

Geology of Iowa - EarthSci 3400/5400

Spring 2016

This syllabus is subject to change over the course of the semester...

Lecture: M, W, F 11:00 to 11:50 (Latham Hall 133)

Professor: Dr. Chad Heinzl (116 Latham Hall)

Office hours: M, W, F 10 to 11, and by appointment

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Class website: www.exploreiowageology.org

Social Media Twitter @Ubreccia Facebook: UNI Earth and Environmental Science Dept.

Text: Iowa's Geological Past: 3 Billion Years of Change by Wayne I. Anderson

Final Exam: **Tuesday, May 3, 10-11:50 a.m.**

*Cell phones (silent, earbuds out) & computers may be used in class, but ONLY for Geology of Iowa content.

	<u>Lecture Schedule</u>	<u>Text/Reading</u>
Week One (Jan. 11-15)	Geologic Setting Iowa's	Ch. 1
Week Two (Jan. 18-22)	Iowa GIS and Literature data <i>NO CLASS: MONDAY Jan. 18 MLK Day</i>	Handouts
Week Three (Jan. 25-29)	Precambrian & Cambrian Quiz 1	Ch. 2 & 3
Week Four (Feb. 1-5)	Ordovician Quiz 2	Ch. 4
Week Five (Feb. 8-12)	Silurian Quiz 3, Project checkpoint 1	Ch. 5
Week Six (Feb. 15-19)	Devonian Quiz 4	Ch. 6
Week Seven (Feb. 22 -26)	Carboniferous Quiz 5	Ch. 7 & 8
Week Eight (Feb. 29 - Mar. 4)	Mesozoic 2 nd half of the semester begins, Quiz 6	Ch. 9
Week Nine (Mar. 7-11)	Cenozoic Quiz 7, Project checkpoint 2	Ch. 10
Week Ten (Mar. 14-18)	<i>SPRING BREAK</i> Running on beaches/Snowboarding down mountains	
Week Eleven (Mar. 21-25)	Glacial geology of Iowa	Handouts

Week Twelve (Mar. 28 - Ap. 1)	Iowa's landscapes and soils Quiz 8	Handouts
Week Thirteen (Ap. 4-8)	Iowa's geologic resources I Quiz 9	Handouts
Week Fourteen (Ap. 11-15)	Iowa's geologic resources II Quiz 10	Handouts
Week Fifteen (Ap. 18-22)	Field geology in Iowa	
Week Sixteen (Ap.25-29)	Geology of Iowa presentations	
Week Seventeen (May 2-6)	FINAL EXAM <i>Tuesday, May 3, 10-11:50 a.m.</i>	

Grading procedure 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 a grade of 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 quizzes after the scheduled exams are given. Should you have a scheduled conflict, please visit 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.

Approximate point distribution

Grades and %'s will be provided at the end of each exam, e-learning will not be used.

Quizzes (cannot be made up)	10 @ 20 pts = 200 pts
Geology of Iowa Project	300 pts
- Content quality	100
- Maps	100
- Writing and references quality	30
- Checkpoint 1	20
- Checkpoint 2	20
- Presentation	30
Lab activities (Minerals, rocks, soils)	3 @ 20 pts = 60 pts
Participation/Attendance	40 pts = 40 pts
	<u>Approx. total = 600 points</u>
	A = 550; B = 500; C = 450; D = 400

Class Attendance and Participation

Exam Attendance is essential. Each unexcused absence will lead to a deduction of 5 points from your overall participation/attendance out of 40 points.

Academic dishonesty- Is not tolerated on the UNI campus (the campus wide policy will be followed). You are at UNI to better yourself! If you are caught cheating (e.g. staring at another student's exam) you will receive 0 points for that exam.

Basic course objectives

Your liberal arts education - Courses in natural science promote an understanding of science as a human process that investigates matter and energy acting within complex organic and inorganic systems. Fundamental principles of both physical and life sciences are included.

