

# GEOL 321: EARTH HISTORY AND STRATIGRAPHY

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## History

1. May 1, 2021 by Kathryn Ann Maneiro (kathryn.maneiro)
2. Feb 4, 2025 by Theresa Stanger (theresa.stanger)
3. Feb 26, 2025 by Andrew James Luhmann (andrew.luhmann)

## Viewing: GEOL 321 : Earth History and Stratigraphy

Last approved: Wed, 26 Feb 2025 17:02:26 GMT

Last edit: Thu, 06 Feb 2025 22:19:56 GMT

## Faculty

### Faculty Petitioner(s)

Andrew Luhmann

### Is this a small course revision?

Yes

### Effective Date

Fall 2025

### Is this an experimental course?

No

### Christ at the Core Renewal?

No

### Course Prefix

GEOL - Geology

### Course Number

321

### Division/ School

Natural Sciences (NTSC)

### Department

Geology, Environmntl Sci Dept

### College

College of Arts & Sciences

### Academic Level

Undergraduate

### Title of Course

Earth History and Stratigraphy

### 30 Character Abbreviation of Course Title

Earth History Stratigraphy

### Credits

4

### Recommended Course Fee

\$25 lab, \$120 field trip

### Catalog Description

Basic principles of interpreting Earth history: geologic time, stratigraphic analysis, reconstructing past environments. Actualism, catastrophism and engagement with Christian theology in the historical development of geology. Overview of Earth history including origin of Earth-Moon, history of life, stratigraphic record and tectonic activity. Three hours lecture, two hours laboratory.

Limit to 500 characters

**Prerequisites**

GEOL 212 or ENVR 212

**Corequisites**

GEOL 321L - Earth History Stratig Lab

Contact test

**Repeatable**

No

**Christ at the Core**

**Core Competency**

No

**Shared Core**

No

**Thematic Core**

Yes

**Thematic Core**

Scientific Issues & Perspectives (SIP)

**Group Proposal**

No

Group proposals should include a course catalog description that is sufficiently detailed, avoiding open-ended or broad description that does not align with the theme and its outcomes. Include clear identification of the shared elements of the course (such as shared assessments and other common elements) that allow for internal coherence across the range of courses covered by this proposal. Please provide a sampling of syllabi.

**Provide the rationale for and summary of this course proposal:**

GEOL 211 is no longer taught.

**For group proposals, please provide a sampling of syllabi. If you prefer to submit your syllabus via Box, please send it as an email attachment to [curriculum.committee@wheaton.edu](mailto:curriculum.committee@wheaton.edu).**

**For experimental course proposals, a complete syllabus is recommended, but a draft syllabus can suffice. The draft syllabus should include a detailed course description similar to catalog copy, and anticipated course learning objectives, course topics covered, and type(s) of assignments.**

**Attach Syllabus**

GEOL 211 related course and program changes.docx

**SCIENTIFIC ISSUES AND PERSPECTIVES (SIP)**

**Scientific Issues and Perspectives LO #1: Students will be able to articulate the historical and social contexts of scientific investigation**

Description of Assignments (for reporting purposes, only one assignment is needed per outcome)	Brief Explanation of How Assignment Measures Student Achievement of Outcome	Renewal Analysis (Describe changes to assignments and rationale. If no changes, what is working well?)	Instructor Name (for Group Proposals only)
<p>1 This learning objective is addressed in class discussion, lecture, and in a reflective essay tied to reading the book The Bible, Rocks, and Time by Young and Stearley. The mode of formal assessment for this learning outcome reported on end-of-course assessments is select exam questions.</p> <p>An example of a series of related exam questions covering differing historical views of how Earth's rock layers developed and how those views influenced interpretation of geology is provided below:</p> <p>Question on Uniformitarianism vs. Catastrophism:</p> <p>a. Summarize the major conflict between adherents to uniformitarianism vs. neocatastrophism. Include definitions of each position and why they are at odds.</p> <p>b. Interpret this diagram at right through the lens of uniformitarianism and neocatastrophism. [Diagram shows rock layers separated by unconformities that represent breaks in time.] Look for ways that they would come to different conclusions using the same rocks in i through iii.</p> <p>i. Name the geologic feature between layers 2 and 6 using modern geologic terminology.</p> <p>ii. What process or scientific evidence might a neocatastrophist use to explain the feature you identified in i?</p> <p>iii. What process or scientific evidence might a uniformitarian use to explain the feature you identified in i?</p> <p>c. Name and describe the unifying idea that is accepted today and helped resolve this conflict.</p>	<p>The question series provided as an example of assessment for this learning outcome requires students to understand and describe two opposing historical views held within geology. Students must then interpret a single diagram as if they were making that interpretation under two different sets of historical and social contexts to recognize that the scientist's context influenced their interpretation of the same body of evidence. Finally, it assesses student understanding of how views related to the rate and cause of geologic processes have shifted historically and influenced our modern understanding of geology.</p>	<p>Since the course was first proposed, different specific exam questions have been used as the formal assessment for this learning outcome. However, they have all focused on historical perspectives held during the development of geology as a science, the types of questions historically asked by scientists, and how the cultural and religious assumptions and methods of investigation influenced past scientific views and lead to current questions and investigations.</p> <p>This form of assessment seems to be effective in combination with the reflective essay (described below for Learning Outcome 3).</p>	

