I. COURSE DESCRIPTION AND GOALS

Process and Inquiry? What’s this course about? What are the course goals?

1. To develop a basic understanding of the most essential natural and physical processes that make up the Earth system, and to understand the history and ongoing evolution of the interactions between the solid earth, oceans and hydrosphere, atmosphere and life.

   These include:
   • The structure and large-scale movement of the Earth’s interior, and its effects on the surface of the Earth including earthquakes and plate tectonics
   • Geologic time and the scientific approach to the construction of the geologic time scale
   • The Earth/Sun and Earth/Moon system and the cause of seasons and phases of the moon
   • Human impacts on the surface of the earth globally and in the San Diego region
   • Interactions of the oceans and atmosphere with the solid earth and biosphere

2. To build confidence and familiarity with scientific inquiry, analysis, and quantification.

   Most of the learning in this class (and in your future classrooms as teachers) will happen in an active, inquiry-based setting, with you and your groups working together to uncover and understand scientific ideas through investigation. This includes the development of your math and other quantitative skills (such as measurement, graphing, and simple computations), as well as general abilities to develop and test hypotheses.

   Nature of Science: To help you practice and develop an understanding of how knowledge is developed within a scientific community; that doing science involves using evidence and creative thinking, that knowledge is established through collaboration and consensus, and that science knowledge can change over time.

3. To convey the ability to independently research and critically evaluate publicly available Earth and environmental science information. You will learn how to synthesize that material to analyze a local issue and form a teachable unit from your information.

   As you are eventually faced with the job of teaching this material to your pupils, it is important that you learn how to sift through available information and get a solid grasp of complex issues facing many communities today, and to understand how Earth Science is relevant to your lives and the lives of most kids and their parents.

   This course fulfills a Science requirement of the Liberal Studies major.

II. COURSE FORMAT AND STRUCTURE

   This course is designed to be discovery-oriented (directed constructivism). The typical class will have a short lecture/discussion period followed by a lab/activity period for the remainder of the class. This is also followed by a discussion period to analyze as a group what we learnt in the activity. There will be variations in this, and I encourage you to be flexible.

   You will be researching a problem like a geoscientist would. You will be solving problems with your team mates and reaching conclusions before I actually talk about those conclusions.

   Please note, that unlike other lab courses, you are not allowed to leave immediately after the activity as there will be short discussions and wrap-up of the main ideas learnt.
Fieldtrip - this course includes a mandatory field trip on a Saturday morning. Because of time constraints, it is critical that you arrive on time to the field trip. *It is very important that you block this time out of your schedule now.* It is mandatory, and there are no make-up trips or substitute activities. Transportation is available in SDSU vans, but students often use their own vehicles. Directions given later in the semester. You must sign a waiver of liability prior to joining the fieldtrip. Please read the syllabus appendix.

**III. MATERIALS**

**Textbook:** “Foundations of Earth Science”, by Lutgens and Tarbuck 5th edition (or any other), Pearson Ed. This textbook is on reserve, under GEOL 142, in the Library Reserve section. Purchasing it is optional.

You will also need a simple scientific calculator.

**Suggested other materials**
- Small metric ruler; Colored pencils/markers and note paper for drawing diagrams, graphs, etc.
- You may need a 3-ring binder to hold and organize numerous hand-outs, data sheets and additional materials we give you in class.

Please note that your own notes in these handouts will be your best “textbook”, as most of the content in this course is taught via activities and not lecture and exams will reflect this.

**IV. THE RULES**

**Attendance** – *BECAUSE THIS IS AN ACTIVITY-BASED COURSE, ATTENDANCE IS CRITICAL. YOU WILL BE GRADED ON YOUR ATTENDANCE IN MANY DIFFERENT WAYS.*

Work in this class will often be done in groups. Some of the assignments may last more than one class period, meaning that continuity in groups is important. For your own understanding, it is also important that you be present for each lecture/activity. You will rotate between groups twice in the semester.

