

## Colonnade Program Course Proposal: Explorations Category

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**1. What course does the department plan to offer in Explorations? Which subcategory are you proposing for this course? (Arts and Humanities; Social and Behavioral Sciences; Natural and Physical Sciences)**

The Department of Geography and Geology plans to offer the existing GEOL 114 *Earth History Laboratory* in the Natural and Physical Sciences subcategory within the Explorations Category.

Note: This GEOL 114 has an associated proposal with GEOL 112 *Earth History*.

**2. How will this course meet the specific learning objectives of the appropriate subcategory? Please address all of the learning outcomes listed for the appropriate subcategory.**

**Course Description:**

GEOL 114 is a laboratory course taken (ideally) concurrently with GEOL 112. The lab is an active, hands-on learning experience designed to complement the topics covered in GEOL 112. The individual labs will cover a variety of topics, including geologic time; the description, classification, and interpretation of sedimentary rocks; stratigraphy and stratigraphic correlation; fossil identification and classification; and geologic map interpretation.

**Natural and Physical Sciences Learning Objective 1:** Demonstrate an understanding of the methods of science inquiry.

The entire course is designed to provide students with hands-on experience conducting scientific inquiry. In each lab exercise, students are taught skill sets, such as how to identify fossils and how to read geologic maps that permit such inquiry. Students create hypotheses, make careful observations, and interpret their data.

**Natural and Physical Science Learning Objective 2:** Explain basic concepts and principles in one or more of the sciences.

Each lab is designed to reinforce concepts that are introduced in the accompanying lecture course (GEOL 112) and to provide instruction in more advanced concepts and principles. For example, students learn about stratigraphy and correlation, and are asked to complete exercises in which they demonstrate their knowledge of these principles.

**Natural and Physical Science Learning Objective 3:** Apply scientific principles to interpret and make predictions in one or more of the sciences.

Each lab exercise is an opportunity for students to apply the concepts and skills needed to scientifically reconstruct Earth's history. For example, students are given rocks containing minerals, fossils, and/or sedimentary structures and are asked to characterize and classify those materials in order to interpret ancient environments.

**Natural and Physical Science Learning Objective 4:** Explain how scientific principles relate to issues of personal and/or public importance.

Students are asked to directly apply the concepts and principles of historical geology in order to understand how scientists learn about our common heritage and the changes that our planet has experienced through time. Bowling Green and the entire region are underlain by sedimentary rocks, which provide evidence for millions of years of environmental change (there was once a sea where our campus sits!) and evolution.

**3. Syllabus statement of learning outcomes for course. NOTE: In multi-section courses, the same statement of learning outcomes must appear on every section's syllabus.**

**Learning Outcomes:** After completion of GEOL 114, students will be able to:

- understand how the scientific method is used to study geological problems
- use the principles of stratigraphy to correlate and date rocks
- identify and describe sedimentary rocks and fossils
- use sedimentary rocks and fossils to reconstruct past environments
- read and interpret features on maps and geologic cross-sections

**4. Brief description of how the department will assess the course for these learning objectives.**

The Department of Geography and Geology will assess GEOL 114 using a variety of tools including pre- and post-course surveys, written laboratory exercises, laboratory exams, and classroom discussions. These are standard assessment tools used within the Earth Sciences discipline (e.g., <http://serc.carleton.edu/introgeo/assessment/strategies.html>), and are currently in use within the WKU Geology Program. Results from the assessments will be monitored to improve content delivery and assessment techniques. Questions will be “tagged” so that results from the assessments can be monitored to improve content delivery and assessment techniques.

Examples of specific tasks and questions designed to evaluate each of the objectives are listed below.

**Natural and Physical Sciences Learning Objective 1:** Demonstrate an understanding of the methods of science inquiry.

Essay question: “You are a field geologist studying a series of outcrops containing mostly sedimentary rocks intercalated with a few ash beds. Describe the rocks, sedimentary structures, and fossils that you find. Use this information to determine the paleo-environment of that region [Note: There is no one right answer here, but your description of the rocks you “find” and the environment must be consistent.] Also, is there a way or ways to determine an age of the deposits?”

**Natural and Physical Science Learning Objective 2:** Explain basic concepts and principles in one or more of the sciences.

Multiple-choice question: “What conditions lead to the best fossil preservation? a) rapid burial, b) low-energy environment, c) high-energy environment, d) a & b, e) a & c”

**Natural and Physical Science Learning Objective 3:** Apply scientific principles to interpret and make predictions in one or more of the sciences.

Essay question: “Mudrocks are the most common sedimentary rock type. Describe the characteristics of mudrocks. How can you identify these rocks, what do they look like, what are they composed of, and in what environments are they found (be sure to describe sedimentary structures)? If you found a deposit of mudrock in a road cut, what might it tell you about the geologic past of that area?”

**Natural and Physical Science Learning Objective 4:** Explain how scientific principles relate to issues of personal and/or public importance.

Multiple-choice question: “Regarding the image to the right [of thinly bedded limestone from a Kentucky roadcut], what was the environment of deposition? a) alluvial fan, b) stream channel. c) glacial deposit, d) shallow marine shelf.”



**5. How many sections of this course will your department offer each semester?**

The Department of Geography and Geology plans to 1 to 2 sections of GEOL 114 each semester, enrolling a maximum of 24 students per section in order to ensure each student has sufficient access to the instructor during these hands-on experiences. Sections will be offered during summer sessions as well. We plan to monitor demand for the course and adjust offerings as necessary.

