on options provided by the instructor. The instructor provides a framework for learning, while students build the necessary steps for their own success in the course.

**C. Communication:** GEOL 1470 students learn to communicate using both written and oral formats. Team-building exercises provide students the ability to communicate and work in a group. Student teams will lead class discussions for the last third of the course.

**D. Technological literacy:** GEOL 1470 students use the technology of the Internet to acquire necessary course materials. Laboratory problems maybe computer-based. Computer software is used by students to analyze data and produce written reports.

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**In order to successfully complete this course, students must:**

**A. Demonstrate an understanding of fundamental geological processes:**

1. Define the main geologic, petrologic, tectonic and geomorphologic processes involving crustal rocks;
2. Identify and classify rocks (igneous, metamorphic and sedimentary) and to read and interpret geologic maps and sections;
3. Explain the reason for the natural abundances of important chemical elements and compounds in natural environments (air, water, soils, rocks) Diagram the migration of the elements within the main natural environments (biogeochemical cycles);
4. Demonstrate knowledge of basic hydrologic principles, the significance of water and the implications of global water use;
5. Explain the nature and causes of air and water pollution, especially the impact of the movement of pollutants;
6. Evaluate the geology of energy sources and economic considerations;
7. Compare the nature of geological hazards, and their impact on society;

**B. Apply scientific laws and principles to new situations:**

8. Identify environmental problems and apply geologic principles to solving those problems;
9. Exercise thoughtful judgment in decisions relating to the environment, resources, and society as a whole;
10. Demonstrate an ability to use math and metrics to analyze environmental issues;
11. Acquire and synthesize data needed to apply science to the needs of



society;

12. Analyze system dynamics of geologic systems and understand how geologists use temporal and spatial relations to interpret system;
13. Demonstrate awareness of competing concerns (including economic, social, & biological tradeoffs) that arise in environmental geologic decision-making;
14. Develop the ability to extract knowledge from published studies and communicate it in a professional manner via formal writing assignments and oral presentations;

**C. Assess the human impact on natural environments:**

15. Comprehend the impact of human population growth on the global environment;
16. Understand potential impacts of natural geologic events on society and some of the potential impacts of human activities on our environment;
17. Illustrate the connection between water and human health;
18. Describe the role, of human activities and natural variability in controlling climate apply geologic techniques for analyzing climate history and understand how geologists define the climate history;
19. Apply scientific methods and knowledge in making and evaluating decisions in human affairs;
20. Recognize the limitations of science in addressing certain societal problems.

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**Tools used to evaluate the above objectives (see details below):** Online quizzes, written exams (essays), written and computer simulation lab exercises, course project.

- **Notebook/Journal:** You must maintain a bound notebook. Assignments will be given in class. You may also use it for class and reading notes. You must have this notebook with you in class every day. All pages must be numbered in the upper right corner. It must have a complete Table of Contents (TOC) using full descriptions for each entry.
- **Binder/Portfolio:** Your 3-ring binder must be organized with tabbed sections and must have an attractive cover including the course number and name, your name, the semester dates. It must have a complete Table of Contents (TOC) using full descriptions for each entry. Include assigned labs, worksheets done in class and worksheets or assignments done for homework.
- **Classwork and Lab Exercises:** There will be a variety of assignments during in class (see website for detailed list). Some of them will be Internet exercises or CWC computer-based exercises. You may work together with a partner but each of you must do your own work (i.e., put your observations in your own words, not your partner's). Assignments received with identical answers (except for those that should be - as in math) receive scores of zero. Materials for most labs will be provided for you, except for hand lenses. You should bring the following to class with you everyday: textbook, lab manual, notebook, pencils (no ink pens) both carbon and colored, a good (white) eraser, calculator, ruler.

● **Homework:**

- 1) Visit the Student Companion Site and read the Key Learning Concepts.
- 2) Keep these in mind as you read the chapter.
- 3) Read the assigned material before coming to class and write answers to assigned Review Questions in your notebook using full sentences.
- 4) You must take the online chapter quizzes until you score 100% and submit your grades using the Grade Tracker (instruction on website; Class ID is cm394937).
- 5) You will be asked to write several critical thinking questions. These may be form the text and must be typed, or they may be on the website and must be submitted there.
- 6) Q-cards are due each Tuesday (see below for instructions).

