

## **GEOL 164: INTRODUCTION TO THE GEOLOGY CONSTRUCTION OF AFRICA**

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**Instructor:** Dr. Joseph Asante  
**Office:** 404 CARNEGIE  
**Contact Info:** e-mail: [joseph.asante@oberlin.edu](mailto:joseph.asante@oberlin.edu); Phone: 440-775-8714  
**Office hours (Instructor):** Mon 11:30 – 01:00 pm; Tues 01:00 – 02:30 pm by appointment or when you find door propped open  
**Class meeting and building/room:** MWF 10:00 - 10:50 am @ SEVE 132B

### **Textbooks (required):**

The first part of the course requires a textbook of Physical Geology. Students must purchase the following suggested textbooks or any other:

*Earth Science, 13<sup>th</sup> ed., 2012, by E.J. Tarbuck and F.K. Lutgens, publisher Prentice Hall*  
*Essentials of Geology, 3<sup>rd</sup> ed., by Marshak Stephen, publisher W.W. Norton & Company*

No textbook is required for second part of this course.

However some required reading materials for this course will be supplied by the instructor and will be posted on blackboard for the students.

Also students will be guided to search for and read additional research papers.

### **Course Description and Format**

Rocks contain the pages of earth history; therefore for your understanding of the geology of Africa course, we will first study the formation, deformation, and destruction of materials of the earth. The Geology of Africa is an introductory level course that covers the geologic history, tectonic evolution, and implications of African history and tectonics to the spectacular “Basins and Swells”, oil, gas, and mineral resources in the continent. Additional topics to be covered in this course are geologic hazards and environmental problems. The format of the course will be lecture and discussion. We will examine the scientific geological evidence used to interpret the intriguing geological history and tectonic evolution of Africa. In this course the major tectonic events will be explained using examples from specific places on the continent. This course will reveal the complexity of the earth systems on the geological time scale.

### **Course Learning Objectives and Outcomes:**

At the end of this course the student will be able to scientifically explain/articulate:

- Geologic processes that have produced the basins and swells topography in Africa
- Geologic processes in the formation of oil, gas, and mineral resources in Africa
- Occurrence of natural disasters in Africa, examples: volcanic eruptions, dust storms, hydrogen sulfide gas along a coast in Namibia, and East Africa drought
- Water distribution in Africa and implications in a changing climate
- Distribution of rock types in Africa
- Geologic processes in the development of the east African rift systems

- How Archean style plate tectonics contrast/compare with modern plate tectonics
- Geomorphological framework of the African continent

This course will provide the knowledge for anyone thinking about working or investing in Africa, in diverse areas including the Peace Corps; Graduate research; an expat in oil, gas, and mineral industries; and a non-profit agency.

**Course Topics (completion of the topics is based on the progression of the class):**

1. Popular culture in Ghana, Course overview, what is geology? and structure of the earth
2. Introduction to minerals
3. Introduction to Igneous, Sedimentary, and Metamorphic rocks  
**Exam 1 (Friday March 1, 2013)**
4. Introduction to theory of plate tectonics
5. The physical and geological setting of Africa
6. Overview of Geology of Africa
7. Archean geology – Berberthon Greenstone Belt
8. Early Proterozoic cratonic basins and mobile belts – Birimian in Ghana  
**Exam 2 (Monday March 25, 2013)**
9. Proterozoic/Paleozoic - the pan African mobile belts – The Togo belt in Ghana
10. Paleozoic sedimentary basins – Gondwana
11. Paleozoic sedimentary basins and mountains – Pangea
12. Geodynamic evolution – break up of Pangea  
**Exams 3 (Friday April 12, 2013)**
13. Is the African plate stationary? What are the geological implications?
14. East African rift systems
15. Groundwater resources distribution in Africa
16. Environmental geoscience topics of special interest  
**Final Exam (only cover 13 - 16) date to be determined**

**Course Assessment:**

Students' performance in this course will be accessed based on 4 exams, class participation, homework, and attendance and are summarized as follows:

Class participation and homework	35%
4 Examinations (equally weighted)	60%
Attendance	5%

Grade ranges are as follows:

A = 93-100%	B- = 80-82.9%	D = 60-69.9%
A- = 90-92.9%	C+ = 77-79.9%	
B+ = 87-89.9%	C = 73-76.9%	
B = 83-86.9%	C- = 70-72.9%	F = 00-59.9%

**Getting the full participation score has four requirements:**

- a student has done the readings and brought the readings and notes to class

- a student has contributed to class discussion and the contributions are informed by the reading materials
- a student initiated talk and engaged in talk initiated by others
- a student listened to others and made a follow up comments

### **Students Responsibilities:**

#### **Academic honesty**

All works submitted by a student must be the student's work with proper attribution given where due. This class involves a lot of interactions and team group work however I expect that the final work you turn in is based on your own understanding of the material. All students are required to know Oberlin College Honor Code and must write and sign the honor pledge ([new.oberlin.edu/students/policies/](http://new.oberlin.edu/students/policies/))

#### **Attendance**

Attendance at all scheduled class meetings is very important and it is the student's responsibility to attend class. You are responsible for all material covered during class, whether you were present or not. If you are absent, look at what you missed on the topic schedule and discuss what we did with a classmate or me. Note however that if you missed class you will miss the participation grade for that class. If you are an athlete, you should give me the letter from your coach outlining what days you will need to leave early or miss class due to games as soon as you receive it.

#### **Computers and phones in class**

Phones and other digital devices are absolutely not permitted to be used in class. Also browsing the net is not permitted during class sessions

### **Resources for students:**

#### **Blackboard**

Blackboard is an online course-management system that we will use in Geology of Africa that is accessible with your ObieID. Through Blackboard, you will receive important announcements from me, communicate with me, communicate with classmates, access course materials, and participate in other activities I explain during the semester. You can login at <http://blackboard.oberlin.edu>.

#### **Tutoring and other assistance**

If you are in any way concerned about your ability to succeed in this course, you should get help immediately. Student Academic Services is the best resource for you to determine how to get that help, whether it is tutoring, seeing me for extra help, or help with organizing yourself to keep up with the class. They are located in Room 118, Peters Hall. More information is online at <http://new.oberlin.edu/arts-and-sciences/academic-resources-and-support/student-academic-services.dot>

If you require special accommodations, the Office of Disability Services will provide those for you. Remember you must provide all relevant documentation to the Office of Disability Services. They will supply you with a letter to share with me so that I know what accommodations you need and can arrange to meet those accommodations. It is most helpful if we work the details out well before your need for accommodation arises. The Office of Disability Services is located in Peters G-27/G-28.