**6. Please attach sample syllabus for the course. PLEASE BE SURE THE PROPOSAL FORM AND THE SYLLABUS ARE IN THE SAME DOCUMENT.**

See attached.

# GEOLOGY 114– EARTH HISTORY LABORATORY

Western Kentucky University

**Instructor:** Dr. Fred Siewers

**Office Location:**

**Meeting Location:**

**Email:**

**Office Hours:**

**Meeting Times:**

**Course Description:** GEOL 114 is a laboratory course taken (ideally) concurrently with GEOL 112. The lab is an active, hands-on learning experience designed to complement the topics covered in GEOL 112. The individual labs will cover a variety of topics, including geologic time; the description, classification, and interpretation of sedimentary rocks; stratigraphy and stratigraphic correlation; fossil identification and classification; and geologic map interpretation.

This course fulfills one credit hour of the “essential applied/lab component” of the Colonnade Natural and Physical Science Explorations category.

**Course Content Discipline:** Geology

**Credit Hours:** 1

**Course Pre- or Co-requisite:** GEOL 112, *Earth History*.

## **Learning Outcomes:**

- understand how the scientific method is used to study geological problems
- use the principles of stratigraphy to correlate and date rocks
- identify and describe sedimentary rocks and fossils
- use sedimentary rocks and fossils to reconstruct past environments
- read and interpret features on maps and geologic cross-sections

## **Textbook (required):**

Gastaldo, R.A., Savarda, C.E., and Lewis. 2006. *Deciphering Earth History: Exercises in Historical Geology*, 4<sup>th</sup> ed. Contemporary Publishing, Raliegh, N.C.

**NOTE: Do not purchase a used book for this class!** Exercises will be done directly in the book, then torn out and handed in. A used book will likely have missing pages and may be marked up. **BRING YOUR BOOK TO EVERY LAB!!**

## **Attendance Policy:**

Regular and prompt attendance is absolutely necessary in this class! You should keep in mind the following:

- Work missed because of an unexcused absence cannot be made up and it will not be accepted
- The only absences that are excused are those that can be validated by an official note from a doctor, teacher, etc. In the case of family emergencies, a note from a parent or other responsible party may be accepted if it contains a phone number by which the excuse may be verified.
- Four or more unexcused absences will result in a failing grade for the course (note that exceptions to this rule may be made only under very special circumstances).

In the case of an unexcused absence, no late work will be accepted, and no make-ups given. In cases where the absence is legitimately excused, it is up to the instructor’s judgment whether the work can be made up. Whenever possible, when you know that you cannot make lab for an “excusable” reason, please contact me (beforehand) so that we can work out a time for you to make-up a lab.

**Grading/Evaluation:**

Your performance on labs and your understanding of course concepts will be assessed on the basis of the following points and percentages.

|                                      |                   |
|--------------------------------------|-------------------|
| Lab exercises – 10 at 20 points each | 200 points        |
| Lab exams – 2 at 100 points each     | <u>200 points</u> |
| Total                                | 400 points        |

Your grades on all work will be based on the following ranges:

A ≥ 90%, B = 80-89%, C = 70-79%, D = 60-69%, F ≤ 59%

Unless it is absolutely necessary, there will be no “curved” grades.

**University Deadlines and Schedule Change Policy:**

The Department of Geography and Geology strictly adheres to University policies regarding schedule changes. It is the responsibility of the student to meet all deadlines for drop/add etc. Only in exceptional cases will a deadline be waived (you would be required to fill out an appeal form). The form requires a written description of the extenuating circumstances involved and the attachment of appropriate documentation. Poor academic performance, general malaise, or undocumented general stress factors are not considered legitimate circumstances.

**Students with Disabilities:**

Students with disabilities who require accommodations (academic adjustments and/or auxiliary aids or services) for this course must contact the Office for Student Disability Services, DUC A200. The SDS telephone number is (270) 745-5004; TTY is 745-3030. Their website is: <http://www.wku.edu/sds/>  
Please *do not* request accommodations directly without a letter of accommodation from SDS.

**General Comments:**

GEOL 114 will combine exercises from the lab manual with exercises that have been designed by me. The particular sequence of exercises is designed to compliment – as much as possible – the topics covered in GEOL 112; nevertheless, there will be some weeks when lab activities are fairly independent of the lecture. In most cases, pre-lab readings will be assigned to introduce lab topics.

**Proposed Course Schedule**

| Week | Topic  | Pre-lab Reading |
|------|--|-----------------|
| 1    | Overview   |                 |
| 2    | Exercise 3 – Relative time and sequence of events              | 3.1-3.5         |
| 3    | Exercise 1 – Description & classification of sedimentary rocks | 1.1-1.10        |
| 4    | Exercise 2 – Interpretation of sedimentary rocks               | 2.1-2.12        |
| 5    | Exercise 4 - Lithostratigraphy                                 | 4.1-4.7         |
| 6    | Lab exam review  |                 |
| 7    | Lab Exam 1   |                 |
| 8    | Exercise 8 – Fossil preservation                               | 8.1-8.6         |
| 9    | Biostratigraphy  | 5.1-5.2         |
| 10   | Fossil identification I  |                 |
| 11   | Fossil identification II                                       |                 |
| 12   | Lab Exam 2   |                 |
| 13   | Geologic maps I  |                 |
| 14   | Geologic maps II   |                 |