Natural Resources & Civilizations

EarthSci 3336, Fall 2025

Class/time:	M, W, F, 10:00-10:50	Latham Hall 101
Professor:	Dr. Chad Heinzel	
Office hours:	M,W,F 11 to 12, Tuesday 11:20-12:30	Latham Hall 116
Office phone:	273-6168	
Email:	chad.heinzel@uni.edu	
Texts:	None, Mixed-media	
Credits:	Three - This course meets the Course Credit Hour Expectation outlined in the Course Catalog. You should expect to work approximately TWO hours per week outside of class for every course credit hour, (so at least SIX hours per week).	

Final Exam: Monday, Dec. 15, 10 to 11:50, Latham 101

Learning objectives

• Learn the historical use and importance of minerals, rocks, clay, water, energy sources, soil, timber and landscapes as they relate to human activities.
• Effectively communicate how a region's natural resources influence their civilization's economy, health, trade relationships, technological advancements, agricultural potential and potential conflict/warfare.
• Develop understanding and empathy toward differences within a civilization, by learning the importance of having inclusive sociopolitical infrastructures while celebrating our unique backgrounds.
• Recognize the difference between opinion and scientific knowledge, then be able to apply critical thinking to support your personal and civic decisions.
• Compare and contrast the successes and failures of the Roman, Egyptian, Native American and other cultures with respect to their relationships toward natural resources/environments.
"Learning from the past, so that we may not suffer the same fate of past/failed Civilizations."

UNIFI Responsibility: Guides to Ethical Reasoning, Greater Understanding & Applied Critical Thinking

The *Responsibility* category ideally provides you with opportunities to develop skills in ethical reasoning, while building a greater understanding of your personal responsibilities as an effective citizen. This category aims to enable you to move beyond ideological reactions to questions and instead form a careful normative judgment. It does not aim to instill a particular moral code, but to help you develop the habits of reasoning based on consistent principles, and judging based on evidence and logic, which will serve you well as a citizen in charge of creating our shared world.

UNIFI Student Learning Outcomes (SLO):

SLO 11 Values:	Analyze the origins and consequences of one's own personal values
SLO 12 Ethics:	Apply ethical reasoning to important issues facing society

Course Description –
EarthSci3336 - Introduction to the interactions and relationships between humans and natural resources: stone, clay, soil, water, plants. Geoarchaeological findings from the Mediterranean to U.S.A. Rocky Mountains. (Fall or Study Abroad Winter to Summer terms)

Schedule

1 – Aug25/29	Founding principles: Earth, Tragedy of Commons, Wicked Prob, sustainability
2 – Sept 1/5	*No class Sept. 1* Earth & Human *Systems*: Growth vs collapse, TIME
3 – Sept 8/12	Egyptians to Romans, Western civilization development
4 – Sept 15/19	Icelandic to Native American enviro-reciprocity/spatial resource distribution
5 –Sept 22/26	Energy: Oceans and Life – Climate Change Resiliency
6 – Sept 29/3	Land: Minerals, rocks, sediments 'If you cannot grow it then you must mine it'
7 – Oct 6/10	'Whiskey is for drinking; **Water** is for Fighting' – Mark Twain
Pending Chad may be away from campus Oct. 8, 9, 10,	
8 – Oct 13/17	Soil, plants and relationships with food: Hunting and gathering to agriculture
9 – Oct 20/24	Natural resources role in social structures, economics and politics
10 – Oct 27/31	Anthropogenic to Natural Hazards – Implications for humanity and nature
11 – Nov 3/7	Technology, Engineering & Design
12 – Nov 10/14	Art, education and sport – In society
13 – Nov 17/21	Religion & science – Linkages between the Earth and humanity
14 – Nov 24/28	Fall Break
15 – Dec 1/5	Communication through conflict – Decisions, reactions, solutions
16 – Dec 8/12	Environmental Sustainability – build on individual and collective decisions
17 - Final =	**Monday, Dec. 15, 10 to 11:50 Latham 101**

Grading procedures and policies

A >93%, A->90%; B+>87%, B >83%, B->80%; C+>77%, C >73%, C->70%, D+>67%, D >63%, D->60%; F < 60%, If you earn 93% of the total points you are guaranteed an A. The lower limit for each grade range will not move up. A curve will not be used in this class. **There will be no make-up exams after the scheduled exams are given**. Should you have a scheduled conflict, please talk with me at least two weeks before the exam date. An unexcused absence during an exam will lead to an automatic zero. If there is an emergency, we will work together on a solution. *Five unexcused classes = F regardless of points earned*. Excused absences may be obtained with prior communication or a signed doctor's note.

