

## “Geological Disasters: Agents of Chaos” Fall, 2012

**Instructor:** Lawrence Malinconico  
 (“Dr. M.”)  
 101A Van Wickle Hall  
 [malincol@lafayette.edu](mailto:malincol@lafayette.edu)  
 (610) 330-5195

**Office Hours:** Open: whenever I am in,  
 please feel free to drop in,  
 or call or e-mail for an  
 appointment, also 12 -  
 1pm on Monday and  
 Wednesday



I encourage you to meet with me at any time. If I'm busy or not there, you can arrange an appointment with Ms Meyerson, the geology department secretary. Visits should not be restricted to those having difficulties with the course. I welcome visits from students who want to explore geology in more detail, who are contemplating taking additional geology courses, or just want to talk, etc.

**Lectures:** Mondays, Wednesdays, and Fridays at 9:00 - 9:50 in 106 Van Wickle Hall

**Lab:** Wednesday 1:10-4:00, in 106 Van Wickle Hall – Dr. M.  
 Thursday 8:00-10:50am, in 106 Van Wickle Hall – Professor Wilson

**Lab TAs:** Kristen Berger & tbd

**Textbook:** *Natural Hazards and Disasters* by Donald Hyndman and David Hyndman,  
 Thomson. (3<sup>rd</sup> Edition)  
 Laboratory Binder purchased in the Geology Department Office

### **General Course Description**

The geological history of planet Earth began approximately 4.6 billion years ago. Since then the planet has been in a constant state of geological evolution. This evolution, which is shaping and reshaping the surface of the earth, often manifests itself in the form of violent, yet natural events such as earthquakes, volcanic eruptions, landslides, hurricanes, floods and tsunamis. As humans have emerged on the landscape over the last 4 to 6 million years, we have had to learn to cope with these disasters. However, for many different reasons, we are increasingly exposed to the often-severe consequences of living in areas exposed to the violence of nature. It is a rare week when we don't read about the devastation in some part of the world as a result of a natural process. This course will examine these processes from both technical and personal perspectives to try to understand where and why they occur, how human activity interferes with natural processes and probably makes many parts of the planet more disaster prone.

Field trips will allow us to see and test concepts in nature's laboratory. Additionally, periodic small group seminar sessions will allow for in-depth discussions as well as individual research into volcanic and earthquake hazards using library resources and the Internet.

## Course Objectives/Learning Outcomes

Upon completion of this course, I expect you to have a mastery of basic geologic concepts, like Earth structure, plate tectonics and earth materials as well as a more detailed understanding of several specific geologic hazards; volcanism, earthquakes, tsunamis, and impact events. You should be able to relate the specifics of each hazard to the more general earth science processes (like plate tectonics) and geologic time. As a result, you should be able to evaluate the scientific validity of hazards as they are presented in popular media and the news.

Additionally you should understand that the goal of science in general is to comprehend phenomena in the physical and natural world using the scientific method and observation, including data gathering and analysis.

## Labs and Field Trips

The laboratory is an integral part of this course as it provides the hands-on experiences that illustrate the concepts and test the theories discussed in lecture. The lab is a cumulative experience, and because each lab session builds on the material covered in the previous labs, it is imperative that you do not miss a lab exercise. You should work with a partner during the labs and you are encouraged to work together. However, the lab quizzes are individual efforts. Most of the exercises are designed to be completed in the allotted lab time (3 hours), however, some will require that you spend extra time preparing the lab.

By far, the best way to learn about geology is to actually go out in the field and see it. Two field trips are thus planned this semester to provide us with that opportunity. Your attendance on these trips is required. The tentative dates and destinations are provided in your lab schedule. More information will be provided on these trips as the dates approach. Since geology is an outdoor science, we will also take advantage of additional opportunities to get out into the field.

## In-class Worksheets

We will use videos in class to illustrate many of the processes that we discuss. You should not think of these as time to sit back and relax...there is much important information imbedded in these presentations. Almost every video will include an in-class worksheet that must be turned in at the end of class. You will be graded on these worksheets and no worksheets will be accepted after the class has ended. The worksheets will be returned to help you prepare for each exam.