**Scientific Issues and Perspectives LO #2: Students will be able to demonstrate responsible stewardship of scientific knowledge regarding the natural world in personal and/or social decision-making**

Description of Assignments (for reporting purposes, only one assignment is needed per outcome)	Brief Explanation of How Assignment Measures Student Achievement of Outcome	Renewal Analysis (Describe changes to assignments and rationale. If no changes, what is working well?)	Instructor Name (for Group Proposals only)
<p>1 This course deals with personal and/or social decisions related to the age of the Earth, understanding of human origins, and global climate change since all three are intimately tied to a thorough study of Earth's history. SIP Learning Outcome 2 is assessed throughout the course on exams, in class discussion, in the reflective essay on the book Bible, Rocks, and Time (described below for SIP LO 3), and in labs.</p> <p>One particular example occurs in the final week of the course and relates to our discussion of global climate change. Students were asked to read a recent article in the Atlantic in class and to use what they have already learned about the evidence scientists use to define the geologic timescale to debate in class whether scientists should vote to add a new subdivision of time on the geologic time scale called the Anthropocene that demonstrates the scale and permanence of changes to the environment introduced by modern human civilization. Students had to reach a personal decision based on scientific knowledge and then discuss the evidence and use of that evidence with their classmates to reach a class verdict. This topic is also covered on the final exam.</p>	<p>Mastery was assessed through evaluation of the quality of conversation and active participation of all individuals. Students are awarded activity points based on the quality of the discussion and the evidence that they use, regardless of the decision they ultimately choose. Students were also asked to argue this point by providing scientific evidence and social arguments for and against formalizing the Anthropocene on the final exam.</p>	<p>While students do a lot of decision making based on scientific knowledge regarding the natural world within the course, I find this the hardest to directly assess. This assessment is also different from the assessment reported when Stephen Moshier proposed and taught the course. Steve's lab assignment hits on use of scientific knowledge for geologic interpretation, but is not necessarily a personal or social decision. In class we have extensive discussion centering on students using what they learn about the age of the Earth, human origins, and global climate change to make decisions about their own beliefs and to shape how they interface with others and with the church. However, these discussions are not typically formally assessed. To some degree, students are asked to reflect on questions related to the age of the Earth and how that influences them personally in the reflective essay described below and do address global climate change on the final exam, but I am still considering how we might create a new assignment or essay exam question that would more directly report on student's personal decision-making tied to the age of the Earth.</p>	

**Scientific Issues and Perspectives LO #3: Students will be able to discuss connections between science and Christian thought in a humble, constructive, and informed manner**

Description of Assignments (for reporting purposes, only one assignment is needed per outcome)	Brief Explanation of How Assignment Measures Student Achievement of Outcome	Renewal Analysis (Describe changes to assignments and rationale. If no changes, what is working well?)	Instructor Name (for Group Proposals only)
1	<p>Students write a reflective essay after reading Bible, Rocks, and Time (D. Young and R. Stearley, IVP, 2008). They are tasked with integrating theological, historical, and scientific perspectives to reflect on discussion about the age of the Earth. This generally includes reviewing the contributions of "founding geologists" and Christians to geological discoveries pertinent to the age of the Earth and discussion of theological issues related to conflict over the age of the Earth within the North American Church. A description of the assignment has been uploaded along with the rubric for grading this assignment.</p>	<p>Students explore the influence of Christianity and Christian thought on the early development of geologic principles and historical engagement between the church, geoscientists, and their ideas about Earth history through writing. Essays require the support of sources to demonstrate an informed view and the scoring rubric highlights integration of both historical and theological reflection on this conversation. See uploaded assignment rubric.</p>	<p>The core assignment has remained largely unchanged since originally proposed, with the exception of the introduction of a grading rubric and incremental changes to that rubric as I continue to teach the course to help guide direct assessment of all three SIP Learning Outcomes. Changes to the rubric partially resulted from student feedback requesting more guidance on expectations and partially resulted from annual reflection on how the assignment is meeting expectations for SIP LO 3. I also now require all students to propose their idea in advance to help ensure that they will be able to address the topic humbly and constructively and to provide additional guidance. I have already adjusted the rubric for the next time the course is taught to directly emphasize humility and constructive discourse in student responses.</p>

**Describe how the change will affect department major, minor or certificate requirements, if at all.**

We are removing a course that is no longer taught.

**Additional Rationale (Optional)**

**Reviewer Comments**

Theresa Stanger (theresa.stanger) (Thu, 06 Feb 2025 22:10:50 GMT): Administratively updated Alternate Grade Modes

Theresa Stanger (theresa.stanger) (Thu, 06 Feb 2025 22:20:28 GMT): Administratively updated banner prereqs: ENVR 212 level/grade

John Stanifer (john.stanifer) (Mon, 10 Feb 2025 16:31:49 GMT): This small revision is to remove GEOL 211 (which was replaced by GEOL 212) as a prerequisite which is currently in workflow for inactivation.

Key: 1634