- Each Tuesday you must turn in a 4x6 card (Q-card) as follows. (Loose paper or other size cards are NOT acceptable.) Focus on questions that you would like answered in class. DO NOT refer to problems or page numbers from text or lab. DO NOT copy questions out of your text.

| Name                                                                                                                       | GEOL 1470 | Date |
|----------------------------------------------------------------------------------------------------------------------------|-----------|------|
| 1) A thoughtful question pertaining to what you are learning in this class (using Standard English and punctuation).       |           |      |
| 2) Another thoughtful question pertaining to what you are learning in this class (using Standard English and punctuation). |           |      |

- **Exams:** There will be four exams consisting of questions from the weekly quizzes, short answer question form the text and an essay question. The **final exam** will be given on the last day of classes, **21 Dec. 2011**.

- **Field Trip(s):** You are required to attend the field trip(s) and file a report or turn in a worksheet. Any one not ble to attend the trips must consult with the instructor ahead of time and must have a valid excuse. Except in unusual cases "having to work" is not a valid excuse; enough time will be given for you to make appropriate arrangements. The dates and location for this semester's trip will be announcedas soon as possible so that you can make plan to attend. We will try to make some of the trips during class time but a full-day trip may occur on a Friday or weekend.

- **Grading:** Grading Rubrics for Coursework and Motivation and Attitude are given at the end of this document. Those for Essays (Critical Thinking), Notebooks and Projects will be

posted on the website or emailed to you. Letter grades will be assigned based on total class performance with the approximate provisions (determined statistically): >90% A, >80% B, >70% C, >60% D, <60% F. (see front page for assignment weights). Graded papers that are not reclaimed when returned in class, will be left in the assignments rack in MH 163. If you do not want your assignments left there, inform the instructor and make arrangements to claim them. Final Grades will be available on course website and WebAdvisor no earlier than 5 p.m., December 22, 2011.

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**Expectations** (*the fine print; always read the fine print*):

- Attend all lecture and lab sessions and to be on time. Class will start on time and any announcements or changes to the syllabus will be given at the beginning. If you arrive late it is your responsibility to find out what you missed.
- You are responsible for obtaining info/materials/assignments you may have missed due to an absence. Please be aware: I will have copies of handouts, but I do not have detailed lecture notes.
- Pay attention in class and to respect your instructor and classmates by not "chatting" during class time or by not using electronics devices (except calculators) during class time. Please turn off cell phones, MP3 players, pagers, etc. before class; and keep them in your bags, off your desks.
- You will not succeed in college without attending class regularly and doing your homework on time. Therefore, attendance is mandatory. You will be given three absences before your grade is affected so please save them for when you really need them. For every 3 classes you miss, your final grade will go down by one step (i.e. a C becomes a D). Exceptions to this are only made for CWC sanctioned events, with notice given by the supervisor of that event, or extreme illness, with a detailed doctor's excuse provided.
- If you have a question, please ask, politely. You do not have to raise your hand. Make friends. Join the class discussion. You are encouraged to utilize office hours, e-mail or study groups for further discussion. **Please** feel free to bring some topics of discussion into class, and be part of the discussions of others - the time will fly by a lot more quickly if you do this, instead of sitting still, quiet and bored!
- Giving advance notice for absences makes you eligible for make-up privileges. Do not expect to make up missed work if no advance notice is provided. Assignments are due on the given date, at the beginning of class. LATE assignments will be penalized 5% per day up to 50%.
- If you miss an exam for a valid reason (confirmed with me *beforehand*), you must make it up *before* they are handed back (usually the next week). Quizzes **must** be made up prior to the start of next class. Because life does get in the way occasionally, your two lowest (or missing) in-class assignment grades and two lowest (or missed) quiz grades will be dropped.