Estimated point distribution, Subject to change slightly			Subtotal
Monday Q and A		14 @ 10	140
Friday Content and personal reflections		14 @ 12	170
Discussion participation		20	20
Quizzes		4 @ 20	80
Midterm			80
UNI PantherOvation	Mid-term	50	50
	Final	60	60
Final exam			100
		Total	**700**

Approx. X>645 = A, X>580 = B, X>510 = C, X>435 = D, Anything < 420 = F

Class Attendance and Participation

Test questions will reflect and cover class 1) lectures 2) discussions, 3) readings, podcasts and videos, and 4) small group activities. Anything we discuss is fair game for a quiz or exam. *Attendance is essential,* points are primarily based on weekly in class work. If you do not attend class, there is little chance of learning the material you signed up for… If you listen, ask questions, take very good notes, and study chances for earning a good grade are high! And the general guidelines of UNI's attendance policy will be employed, https://policies.uni.edu/306).

UNI - Statements for Non-discrimination and Accessibility

UNI Information and regulations regarding Free Speech, Accessibility and potential issues that may impact course schedules… https://provost.uni.edu/syllabus-statements

Additional recommendations from UNI's Center for Excellence in Teaching & Learning

A. Course materials, accessibility and opportunities for enhanced success

a. Textbook – None, we will use handouts, articles, podcasts, videos and other media

b. Computers and data – You will need access to a computer, the internet and a phone or mp3 player.

c. Field trips – This is also a Study Abroad opportunity. I run this course to Italy, Egypt, Sicily, and Iceland. If you would like to learn this content from within the countries. You could take my Geoarchaeology/Study abroad Course as an elective. Check Here for Opportunities- https://uni.edu/studyabroad/

d. Course webpage – You will have access to some course materials and additional learning resources through the following webpage - https://www.exploreiowageology.org/

e. UNI-E-Learning – https://elearning.uni.edu/, This software will be used to help you keep track of your course progress - primarily scores from homework, fieldwork, tests, etc.

f. Important resources

1) The Dawn of Everything, a New History of Humanity, David Graeber and David Wengrow
2) Collapse, Jered Diamond
3) Egypt, Greece & Rome Civilizations of the Ancient Mediterranean, Charles Freeman
4) The Rise and Fall of Ancient Egypt, by Toby Wilkinson
5) Black Elk Speaks, John Neihardt
6) Braiding Sweetgrass, Robin Wall Kimmerer
7) The Dominant Animal Human evolution and the Environment, Anne and Paul Ehrlich
8) The World in a Grain of Sand, Vince Beiser
9) Sapiens A Brief History of Humankind, Yuval Noah Harari
10) There are many don't stop at these suggestions

B. Pro-Tips for doing well in this class

1. Engage the content material through our discussions, search for information related to our discussions beyond what is provided and work to apply our content to your personal environment.
2. Ask a lot of questions
3. Think about how your major relates to the growth and success of our campus our civilization, how can you become an 'agent of positive change'…
4. If you need to miss a class, please let me know ahead of time.

Knowing the following ideas and principles will help you understand the relationships between humans and their environments

Geology's 'Big ideas'

BIG IDEA #1 Geologists use repeatable observations and testable ideas to understand and explain our planet.

BIG IDEA #2 Earth is 4.6 billion years old.

BIG IDEA #3 Earth is a complex system of interacting rock, water, air, and life.

BIG IDEA #4 Earth is continuously changing.

BIG IDEA #5 Earth is the water planet.

BIG IDEA #6 Life evolves on a dynamic Earth and continuously modifies Earth.

BIG IDEA #7 Humans depend on Earth for resources.

BIG IDEA #8 Natural hazards pose risks to humans.

BIG IDEA #9 Humans significantly alter the Earth.

Climate Principles

Principle #1 Humans can take actions to reduce climate change and its impacts.

Principle #2 The Sun is the primary source of energy for Earth's climate system.

Principle #3 Climate is regulated by complex interactions among components of the Earth system.

Principle #4 Life on Earth depends on, is shaped by, and affects climate.

Principle #5 Climate varies over space and time through both natural and man-made processes.

Principle #6 Our understanding of the climate system is improved through observations, theoretical studies, and modeling.

Principle #7 Human activities are impacting the climate system.

Principle #8 Climate change will have consequences for the Earth system and human lives.

Soil Principles

Principle #1 Soils perform vital functions.
Principle #2 Soil is the basis of our ecosystems.
Principle #3 Soils support and sustain life.
Principle #4 Soil Management affects soil quality.
Principle #5 Soils have unique biogeochemical properties that are important to their proper use.
Principle #6 Soil forming factors determine the location and type of soil present.
Principle #7 A soil survey is a scientifically based inventory of a location soil history and properties.
Principle #8 Soils have advantages and/or limitations that must be characterized and understood.
Principle #9 Scientific soil names reduce ambiguity but may not fully characterize a soil’s full worth.
Principle #10 Soil science may be effectively incorporated into all aspects of life.