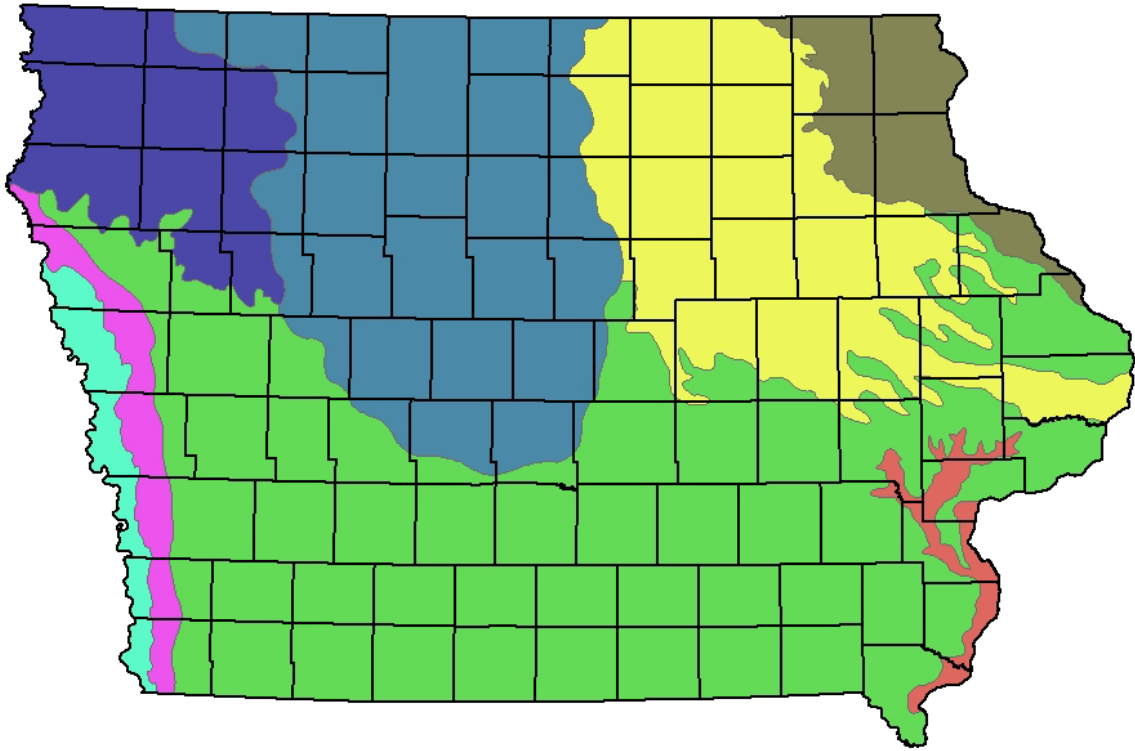
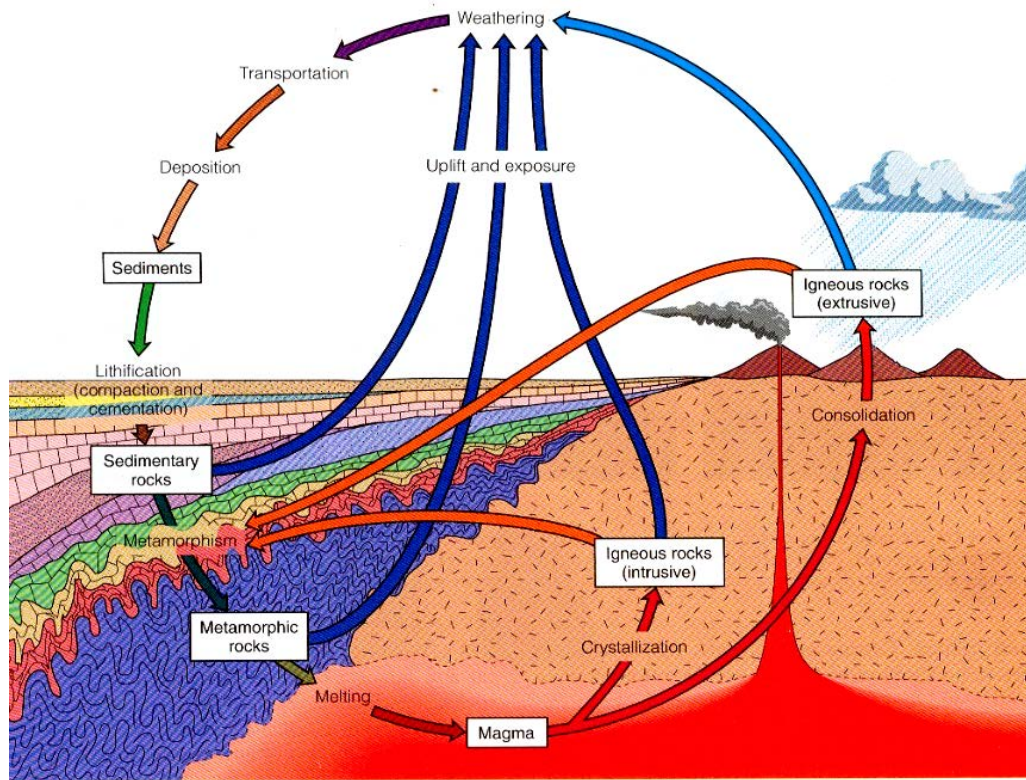
Specifically -

