Course Description

An investigative course of geological and biological aspects of Earth History as developed through the use of fossil evidence and the principles of stratigraphy, geochronology, and the geology of structures. Laboratory work and on-site field experiences are integral parts of the course.

The goal of Historical Geology is the study of the principles of interpretation, especially as they relate to understanding Earth’s history. Historical Geology is intended to give a broad overview of the types of organisms that have existed on Earth, in the geologic past, as revealed from the fossil record. It links these organisms to the physical processes, the past land-sea interactions, and ancient environments that have existed through Earth’s history.

This course is not intended as a vast catalogue of names and dates, but rather it is intended to provide you with the basic ideas of how to decipher the large time scale changes which have had an impact on the Earth. By understanding the ‘grand sequences’ of geologic events, you will investigate the possibilities of developing predictive models. In order to investigate the earth, however, students will have to deal with a lot of jargon words and ideas. Geology, like most of the sciences, has developed a lexicon of its own. This course is not designed to ‘parrot-learn’ these words, but rather to use this language as a working vocabulary throughout the course assignments. Lab including field trips to local geological sites and exercises in identification of rock types and fossils is also an important component of the course.

Textbooks


Objectives

To understand Historical Geology through the discussion of elementary scientific concepts framed within the context of some different areas within the sciences of Geology and Biology. The introductory material will acquaint the student with some basic principles of physical geology. Physical geology concepts will set the scene and introduce some basic ideas and paradigms, which allow a coherent view of the structure and organization of the solid Earth. A significant portion of this information will relate to the idea of Plate Tectonics. Emphasis will be placed on processes and on the way they can be deciphered and interpreted in the geologic past. A general survey of the different sedimentary depositional environments will be presented. These processes and environments will be viewed as a time sequence (a field known as stratigraphy). The course will explore the value of fossils and other biogenic indicators, not just as a Victorian classification scheme, but from the perspective of how they ‘mark’ the passage of time and give a view of the changing conditions of the earth’s surface. All these areas will be used in discovering the geological history within the context of the North American continent.

The different subject areas that we will cover include:
1. Geologic processes, earth materials and the dynamic earth (Plate Tectonics)
2. Geologic Time: Relative and Absolute
3. The Origin and Evolution of Life: The Fossil Record
4. Sedimentology and Stratigraphic principles: The layering of the earth’s crust: sedimentary carapace

Course Schedule

WEEK 1 (Jan.19,20)
Course Structure/ Introduction to Historical Geology/ Earth Materials Review Ch. 1/2

Earth Materials Lab Review

WEEK 2 (Jan. 24-27)
Plate Tectonics Review Ch. 3
Quiz (Rock & Mineral ID)
Historical Geology: The Players

WEEK 3 (Jan.31;Feb.2,3)  Geologic Time  Ch. 4
Geologic Maps Lab

WEEK 4 (Feb.7-10)  Test#1/ Rocks, Fossils and Time/Library Search  Ch. 5

WEEK 5 (Feb.14-17)  Sedimentary Rocks  Ch. 6
Sedimentary Rks & Structures Lab

WEEK 6 (Feb.21-24)  No Class Monday (Pres. Day)/Evolution  Ch. 7

WEEK 7 (Feb.28;Mar. 2,3)  Evolution  Ch. 7
Fossil Preservation Lab
Test #2

WEEK8 (Mar.7-12)  SPRING BREAK

WEEK9 (Mar.14-17)  Lab Test #1-Maps, Sedimentary Rocks & Structures & Fossil Preservation
The Hadean & Archean / Ch. 8/9

WEEK 10 (Mar.21-24)  Paleozoic  Ch. 10
Lab I-Protista, Archeocyathids, Porifera & Conularids & Lab II Cnidarian  Ch. 4/5/6(L); p. 339-388 (T&D)

WEEK 11 (Mar.28-31)  Paleozoic  Ch. 11
Lab III Brachiopoda & Bryozoa & Lab IV Arthropoda  Ch. 7/8/10(L)
p. 547-686 (T&D)

WEEK 12 (Apr.4-7)  Test#3/ Mesozoic (1st Draft of Paper due)  Ch. 14
Lab V Mollusca & Lab VI Echinodermata & Graptolites  Ch. 9/11/12(L)
p. 389-536; 687-730 (T&D)

WEEK 13 (Apr.11-14)  Mesozoic  Ch. 15
Lab VII Plants  p. 738-750 (T&D)

