Syllabus
Historical Geology, Geology 212, 4 Credits
Winter Quarter 2015
Lectures: MWF 1:00-1:50pm
in ES 313

Instructor: Brady Foreman
Office Location: ES 202
Phone Number: 650-2546
E-mail: brady.foreman@wwu.edu (scheduling appointments only please)
Office Hours: Monday (2-3pm), Wednesday (11am-12 pm) and by appointment

Contacting me: e-mail is best or talking to me before/after class

Required Reading: *The Story of the Earth: The first 4.5 billion years from stardust to living planet* - Robert Hazen
Your Inner Fish: A journey into the 3.5 billion year history of the human body - Neil Shubin
Assigned articles provided on Canvas (see class schedule outline below)

Suggested Reading: *Wonderful Life* - Steven J. Gould
Extinction: Bad Genes or Bad Luck? - David Raup

Course Description: Evolution of the major features of the earth's surface and of life; history of the ocean basins, continents and mountain belts related to the theory of plate tectonics; geologic history of North America and the Pacific Northwest.

This course will emphasize a 'systems' perspective on Earth history. This means emphasizing the connections and interactions of the Earth's interior and crust with the biosphere, hydrosphere, and atmosphere on different timescales. Moreover, we will examine the geologic observations that led geologists to the various conclusions and hypotheses on Earth's evolution. This will give insight into how geoscientists and paleobiologists apply the scientific method to understand Earth's history.

Student Learning Outcomes: By the end of the course you will be able to:

1) describe and classify sedimentary rocks and identify fossils
2) apply stratigraphic principles and dating methodology to reconstruct the order and character of geologic events
3) interpret geologic data sets in the context of plate tectonics
4) appreciate the link between geologic observations of faunal succession with evolution and extinction patterns
5) describe the major geologic and biologic events in Earth's History

Attendance: Highly recommended. It is unlikely you will pass the class if you don't attend classes.

Labs: Lab assignments cover a variety of topics including identification and classification of rocks, fossils, geologic map interpretation, cross-section construction, and the development of geologic histories. Labs start the second week of class. Labs are required and are an important part of this class. Expect some of the labs to take longer than the allotted in-class time period. The lab room (ES 227) should be open outside of the normal class period. Discuss with TA for room availability.

Lab Manual: Historical Geology Lab Manual for fall 2016.

Lab Equipment: Lab manual, colored pencils, ruler, calculator, protractor, and hand lens.

Exams: There are three exams and a final on canvas. They will be a mix of multiple choice and short answer. Final is cumulative. *Departmental policy*: No early exams. Make-up exams given only with an official excused absence.

Time Scale Quiz: There will be two quiz and it will be a review of physical geology concepts and the geologic time scale near the beginning of the course.

Grading: Exam Dates: October 17 (canvas); November 2 (canvas); November 18 (canvas);
Final is on December 9th (canvas)

What determines your final grade

Time Scale Quiz	5%
Geology Quiz	5%
Exam 1	15%
Exam 2	15%
Exam 3	15%
Final (cumulative)	20%
Labs	25%
	100%

Academic Honesty:

Quick Guidelines

1) You are academically honesty if you can look me in the eye and say "this is my work" and/or "this exam represents what I know".
2) Minimize copy and paste to minimize dishonesty (if you are doing a lot ofCtrl-C, Ctrl-V you are entering the danger zone).
3) When working in groups don't look at what the other person wrote. Instead discuss it with them and write down your interpretation.

