

**UNIVERSITY OF NORTHERN COLORADO
COLLEGE OF NATURAL AND HEALTH SCIENCES**

Course Number and Prefix: ESCI 200

Title: Introduction to Environmental Earth Science (4 credits)

Co-Requisites/Prerequisites: None

Instructor: Dr. Steven Anderson, Ross Hall 3235K – 970 351 2973 – steven.anderson@unco.edu

Office Hours: Tuesday and Thursday 8:30 – 9:30 am, Thursday 11am-12 noon, and by appointment

Textbook: None required. If you desire a text to compliment the lecture, you may purchase any college-level environmental geology text published within the past 10 years. Environmental Geology by Montgomery (William C. Brown) is a particularly good textbook.

Course Description: This lecture/lab course is an exploration of the complex changes in the Earth's environment, the science behind these changes, and impacts on human populations requiring interdisciplinary strategies to solve problems.

Course Objectives:

- Students will understand the complex, global, interdisciplinary nature of environmental Earth science as it is applied to a number of current environmental and sustainability topics in both the classroom and lab settings.
- Students will evaluate information from diverse science and non-science fields as they consider human response to environmental change
- Students will analyze environmental data to answer questions through use of the scientific method
- Students will explain results from their classroom and lab exercises via presentation and written reports to hone their communication skills.

Outline of Course Content

Below is a list of some of the topics we may cover this semester. I reserve the right to alter the topics depending on class interest and current world events. These topics may or may not be covered in the order listed below.

Foundations of Environmental Earth Science

The Scientific Method Applied to the Earth Sciences – Data Collection, Observations, Hypotheses, and Modeling

Structure of the Earth and Atmosphere

Human Population Dynamics

Earth Processes and Natural Hazards

Atmospheric Hazards

Volcanoes, Earthquakes, Flooding, and Tsunamis

Human Resource Consumption, Pollution, and Waste – Interconnections between Human Activity and the Environment

Mining and Mine Waste

Geology of Mineral Resources and Recycling

Human Waste and Sanitation Issues

Relationships Between Geology and Health

Energy

Types of Energy
 Energy Production for Growing Populations
 Consequences of Energy Production

Water
 Distribution of Water on Earth
 Supplying Water to Populations and Sustainability
 History of Water Use in America

Climate Change and Extinctions
 History of Climate Change Science
 The Science, Politics and Misinformation, and Economics of Climate Change
 Mass Extinctions

Course Requirements

1st Mid-term Exam (Short answer, essay and problem sets) – Late September or Early October
 2nd Mid-term Exam (Short answer, essay and problem sets) – Early November
 Final Exam (Short answer, essay and problem sets - CUMULATIVE) – the final will be given on the last lecture day, and handed back and reviewed during the scheduled final exam period.
 Lab (lab reports, exams and presentations – see below)

Method of Evaluation: Letter Graded

The final grade for the ESCI 200 students will be derived from the following activities:

<i>Method of Assessment</i>	<i>Approximate weight</i>
1 st Mid-term Exam	25%
2 nd Mid-term Exam	25%
Final	50%
Lab	25%

**Students may drop the lowest of the first two exams, or ½ of their final exam score to give 100%
 The lab grade cannot be dropped under any circumstance.**

Grading Scale: **A = 90-100%** **B = 80-89%**
 C = 70-79% **D = 60-69%**
 F = 0-59%

Labs

The points you earn in lab will be combined with your lecture points and account for 25% of your overall grade.

Your lab grade will be based on 1) Weekly lab reports (1 point for properly finished lab, 0.5 points for attempted lab – 10 points total), a lab midterm (5 points) and a group lab final (10 points).

Group Lab Final

All students will participate in a group land use planning project that will build upon the skills that you learn during the weekly labs. Groups will consist of 3 to 5 students (you may choose your own group), and each group will choose a 4 square mile local area to study. Each group will study the chosen area and determine the best land

use strategy for the next 25-year period. Land use planning is an important area for environmental geologists, and this exercise should enable everyone to gain some practical experience with different data sets, analyzing techniques and decision making. You will look at such aspects as soils, vegetation cover, rock types, topography, proximity to cities, surface and ground water presence, current land use, and extractable natural resources as formulate a land use plan for the future.

DETAILS:

Form groups by the end of Lab 3 and provide me with a list of members in each group. Lab 3 will be used for working with your group to start choosing and investigating your land use planning exercise. Our first two labs on maps and computers/GIS should be helpful in getting you started.