## Learning Modules

As part of this course you will be expected to complete some online learning modules prior to the presentation of material both in class and lab. These modules will provide a context and review for the math that may be necessary to understand the concepts. The objective of these modules is to allow you to gain a greater appreciation for the geological concepts without getting bogged down relearning the mathematics in lab or class. Completion of these modules will count toward your grade in the course, but you can do them over until you have achieved a 100% - they will be limited to completion within a certain time frame however.

This is done at two different online modules:

1. The review/tutorial portion is found at <http://serc.carleton.edu/mathyouneed/index.html/> (choose the appropriate module)
2. There will be a link at the end of each review module that will take you to the WAMAP website (<http://wamap.org/index.php>) where you will be required to complete a brief (usually five questions) evaluation to test your competency on the reviewed material. You can take this

evaluation as many times as you want in order to achieve a 100% (up until the due date/time) for the assignment. Your % score on the modules will count for 5% of your course grade...spend the time and get full credit.

### HOW TO DO WELL IN GEOLOGY 120

1. Read, Read, Read, and come to class!! Readings are assigned for each lecture period and you should read this material *before* coming to class. This advance preparation will not only help you understand the days' lecture material, but it will make studying for exams much easier. We also encourage and solicit classroom discussions, so advance preparation will enable you to participate in these discussions. Feel free to ask questions during the lecture.
2. Read the assignments carefully and take notes on what you read, using your own words. Write down questions on material you don't understand and ask for help. Look at and understand the figures. Geology is a very visual science. *Do not read the text like a novel*.
3. Do not miss classes. Listen to the lecture and take notes. If you have questions, ask them in class, after class, or come by later and ask. If you don't understand something, don't let it slip by. Such items commonly build into major problems that affect learning in later meetings.
4. After class, review your lecture notes and compare them with your reading notes. Compile a summary of the material covered.
5. Keep up in the laboratory and seminar portions of the course. These exercises will help you understand the lecture material and visa versa. Don't just go through the motions in lab, make sure you understand what's going on! **ASK QUESTIONS!!**
- 6) Have fun...this is an interesting and timely topic let's enjoy it together.

### Grading

**Lecture Exams**

First Exam . . . . .	100 pts
Second Exam . . . . .	100 pts
Third Exam . . . . .	100 pts
Fourth Exam . . . . .	200 pts
<b>Lab:</b> Lab Exercises, Field Trip Reports, Video analysis, etc	300 pts
<b>Natural Disaster Report</b> (this may become part of lab) . . .	50 pts
<b>Out-of-Class Learning Modules</b> . . . . .	50 pts
<b>In-class worksheets</b> . . . . .	100 pts
<b>Total Points</b> . . . . .	<b>1000 pts</b>

### Attendance Policy

Your attendance is required at all lectures, labs, seminars, and field trips. Please inform me ahead of time if you will be unable to attend a class, lab, seminar, or field trip. Students are responsible for all material covered in class and lab. In-class worksheets are randomly assigned and count 10% towards your overall grade. They cannot be made up if missed. All absences will require a Dean's excuse. This includes absences due to illness.

### Cell Phones/Computers

Out of respect for your fellow students and me, please do not have your cell phone out during class. If there is something important that you anticipate, let me know beforehand. Additionally, unless I ask you to bring them, please do not have computers open during class or lab.

## **Academic Honesty**

Students are expected to conduct themselves according to the guidelines and rules of Lafayette College (see your student handbook) with respect to academic honesty and the preparation of their work for this class.

### **Additional Sources:**

Decker, R., and B. Decker, 2006, *Volcanoes*, W.H. Freeman and Company, New York, 326 pages.

Bolt, B.A., 2004, *Earthquakes*, W.H. Freeman and Company, New York, 378 pages.

Ebert, Charles H.V., 2000, *Disasters; Violence of Nature & Threats by Man*; Kendall/Hunt Publishing Company, 4th edition, 240pp.

Harris, Stephen L., 1990, *Agents of Chaos*; Mountain Press Publishing Company, Missoula, Montana, 260pp.

McPhee, John, 1989, *The Control of Nature*; Farrar Straus Giroux, New York, 272pp.

From time to time I may place additional readings on reserve at Skillman Library, on the Moodle Site or give you specific websites to visit. These will be announced and are part of your required readings for this course.