WEEK 14 (Apr.18-21)  Cenozoic (Paper due)  Ch. 16/17
Lab VIII- Trace Fossils & Vertebrates  p. 731-737;755-768 (T&D)

WEEK 15 (Apr.25-28)  Test #4/ Presentations

WEEK16 (May 2,4)  Presentations
Lab Practical #2- ID of fossil specimens identified during the semester-10:30AM-12:30PM

COURSE REQUIREMENTS

Attendance: Attendance is strongly recommended. Attendance will be taken at the start of each class period. Excused absences from class will be granted only upon a written medical or sponsored university activity notification. If the student comes to class late, it is his or her responsibility to inform the instructor and sign the attendance sheet. Once the instructor leaves the classroom, any student not appearing on the attendance sheet will be counted as absent. A student missing in 3 or more classes will be docked 2% on his or her final grade.

Methods of Instruction and learning: This course will employ the following pedagogic techniques;
1. Lecture and lab discussion of material.
2. Audio visual instruction in the form of PowerPoint presentations and/or specific VHS tapes or DVDs
3. Laboratory lecture and applied problem solving skills and analysis.
4. Testing of material and laboratory practicals
5. Oral presentations and report writing
6. There is an instructor’s webpage with PowerPoint slides (http://faculty.njcu.edu/dfreile/ look for Geos 241 Historical Geology)
7. There is an instructor’s Blackboard course page with assignments as well.

Evaluation Components and Grading Scale
Tests (4 @ 10%)  40%
Quizzes and Tests: There will be 2 quizzes. The first will consist of specimen identifications (Rocks and Minerals). All tests will consist of the following types of questions- multiple choice, true or false, short answer, and diagrams to label. All tests will contain an extra-credit question for bonus points. **Make-up tests will not be given under any circumstance**. If you miss any of the tests, then the other ones will account for the remainder of the grade, minus 10% (For instance if you take 3 of the 4 tests and get an 80 on each one the 4th test will count as a 72; the average of the 3 tests taken minus 10%; 80+80+80= 240/3 = 80-10%= 72).

Field Trip: You will be required to attend one very long one day field trip TBA- April Date, probably on April 9th 2011.

Paper/Presentation: You will be required to write a 5-6 page research paper and present a short 10 minute PowerPoint presentation on a topic related to the class. The topic will relate to something covered in class e.g. the Michigan Basin, the Green River Basin, the West Texas Permian Basin, the Newark Basin (or any other basin), the Catskill Clastic Wedge, The Queenston Clastic Wedge, Devil’s Tower, the Cascade Chain, the Basin and Range.

Students agree that by taking this course all assignments are subject to submission for textual similarity review to Turnitin.com. Assignments submitted to Turnitin.com will be included as source documents in Turnitin.com's restricted access database solely for the purpose of detecting plagiarism in such documents. The terms that apply to the University’s use of the Turnitin.com service are described on the Turnitin.com web site. For further information about Turnitin, please visit: [http://www.turnitin.com](http://www.turnitin.com). The first draft and final draft will be submitted to ID 3762898 Historical Geology password: histgeo11


**Paper:** The paper will be written using standard scientific format. The paper will be double-spaced using 10 or 12-point font and 1-inch margins. The paper will contain an abstract, introduction to the area, geologic setting, and history and conclusion and a bibliography containing no less than 8 references; four of the reference MUST be peer-reviewed journal articles. The paper will also include figures and tables. The first draft of the paper is due on April 5th and the final paper is due April 18th. The oral presentations will start on the 25th of April and continue until May 2nd.

**Length:** 5-6 written pages (not including figures or tables), doubled spaced with a one (1) inch margin and a 10 or 12-point font size. The paper must also contain at least 5 pages of maps, figures (photographs) and graphs.

**Sources** At least 8 sources (not webpages) and 4 from refereed (peer-reviewed) publications.

**Grading**

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<th>Assignment</th>
<th>Due Date</th>
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<tr>
<td>Outline</td>
<td>Mar 17th</td>
<td>35 pts</td>
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<tr>
<td>First Draft</td>
<td>Apr. 5th</td>
<td>20 pts</td>
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<td>Final</td>
<td>Apr 18th</td>
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Grading: Content 35 pts  Completeness 20 pts  Paper must be divided into sections with headings and subheadings {Abstract, Introduction, Body, Summary and Conclusions; Appendices}  Figures 15 pts  Bibliography* 15 pts  Spelling/grammar 15 pts