Western Washington University's policy can be found here:
http://www.wwu.edu/depts/registrar/acad_dishonesty.shtml

Below is WWU's description of academic dishonesty

From http://catalog.wwu.edu/content.php?catoid=7&navoid=1014

"*Academic dishonesty is not qualitatively different from other types of dishonesty. It consists of misrepresentation by deception or by other fraudulent means. Academic dishonesty compromises the instructor's ability to fairly evaluate any student's work or achievement. It includes, but is not limited to, the following:*

a. *Giving, taking, or receiving unauthorized information to/from another person during any type of assignment or test.*
b. *Obtaining or providing without authorization questions or answers prior to the time of an assignment or test.*
c. *Using unauthorized sources for answers during any assignment or test.*
d. *Taking part in or arranging for another person to complete an assignment or to take a test in place of another.*
e. *Giving or receiving answers by use of signals or electronic communication during a test.*
f. *Altering answers on a scored test and submitting it for a higher grade.*
g. *Collaborating with others in a required assignment without the approval of the instructor.*

h. Stealing class assignments or portions of assignments, including electronic files, and submitting them as one's own.

i. Not crediting participants for their part in a group project or claiming credit for work not done on a group project.

j. Plagiarism, which is presenting as one's own in whole or in part the argument, language, creations, conclusions, or scientific data of another without explicit acknowledgment. Examples include, but are not limited to:

1. *Using another person's written or spoken words without complete and proper citation.*
2. *Using information from a Website, CD-ROM or other electronic source without complete and proper citation.*
3. *Using statistics, graphs, charts and facts without acknowledging their source.*
4. *Submitting a paper purchased from a term-paper service.*
5. *Paraphrasing, which is imitating someone else's argument using other words without acknowledging the source.*
6. *Claiming credit for someone else's artistic work, such as a drawing, script, musical composition or arrangement.*
7. *Using someone else's lab report as a source of data or results.*
8. *Using one's own or substantially similar work, produced in connection with one course, to fulfill a requirement in another course without prior permission. A student may use the same or substantially the same work for assignments in two or more courses only with written permission from the instructors of all the classes involved.*
9. *Submitting the results of a machine translation program as one's own work."*

Academic Support: Western is committed to equal opportunity and non-discrimination in all programs and activities. Requests for accommodation or assistance should be directed to Disability Resources for Students located in Old Main 110; additional information is available at: http://www.wwu.edu/depts/drs/
Telephone: 650-3083 Email: drs@wwu.edu

Flexibility Clause: This syllabus is subject to change. Some material may require additional time to cover or garner more questions from the students. Exam dates will **not** change though.

Timeline of Course:

Week 1
09/21 – Introductions, Class Overview, Syllabus, History of Earth Exercise
09/23 – Review of rocks and their tectonic context

Week 2
09/26 – Telling Time from Rocks – Relative Dating & Geologic Timescale
09/28 – "The Clean Room" Cosmos Video & Age of the Earth
09/30 – Telling Time from Rocks – Absolute Dating & Geologic Timescale, **Geology Quiz (canvas)**

Week 3 HAZEN book
10/03 – Big Bang & Formation of the Solar System, Earth, Moon Reading: Ch. 1, 2
10/05 – Early Earth: Differentiation Reading: Ch. 3, 4, 5
10/07 – **Geologic Time Quiz (in class)**, discussion of readings

Week 4
10/10 – Differentiation Reading: Ch. 6, 7
10/12 – Snowball Earth & Super Continents Reading: Ch. 8, 9
10/14 – Precambrian to Cambrian Transition of Life Reading: Ch. 10

Week 5

10/17 – discussion of readings, **Exam #1 (canvas)**
10/19 – Epicontinental Seas (Paleozoic & Mesozoic of North America, Tethys Sea)
10/21 – Rifts to Passive Margins (Atlantic Ocean initiation & east coast of North America)

Week 6

10/24 – Subduction Zones (Franciscan Complex, Greek Isles)
10/26 – Foreland Basins (Sevier & Laramide Orogenies, Andes)
10/28 – Continent-Continent collision (Appalachians, Himalayas)

Week 7

10/31 – Arc Accretion & History of the Pacific Northwest
11/02 – discussion & review, **Exam #2 (canvas)** SHUBIN BOOK
11/04 – Invertebrate & Vertebrate Evolution & Extinction Reading: Ch. 1-3
Reading: *Evolution of Life* – Gould

Week 8

11/07 – Invertebrate & Vertebrate Evolution & Extinction Reading: Ch. 3-6
Reading: *Mother of Extinction* – Erwin
11/09 – Quantitative Paleobiology - Dinosaurs Reading: Ch. 6-8
Reading: *Triumph of Titans*–Curry-Rogers & D'Emic
11/11 – Veteran's Day (no class)