- You are required to use a computer in this class but you do not have to own one. They are available for you to use in several locations on this campus but especially, MH 163, Library, MH 156 and the CALL/Tutor Lab. Please ask for help if you need it. Not knowing how to use a computer and the Internet is not an excuse for not completing your class assignments on time.
- It is to your benefit to keep in contact with your classmates and the instructor during this course. You must learn how to use e-mail if you do not already know how. E-mail is the best way to contact the instructor.
- Always be willing to ask questions. If I can't answer them right away, I will try to get answers to you in a timely fashion. If you would like a question answered outside of class, or want to set up an appointment you can send me a message by phone or e-mail. I will check my e-mail and or call during office hours. I will respond as soon as I can, either by e-mail or phone.
- Assigned material must be read before coming to class. Being prepared by reading ahead will lead to more informative in-class discussions. Geology is a very visual science. Lectures will also include CD-ROM animations, videos and activities.
- You get out of this class what you put into it. You are expected to put in two hours of study outside of class for every hour spent in class. Manage your time appropriately.
- If you drop, you must follow the appropriate procedure. If you just stop coming to class, you will be assigned a "F" for the course. Incomplete grades (X) will be given at the discretion of the instructor and only when the student is passing the class at the time of the request.
- Students desiring reasonable accommodation under the Americans with Disabilities Act or who have serious medical conditions must notify the instructor to discuss their needs. All information will be held confidential.
- Plagiarizing/academic dishonesty: first offense will result in a reprimand/warning and counseling; second offense will result in failure of the course
- All other academic issues shall follow the procedures outlined in the CWC college catalog or CWC student handbook.
- Extra credit will be given on occasion. It is designed to enhance your grade, not replace missed work. Therefore, it will only count when all other assignments have been completed.

- If you have constructive criticism, *please* don't hesitate to approach me with your thoughts outside class. Don't wait for the semester's end, by which time it's too late for either of us to correct a negative situation. This is your class; make it worth your while!

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### **Grading Rubrics:**

**Exercises (In-class and Homework) will be graded using the following scale:**

(100% poss pts) Excellent work. Correct, complete, and neat. Perfect with regard to the questions asked. Conclusions are logical both quantitatively and qualitatively. Also the conclusions are shown to follow from the data. Extraordinary analysis of questions and hypotheses.

(90% poss pts) Proficient work. Correct, complete and readable. There may be a few minor errors. Conclusions are logical both quantitatively and qualitatively. Also the conclusions are shown to follow from the data. All places where a quantitative analysis is possible must include errorless, thorough quantitative analysis.

(75% poss pts) Adequate work. Qualitative analyses are logical. Some of the data or interpretations may be incorrect. Most quantitative analyses are good, however, some incomplete, inaccurate or inappropriate work may be apparent (math errors, or some conclusions and equations are not shown to fit the data).

(60% poss pts) Marginal work. Data analysis is logical on the qualitative level but much of the quantitative analysis is done sloppily or is full of errors. Weak analysis of questions and hypotheses. Some interpretations may be incorrect or there may be evidence of misconceptions.

(40% poss pts) Unsatisfactory work. May be incorrect, incomplete or unreadable. Poor analysis of questions and hypotheses. Although all questions may be answered, the answers show no evidence of understanding.

(0%) Failed to do the assignment or the assignment is exceptionally late.

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### **Scoring for Motivation and Attitude (M&A):**

100% (A) Excellent attendance record. [No unexcused absences. Timely arrival to lecture and lab.] Completes all assignments on time or arranges for later due date ahead of time (and only occasionally). Has a truthful, enthusiastic attitude toward computer work, homework, lab exercises and outside assignments. Shows higher-order thinking skills, independence and creativity. Is alert during demonstrations and videos, taking complete notes. Participates in class discussions and assists peers in a friendly manner. Consistent and precise; stays on task and offers useful ideas.