* Proper formatting must be followed; see below

This paper has to be written in a scientific manner. References should be cited within the paragraphs for an idea that is not yours [i.e. According to Smith (1995) the concentration of sulfur in............ or The concentration of sulfur was determined to be ....... (Smith, 1995)]. Several figures (charts, graphs, maps, etc.) **must** be included in your paper to illustrate your points. Do NOT take paragraphs out of books or articles ‘as is’, always paraphrase or summarize the information and reference it. I do not want to see a string of quotes from other writers linked together with ‘and’, ‘while’, ‘however’, and other such conjunctions. Do not use footnotes. They are not used in the sciences. At the end of the paper provide a bibliography of all material used and cited. The following format should be used when writing this bibliography You can also see the library webpage (http://www.njcu.edu/Guarini/Instructions/CitationGuide.htm#APA):

In case of an article in a journal:

Author last name, First name, date. Title of article (small letters; except for proper nouns), Journal (italicized) vol., number, pages. [i.e.: Smith, John, J., 1995, Sulfur determinations in natural waters, Journal of Hydrology, vol. 32, no. 4, p. 34-56.]

In case of a book:
The REFERENCE Librarians are very helpful and can help you in locating peer-reviewed literature. The library also has databases that you can search. You can ASK if you have questions.

**Laboratory:** The ‘laboratory’ component of this course will discuss and apply basic concepts of historical geology. Specific topics will include a brief introduction to rocks and minerals and the rock cycle as well as a good understanding of fossilization and extinct fossil taxa as well as geologic maps and an understanding of relative geologic history from maps and block diagrams. The students will apply the concepts learned by fulfilling lab assignments and taking 2 quizzes and 2 lab practicals. The quizzes and the practicals will test the students using both written questions and specimen identification. You are required to keep a lab book with accurate drawings of the fossil taxa observed.

The aim of the laboratory is to give the student a basic content knowledge relating to physical and historical geology. The different subject areas that we will cover include:

1. Earth Materials (Rocks and Minerals)
2. Geologic Principles and Stratigraphy
3. Geologic Maps
4. Sedimentary rocks and sedimentary structures
5. Formation and classification of fossil taxa

**Grading Scale**

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<td>95-100</td>
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**Expected Outcomes:** After completing this course the student is expected to have a solid understanding of the history and evolution of the physical earth and the extinct and extant organisms as observed through the fossil record. The student will be able to explain the internal and external processes that have shaped the earth through time. The student will also have developed skills in identifying rocks and fossils and the observation and analysis of the same in practical situations such as a field trip. The students will have made a useful contribution to the success of their understanding of science and scientific principles and their application to the world around them.

**Participation:** Class participation is an important part of the learning process. Participation in class is highly encouraged and variations in points of view are welcomed.

**Assignments:** Students must submit all major assignments on time. Failure to do so will result in failure of the course.

**SPECIAL HELP.** My office hours are held for a reason, they are on TIME AND DAY above, or by appointment. Any student having problems with the material should see me immediately. Please do this BEFORE you get into serious trouble academically.

**Academic Dishonesty:** Students are expected to demonstrate academic integrity at all times. NJCU condemns cheating and plagiarism in any form; intentionally using the ideas, knowledge, words, and/or visual images of another individual as if those were original to the writer or speaker; and any other forms of deceit in relation to the student’s affiliation with and commitment to the university. In this course any student caught cheating on any test or plagiarizing any work will receive an ‘F’ for the entire course. I have a zero tolerance for plagiarism.

**Withdrawal:** Please note that April 15th is the last day to withdraw from a course with a grade of “W”.

**Extra Credit:** There will be one extra credit opportunity. the extra credit will earn up to 15 points added to your lowest test grade and will consist of going to the Museum of Natural History (in NYC) and answering a series of questions on some exhibits.

**Cell Phones and smart phones:** Please turn OFF all cell phones and smart phones. If a phone rings during class time the student will be asked to leave and counted as absent for that day. There will be NO texting allowed, anyone caught texting or accessing the internet will be asked to leave and be counted absent for the day. (see attendance policy) You are an adult; you are here for an education. If you are not serious about an education then do not bother being here.
If a phone rings during class time the student will be asked to leave and counted as absent for that day. Use of cell phones, iPods, MP3 players or any other electronic device is PROHIBITED during class or EXAMS. Any student using the device will be asked to LEAVE immediately and if taking an exam the exam grade will result in a zero (0).