Week 9

11/14 – Quantitative Paleobiology – Mammals Reading: Ch. 8-11
Reading: *Mammals of the Sea* – Wong
11/16 – Plant Evolution & Extinction Reading: *The Big Bloom* – National Geographic
11/18 – discussion & review, **Exam #3 (canvas)**

Week 10

11/21 – Paleoclimatology Methods & Carbon Cycle Reading: *Uplift & Climate* – Ruddiman
11/23 – Thanksgiving (no class)
11/25 – Thanksgiving (no class)

Week 11

11/28 – Greenhouse Climates Reading: *Hothouse Earth* – National Geographic
11/30 – Icehouse Climates Reading: *Glacial Cycles* – Broecker & Denton
12/02 – discussion & review
12/09 – **FINAL (cumulative) will be posted on CANVAS**

Outline of Major Assessments for Geol 212 – Historical Geology

Course Outcomes

1. Understand general sedimentary rock types and stratigraphic relationships.
2. Understand early evolution of Earth and how it came to support life.
3. Understand how plate tectonics and sediment dynamics alters Earth's surface.
4. Understand past and present climate patterns.
5. Understand how the geologic record can be used to interpret Earth history.
6. Understand major patterns in evolution of life.

Objectives (SWBAT)

1.1. Identify unknown sedimentary rocks and fossils.
1.2. Order the record of deposition in an area based on fossils, radiometric dates, and way-up indicators.
2.1. Describe major changes in cellular and morphologic complexity, habitat usage, and environmental change as well as how
2.2. Explain how life influenced atmospheric chemistry and the character of sedimentary rocks.
3.1. Describe origins of major mountain ranges.
3.2. Describe the evolution of Earth's ocean basins.
3.3. Explain the geologic history of Washington state.
4.1. Draw graphs of past temperature fluctuations and identify potential controls.
4.2. Draw graphs of past CO_2 conditions and identify potential controls.
5.1. Solve sequence of events diagrams.
5.2. Interpret geologic events from stratigraphic columns.
5.3. Draw and explain the geologic timescale.
6.1. Label a geologic timescale with major extinctions and identify potential causes.
6.2. Describe techniques used to reconstruct past ecosystems.

Geology Program SLOs Addressed

Geology 212 (Historical Geology) provides information for the following degree/program outcomes:

	B.A. Geology	B.S. Geology	B.S. Geophysics	GUR
Outcomes	1. Earth has a history of biological and physical change over billions of years. 2. Earth's surface is affected by dynamic processes on a range of timescales. 3. Earth's composition varies and these compositions provide the raw materials for the rock cycle. 5. Earth scientists use repeatable observations and testable ideas to understand and explain our planet. 7. (Students) Have developed their observational, analytical, and quantitative skills.	1. Earth has a history of biological and physical change over billions of years. 2. Earth's surface is affected by dynamic processes on a range of timescales. 3. Earth's composition varies and these compositions provide the raw materials for the rock cycle. 5. Earth scientists use repeatable observations and testable ideas to understand and explain our planet. 7. Have developed their observational, analytical, and quantitative skills. 8. Student can create maps and understand what they tell us about the Earth. 9. Will be able to apply physics, chemistry, and mathematics concepts to the study of Earth. 10. Graduates (alone or in teams) will be able to present geological information clearly.	1. Earth has a history of biological and physical change over billions of years. 2. Earth's surface is affected by dynamic processes on a range of timescales. 5. Earth scientists use repeatable observations and testable ideas to understand and explain our planet. 7. Have developed their observational, analytical, and quantitative skills. 8. Student can create maps and understand what they tell us about the Earth. 9. Will be able to apply physics, chemistry, and mathematics concepts to the study of Earth. 10. Graduates (alone or in teams) will be able to present geological information clearly.	1. Analyze and communicate ideas effectively in oral, written, and visual forms. 3. Use quantitative and scientific reasoning to frame and solve problems.