1. Learn about Iowa's geologic history, processes, and natural resources.
2. Obtain experience utilizing scientific methodology (observation, hypotheses, experimentation, interpretation, and theory)
3. Gain a fundamental understanding of Iowa's geology (properties and processes)
4. Provide you with valuable information that will give you a basic 'tool kit' to go out and actively explore your environment and interpret articles/video of earth science publications.
5. Prepare you for taking upper level earth science courses, allowing you to further explore what you find most fascinating.
6. Work hard and have a great time doing it!

Special Needs: Any student who requires special accommodations for learning please let me know (privately) as soon as possible.

Tips for doing well in this class

- Do the reading assignments before you come to class;
- Keep on top of your project work load, do not procrastinate;
- Be a good detective, the concepts that you will be learning are connected, so if you don't understand a concept (early on) make sure you ask questions, because you will be using that knowledge again;
- Take great notes, keep track of and use all handouts, there will be a lot of information coming your way;
- Figure out what is most interesting to you and go with it, I will do everything that I can to help you reach your goals;
- Ask a lot of questions;
- Have fun, Geology is about exploring and learning from our natural surroundings don't be afraid to get dirty!
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Landforms of Iowa

landform NAME

- | | | |
|---|--|---|
|  Des Moines Lobe |  Missouri Alluvial Plain |  Southern Iowa Drift Plain |
|  Iowan Surface |  Mississippi Alluvial Plain |  Paleozoic Plateau |
|  Loess Hills |  Northwest Iowa Plains | |

Geology's 'Big ideas' - You shouldn't leave this class without!!!

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

1.1 Earth scientists find solutions to society's needs. Earth scientists work on challenging problems that face humanity on topics such as climate change and human impacts on Earth. Earth scientists successfully predict hazards to humans and locate and recover natural resources, making possible the flourishing of humans on Earth.

BIG IDEA 2. Earth is 4.6 billion years old.

2.1 Earth's rocks and other materials provide a record of its history. Earth scientists use the structure, sequence, and properties of rocks, sediments, and fossils to reconstruct events in Earth's history. Decay rates of radioactive elements are the primary means of obtaining numerical ages of rocks and organic remains. Understanding geologic processes active in the modern world is crucial to interpreting Earth's past.

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

3.1 The four major systems of Earth are the geosphere, hydrosphere, atmosphere, and biosphere. The geosphere includes a metallic core, solid and molten rock, soil, and sediments. The atmosphere is the envelope of gas surrounding Earth. The hydrosphere includes the ice, water vapor, and liquid water in the atmosphere, the ocean, lakes, streams, soils, and groundwater. The biosphere includes Earth's life, which can be found in many parts of the geosphere, hydrosphere, and atmosphere. Humans are part of the biosphere, and human activities have important impacts on all four spheres.