You will be primarily responsible for your own learning in this class. By engaging in meaningful discussions with your group members, by actively participating in whole class discussions, and by actively performing the experiments, you will develop with your classmates a set of ideas. Similar to the way in which scientists develop ideas, your ideas will be based on *evidence* gathered from the experiments you do. At appropriate times, you will be able to compare your ideas with those developed by scientists. It is expected that, except for some special jargon, the ideas you develop with the class should be quite similar to the scientists’ ideas.

Because you will play such an important role in your own learning then, and especially the learning of your classmates, you are expected to come to class on time every class period and participate throughout the period. Class will begin sharply at 9:30 AM. We will meet in other classrooms once or twice during the semester, so please be on time or you’ll miss that lab!

- Students who miss more than 2 days of class will have 4 negative points added to their score.
- Being late two times will count as an absence. All this will be noted. Limited medical emergencies will be excused only if explained in writing and accompanied by a note on letterhead from your doctor.

Unfortunately, before implementing this policy, students who attended class regularly and were always on time suffered unduly from lack of consideration by those who were frequently absent or late.

**Cheating and plagiarism** – are not tolerated and they tend to be really easy to spot in written assignments and tests, so don’t try it. All assignments must be the student’s original work. If you are caught, you may be given a grade of F for that assignment and other measures may be taken. You may be asked to submit your final paper through Turnitin, a Blackboard tool that helps to identify and instruct about what is/is not considered original work.

- **Homework plagiarism** – Please re-phrase or use your own thoughts and logic when answering HW questions from the textbook. Taking text straight from the book means that you did not really learn the concept and, therefore, do not understand the answer either.

Any group work we do is also expected to be a collection of individual efforts, not the work of one person copied many times over. Make sure to do your own work and make your own contributions. You will be a more successful student and teacher in the long run!
• Any assignments that are late will not be accepted, unless you can convince me that there are exceptional, tragic and unforeseen circumstances.

**Note:** No mobile phone handling of ANY kind during class time. No electronic device handling permitted during class time. Doing any kind of work from other classes is not permitted during class time. Reading magazines or newspapers is not permitted during class time. No exceptions!

### V. GRADING, EXAMS, PROJECT

#### Lab Activities
These are laboratory activities completely informal that include discussions and participation of everyone in the class. The themes are physical and geological processes, after a brief Math review. They are worth from 5 to 20 points, depending on length, type, or difficulty level. Fieldtrips are included here.

There is no make up of any labs, regardless of personal reason.

#### Homework and Small Projects
In addition to daily reading assignments in your textbook, you will regularly have homework assignments or small reports (typically worth 5 points) based on certain activities, readings, and lecture material. Typically you will have about 1 week to complete these homeworks. They will be posted in Blackboard and announced in class. Please check the Bb section Assignments and make sure you know and adhere to all due dates.

Homework is turned in at the beginning of class, so be sure that you're on time. No late HW will be accepted. Please do not plan on doing forgotten HW in class the morning that it’s due. That is considered late! **Total points for all lab activities and fieldtrips, and all homework is 250 (30% of your grade).**

#### Exams
We will have **2 lecture exams, each worth 100 points**. These tests may include calculations, interpretation of diagrams, fill-in blanks, and short essays. Each test will emphasize lecture and reading material from the current section only, and also your ability to assemble ideas presented in class in new ways (i.e. think independently and apply your knowledge). Your exams are based heavily on the lab activities.

**Total points for exams is 200 (50% of your grade).**

**NOTE:** No make up tests will be given, except under unforeseen, tragic, extraordinary, and documentable circumstances. A penalty of 40% will be added.

#### Final Project
In lieu of a final exam, we have a substantial final project consisting of a research paper, a lesson plan, and a poster presentation about an environmental issue. Students often feel this is the most rewarding portion of the course and find direct use for the work they complete in their senior assessments and in their future classrooms.