UNIFI Student Learning Outcome 11
Values: Analyze the origins and consequences of one's own personal values.

	Exemplary (3)	Competent (2)	Emerging (1)	Needs Improvement (0)
Ethical Self-Awareness.	Discusses in detail and analyzes connections between core beliefs and the origins of the core beliefs.	Discusses in detail both core beliefs and the origins of the core beliefs.	States both core beliefs and the origins of the core beliefs.	Fails to articulate either core beliefs or the origins of their core beliefs.
Knowledge. *Cultural self-awareness*	Analyzes how cultural rules and biases contribute to social/cultural interactions, relationships, etc. and how their own biases may shape their interactions with others.	Recognizes new perspectives about their own cultural rules and biases (e.g. not looking for sameness; comfortable with the complexities that new perspectives offer) and articulates how their experiences have shaped these perspectives/biases.	Shows some awareness of own cultural rules and biases (e.g. with a strong preference for those rules shared with own cultural group and seeks the same in others).	Shows minimal awareness of own cultural rules and biases (even those shared with own cultural group(s)) (e.g. uncomfortable with identifying possible cultural differences with others).
Reflection and Self-Assessment. *Demonstrates a developing sense of self as a learner, building on prior experiences to respond to new and challenging contexts (may be evident in self-assessment, reflective, or creative work)*	Envisions a future self (and possibly makes plans that build on past experiences) that has occurred across multiple and diverse contexts.	Evaluates changes in own learning over time, recognizing complex contextual factors (e.g., works with ambiguity and risk, deals with frustration, considers ethical frameworks).	Articulates strengths and challenges (within specific performances or events) to increase effectiveness in different contexts (through increased self-awareness).	Describes own performances with no reflection and only general descriptors of success and failure.
Student's position. *Perspective, thesis/ hypothesis*	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Recognizes the limits of position (perspective, thesis/ hypothesis), as well as the possible advantages/limits of the perspectives of others.	Specific position (perspective, thesis/ hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is either unstated or does not acknowledge different sides of an issue.

UNIFI Student Learning Outcome 12
Ethics: Apply ethical reasoning to important issues facing society.

	Exemplary (3)	**Competent (2)**	**Emerging (1)**	**Needs Improvement (0)**
Understanding. *Theories or conceptual frameworks*	Names the theory or theories, presents the gist of said theory or theories, and accurately explains the details of the theory or theories used.	Names the major theory or theories they use, presents the gist of said theory or theories, and attempts to explain the details of the theory or theories used, but has some inaccuracies.	Names the major theory they use, and only present the gist of the named theory.	At best, only names the major theory they use.
Recognition.	Recognizes ethical issues when presented in a complex, multilayered (gray) context AND recognizes cross-relationships among the issues.	Recognizes ethical issues when issues are presented in a complex, multilayered (gray) context OR identifies cross-relationships among the issues.	Recognizes basic and obvious ethical issues and identifies (incompletely) the complexities or interrelationships among the issues.	May recognize basic and obvious ethical issues but fails to identify complexity or interrelationships.
Application.	Independently applies ethical perspectives/ concepts to an ethical question, accurately, and is considers full implications of the application.	Independently (to a new example) applies ethical perspectives/concepts to an ethical question, accurately, but does not consider the specific implications of the application.	Applies ethical perspectives/concepts to an ethical question, independently (to a new example) and the application is inaccurate.	Applies ethical perspectives/concepts to an ethical question with support (using examples, in a class, in a group, or a fixed-choice setting) but does not apply ethical perspectives/ concepts independently (to a new example.).
Evaluation.	States a position and objections to assumptions and implications of, and reasonably defends against the objections to, assumptions and implications of different ethical perspectives/ concepts, and the defense is adequate and effective.	States a position and objections to assumptions and implications of, and respond to the objections to, assumptions and implications of different ethical perspectives/ concepts, but the response is inadequate.	States a position and the objections to assumptions and implications of different ethical perspectives/ concepts but does not respond to them.	May state a position but cannot state the objections to and assumptions and limitations of the different perspectives/ concepts.
Personal and Social Responsibility.	Analyzes what it means to act responsibly to address ethical and social challenges and differentiates the effects of individual and collective actions within those systems.	Explains ethical and social challenges and identifies a range of actions informed by one's sense of personal and civic responsibility.	Identifies he ethical and social consequences of local, national, or global decisions.	Fails to identify basic ethical dimensions of some local, national, or global decisions.