BIG IDEA 4. Earth is continuously changing.

4.1 Earth's geosphere changes through geological, hydrological, physical, chemical, and biological processes that are explained by universal laws. These changes can be small or large, continuous or sporadic, and gradual or catastrophic.

BIG IDEA 5. Earth is the water planet.

5.1 Water is found everywhere on Earth, from the heights of the atmosphere to the depths of the mantle. Early in Earth's history, surface water accumulated through both out-gassing from its interior and the capture of some extraterrestrial ice. Water vapor in the atmosphere condensed and rained out as the planet cooled.

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

6.1 Fossils are the preserved evidence of ancient life. Fossils document the presence of life early in Earth's history and the subsequent evolution of life over billions of years.

BIG IDEA 7. Humans depend on Earth for resources.

7.1 Earth is our home; its resources mold civilizations, drive human exploration, and inspire human endeavors that include art, literature, and science. We depend upon Earth for sustenance, comfort, places to live and play, and spiritual inspiration.

BIG IDEA 8. Natural hazards pose risks to humans.

8.1 Natural hazards result from natural Earth processes.

These hazards include earthquakes, tsunamis, hurricanes, floods, droughts, landslides, volcanic eruptions, extreme weather, lightning-induced fires, sinkholes, coastal erosion, and comet and asteroid impacts.

BIG IDEA 9. Humans significantly alter the Earth.

9.1 Human activities significantly change the rates of many of Earth's surface processes. Humankind has become a geological agent that must be taken into account equally with natural processes in any attempt to understand the workings of Earth's systems. As human populations and per capita consumption of natural resources increase, so do our impacts on Earth's systems.

BIG IDEA 10. Becoming an earth scientist is an extremely meaningful and rewarding career!

Climate Principles - You shouldn't leave this class without!!!

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

Actions taken by individuals, communities, states, and countries all influence climate. Practices and policies followed in homes, schools, businesses, and governments can affect climate. Climate-related decisions made by one generation can provide opportunities as well as limit the range of possibilities open to the next generation. Steps toward reducing the impact of climate change may influence the present generation by providing other benefits such as improved public health infrastructure and sustainable built environments.

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

Sunlight reaching the Earth can heat the land, ocean, and atmosphere. Some of that sunlight is reflected back to space by the surface, clouds, or ice. Much of the sunlight that reaches Earth is absorbed and warms the planet.

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

Earth's climate is influenced by interactions involving the Sun, ocean, atmosphere, clouds, ice, land, and life. Climate varies by region as a result of local differences in these interactions.

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

Individual organisms survive within specific ranges of temperature, precipitation, humidity, and sunlight. Organisms exposed to climate conditions outside their normal range must adapt or migrate, or they will perish.

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

Climate is determined by the long-term pattern of temperature and precipitation averages and extremes at a location. Climate descriptions can refer to areas that are local, regional, or global in extent. Climate can be described for different time intervals, such as decades, years, seasons, months, or specific dates of the year.

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

The components and processes of Earth's climate system are subject to the same physical laws as the rest of the Universe. Therefore, the behavior of the climate system can be understood and predicted through careful, systematic study.

Principle #7 Human activities are impacting the climate system.

The overwhelming consensus of scientific studies on climate indicates that most of the observed increase in global average temperatures since the latter part of the 20th century is very likely due to human activities, primarily from increases in greenhouse gas concentrations resulting from the burning of fossil fuels.

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

Incidents of extreme weather are projected to increase as a result of climate change. Many locations will see a substantial increase in the number of heat waves they experience per year and a likely decrease in episodes of severe cold. Precipitation events are expected to become less frequent but more intense in many areas, and droughts will be more frequent and severe in areas where average precipitation is projected to decrease.

Source materials =

Geology – www.earthscienceliteracy.org

Climate – www.cleanet.org