Pick a local area to study. The area should consist of 4 adjacent sections, and cannot include anything within the city limits of Greeley. It is important to pick an area that has variability in terms of vegetation, topography, current land use, etc., in order to make the land use planning exercise as interesting as possible. The more interesting the area, the more interesting your land use planning project, the better your grade will be. After choosing the area, you must go into the field and inspect the area to make sure it has the desired variability. All groups must provide me with the location of their study areas by the beginning of Lab 5 and present a short 5-10 minute report to the rest of the class during Lab 5 that describes the area chosen for study, presents a justification for studying the area (why is it important to study your particular area), and briefly highlights some of the area's interesting characteristics. This presentation will allow others in the class to learn from what you are doing, and will force you to consider the importance of your land use study.

You will have to make some assumptions about your land. You can either assume that it is available to do with whatever you want with. Some students in the past have actually interviewed landowners to see if they would ever part with the land, and in doing so they come up with a more "practical" approach. Both approaches are perfectly fine, just state in your introduction any assumptions you are making about land availability for your project.

The final project will contain your data on the soils, hydrology, geology, present land use, historic land use, potential for economic development, etc, and your 25 year plan or assessment. There is no set length, and no mandatory sections. This makes it easier because you can determine how to best use and present your data. It also makes it more difficult because I'm not telling you specifically how to do this exercise.

Each group member may participate in the presentation, or you may choose to have one or two group members present. You may use slides, overheads, video, or any visual aid necessary to convey your information effectively.

Your group project will be due at the beginning of class on November 17, and will consist of maps and a report that illustrate your land use plan for the next 25 years. There is no set format or length for your final maps and reports. It is your responsibility to convey your work in the most effective manner possible.

Your group will give a final presentation (15-25 minutes) of your land use plan to the rest of the class during lecture the last week of class. You may use slides, overheads, video, or any other type of media to aid you in your presentation. Again, all group members may participate in the actual presentation, or you may delegate the duty to certain group members.

NOTE: It is the responsibility of the group members to fairly divide the work to be done on this project. I will not interfere in the group dynamics. If you feel one or more members are slacking, it is your responsibility to express your concerns to the group. If at the end of the project, you still feel that some group members did not do their fair share or did poor quality work, then you can give them a poor grade when you evaluate other group members (I will give out the evaluations after the final presentation). You will give each group member a grade (100 points

total) based on their participation and the quality of their work. I am the only person who will view your evaluations. Group members receiving less than an average of 70 points will have their project grades lowered. Group members receiving less than 60 points average will not receive any credit for the group project.

GRADING: The entire group project is worth 10 points. The point breakdown is as follows:

Preliminary 5 minute report (during Lab 5)	2 points
Final presentation (Last week of class during lecture)	4 points
Final report (due November 17)	4 points

All group members will receive the same grade unless group evaluations warrant lowering of some member's scores.

**** All grading is done on a competitive basis. In other words, the group giving the best presentation and completing the best report will receive the best grade.

Disability Support Services

Any student requesting disability accommodation for this class must inform the instructor giving appropriate notice. Students are encouraged to contact Disability Support Services at (970) 351-2289 to certify documentation of disability and to ensure appropriate accommodations are implemented in a timely manner.

Honor Code

All members of the University of Northern Colorado community are entrusted with the responsibility to uphold and promote five fundamental values: *Honesty, Trust, Respect, Fairness, and Responsibility*. These core elements foster an atmosphere, inside and outside of the classroom, which serves as a foundation and guides the UNC community's academic, professional, and personal growth. Endorsement of these core elements by students, faculty, staff, administration, and trustees strengthens the integrity and value of our academic climate.

UNC's Policies

UNC's Policies – UNC's policies and recommendations for academic misconduct will be followed. For additional information, please see the Dean of Student's website, Student Handbook link <http://www.unco.edu/dos/handbook/index.html>

Portable Electronic Devices

Research has shown that writing out class notes results in significantly higher levels of learning (see <http://www.wsj.com/articles/can-handwriting-make-you-smarter-1459784659> for a review) . Personal experience also shows that electronics use in class is highly disrupting to other students. Therefore, please extend courtesy to your instructor and fellow students by using your electronic devices in class ONLY when asked by your instructor as part of an in-class activity. Therefore, no cell phones, tablets or laptops unless permission is granted by the instructor. Any disruptive use of electronic devices (ANY use that distracts another student from the classroom activities) will result in a ½ letter grade deduction at the end of the semester. If you must use a computer to take notes, please clear that use with me at the beginning of the semester.