80% (B) Above-average attendance record. [Few unexcused absences. Timely arrival to lecture and lab.] Completes all assignments on time or arranges for later due date ahead of time (and only occasionally). Has a truthful, enthusiastic attitude toward computer work, homework, lab exercises and outside assignments. Shows limited higher-order thinking skills, independence and creativity. Is usually alert during demonstrations and videos, taking complete notes. Participates in class discussions and assists peers in a friendly manner. Consistent with minor flaws; stays mostly on task and offers some useful ideas.

60% (C) Adequate attendance record. [Several unexcused absences. Often late arrival to lecture and lab.] Completes most assignments on time or arranges for later due date ahead of time. Has a truthful, somewhat enthusiastic attitude toward computer work, homework, lab exercises and outside assignments. Is sometimes alert during demonstrations and videos, taking minimal notes. Infrequently participates in class discussions and rarely assists peers. Needs teacher's help or is overly dependent on peers (needs some prompting); offers few useful ideas.

40% (D) Marginal attendance record. [Many unexcused absences. Often late arrival to lecture and lab.] Completes many assignments on time but has a ready excuse for most late work. Has a somewhat enthusiastic attitude toward computer work, homework, lab exercises and outside assignments. Is rarely alert during demonstrations and videos, taking minimal notes. Rarely participates in class discussions and relies somewhat peers. Needs constant attention, offers very few useful ideas and is marginally involved in the task.

20% (E /F) Unsatisfactory attendance record. [Many unexcused absences. Mostly late arrival to lecture and lab.] Rarely completes many assignments on time but has little or excuse for most late work. May not turn in some assignments. Has very little enthusiasm, or a negative attitude, toward computer work, homework, lab exercises and outside assignments. Needs constant attention, offers no useful ideas and is not involved in the task. Finds fault for personal inadequacies everywhere but within.

0% (F) Unprepared for college-level work. Poor attendance record. [Many unexcused absences. Mostly late arrival to lecture and lab. Leaves room frequently.] Rarely completes many assignments on time but has little or excuse for most late work. May not turn in many assignments. Has very little (or false) enthusiasm, or a negative attitude, toward computer work, homework, lab exercises and outside assignments. Is rarely alert during demonstrations and videos, taking no notes. Does not participate in class discussions and relies heavily on peers. Needs constant attention, offers no useful ideas and is not involved in the task. Finds fault for personal inadequacies everywhere but within.

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**Extra fine print:** Any of the material in this document may be modified by the instructor at anytime, depending on student needs and progress. Notice of changes will be by either in-class announcement, e-mail announcement, website or all three.

## GEOL 1470 Environmental Geology

### Tentative Lecture Topic Order:

#### **Part 1: The Earth System and Living With Earth**

- Ch. 1 Living with Earth
- Ch. 2 Earth Systems
- Ch. 7 Rivers and Flooding

#### **Part 2: Earth Materials and Processes**

- Ch. 3 Plate Tectonics
- Ch. 4 Earth Materials

#### **Part 3: Geologic Hazards and Resources**

- Ch. 6 Volcanoes
- Ch. 10 Water Resources
- Ch. 11 Soil Resources (if time allows)
- Ch. 12 Mineral Resources
- Ch. 13 Energy Resources

#### **Part 4: Resource Use and Environmental Impact**

- Ch. 14 Atmospheric Resources & Climate Change
- Ch. 15 Human Impact on Resources

### Tentative Lab Exercise Order:

#### **Part 1:**

- Ex. 1 (parts) & Part IV - Misc Intro; TMYN pre-assessment
- Ex. 3 (parts) & TMYN assignment 1; GCI
- Ex. 2 (parts) & TMYN assignment 2
- Ex. 10 & TMYN assignment 3

#### **Part 2:**

- Plate Tectonics Digital Lab
- Ex. 1 (parts) Minerals
- Ex. 1 (parts) Rocks

#### **Part 3:**

- Ex. 4
- In-class Volcano Simulation
- Ex. 12 & TMYN assignment 4
- Ex. 13 & TMYN assignment 5
- Ex. 15 & TMYN assignment 6

#### **Part 4:**

- Ex. 17 & TMYN assignment 7
- Ex. 18 & TMYN assignment 8; TMYN post-assessment
- Global Warming Online Lab

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