You will receive detailed information about this assignment later in the semester. You will be occupied with this project in the final 3 weeks of the semester. **Total points for the project is 135 (20% of your grade).**

“Show Me Geology” – an outreach science education program for K-8 students organized by SDSU Geol dept. You have the opportunity to earn points for this class if you participate in the activities. Schedule will be available after the first 2 weeks of the term. Show Me Geology takes place only on Fridays and in our department facilities.

**Final Grade – breakdown of points:**

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Lab/Lecture Exams</td>
<td>50%</td>
</tr>
<tr>
<td>1 final Project</td>
<td>20%</td>
</tr>
<tr>
<td>Lab Activities/Homework</td>
<td>30%</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td>100%</td>
</tr>
</tbody>
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Your final grade will be based on the following percentage scale:

A = 100 – 90%, B = 89 – 80%, C = 79 – 70%, D = 69 – 60%, F ≤ 59%

(Grades within 2% of a boundary will receive + or –, depending on class average, improvement, and participation)

**Please note:** No extra credit given to anyone at all. This is work not specified on a course syllabus.

GEOL 499 – see me if you’re interested in signing up to be a TA for this course in the future (1-3 units).
GEOL 412 – TENTATIVE CLASS SCHEDULE (subject to change with notice)

Note that the following lecture and exam schedule is subject to change depending upon the progression of the course. You will be notified online and in class. You are responsible for noting all changes and adhering to them.

Week 1
30 Aug Course Overview, Constructivism and Science Learning ................................. Intro. Chapter
1 Sept Math review – Scientific Notation

Week 2
6 Sept Math Review – Area and Volume, Earth’s Volume, PlayDo Earth
8 Sept Sink and Float, Earth’s Materials and Density ................................................. Chapter 6

Week 3
13 Sept Convection – Sinking and Floating in Motion ............................................. Chapter 5
15 Sept The basis of Plate Tectonics: Convection .................................................. Chapter 5

Week 4
20 Sept The basics of Plate Tectonics: Location, Evidence, and Function .................. Chapter 5
22 Sept Seismic Eruption – Computer lab, 2nd floor ............................................. Chapter 5, 6

Week 5
27 Sept Seismology intro – Earthquake Location and Magnitude ............................. Chapter 6
29 Oct Faulting in California ..................................................................................... Chapter 6

Week 6
4 Oct The Earthquake Machine

6 Oct TH- EXAM 1

Week 7
11 Oct Recap of Exam 1 results. Sediment and Grain Size – Rock lab, 1st floor .... Chapter 2
13 Oct Sedimentation and Sedimentary Environments .......................................... Chapter 2

Week 8
18 Oct Sedimentary Rocks and Sedimentary Structures; Intro to Fossils ................ Chapter 8
20 Oct Geologic Time #1, Relative Dating ............................................................... Chapter 8

Week 9
25 Oct Geologic Time #2, Faunal Succession and Correlation ............................. Chapter 8
27 Oct Geologic Time #3, Radiometric Dating ....................................................... Chapter 8
29 Oct – Mandatory Saturday morning field trip to Torrey Pines State Beach – 10am to 12pm.

Week 10
1 Nov Walk through the Solar System .................................................................. Chapter 15
3 Nov Seasons and Day Length – Seasonality and Climate .................................. Chapter 11

Week 11
8 Nov Heat capacity – NASA exercise - Computer lab, 2nd floor ......................... Chapter 11
10 Nov Final Project introduction

Week 12
15 Nov Phases of the Moon.
17 Nov Mandatory campus field trip – Library - Online research session with Marilyn Hall (LA 76).

Week 13
22 Nov T- EXAM 2

24- 25 Nov: Thanksgiving Recess

Week 14
29 Nov Recap of Exam 2 results. Conclusion of labs.
1 Dec Project work day; Project consultations

Week 15
6 Dec Project work day; Project consultations
8 Dec All posters due – Poster presentations

13 Dec, Thursday, 8 AM - FINAL PAPER DUE – (our Final Exam time). No late papers accepted at all. A 50% penalty per day will accrue if you insist on turning in your paper after the due date and time. You may email the paper to me on or before the due date and time.