

**UNIVERSITY OF WYOMING**

**GEOL 3005 Principles of Geophysics, 4CH**

*Meeting Location:* GE318

*Term:* Fall 2019

*Meeting times and dates:* MWF 2:10-3pm, August 29<sup>th</sup> – December 10<sup>th</sup>

*Instructor contact information:* Prof. Andrew Parsekian, office: Geology 133B.

*Office hours:* T/Th 11:15-12:15, W 3-4 pm & by appointment

*Course prerequisites:* Physics 1110/1210

**Course Description:**

The goal of this course is to introduce you to the properties and processes of the physical Earth. Topics to be covered include seismology, electrical and electromagnetic methods, gravity, magnetism, heat flow, and plate tectonics. We will take a largely practical approach, using hands-on data acquisition with modern geophysical instruments as a means to convey geophysical methods.

**Student Learning Outcomes:**

*Upon completion of this course, students will be able to:*

1. communicate geophysical concepts with acceptable precision and accuracy;
2. explain fundamental concepts underlying common exploration geophysics methods;
3. describe the Earth processes related to several large-scale geophysical phenomena;
4. work through common geophysical problems using computer-based mathematical tools;
5. describe the core field practices associated with geophysical measurements.

**Required texts, readings, and special tools or materials:**

The required textbook for this class is *Looking Into the Earth*, by A.E. Mussett and M.A. Khan, published by Cambridge University Press. It is available at the University bookstore and on amazon.com (including as a Kindle e-book). Reading assignments from the book will be given in class; you will be responsible for completing the reading and knowing the material in the assigned chapters (we will not cover every chapter in the book). In addition, lecture notes and supplementary reading materials may be handed out occasionally. You are responsible for reading all handouts and knowing the material in them, unless otherwise instructed in class.

**General requirements and expectations for the course:**

Lectures: Lectures for this class are recorded in advance for you to listen to prior to class in conjunction with the assigned reading. The philosophy of the lectures will not be to cover every single detail of the material or textbook, but rather to (1) convey key concepts, (2) supplement the textbook with interesting examples from our experience, and (3) establish the theory behind the

instruments you'll be using in the labs. A short quiz based on the lecture and reading is required to be completed on WyoCourses before the beginning of each class. You will be invited to ask questions on the lecture at the beginning of each class meeting.

**Team Based Learning:** At the beginning of the semester, each student will be assigned to a small team that they will work with for the duration of the course. In-class exercises will be completed and graded as a team. In most meeting periods, you will have >40 min to work on the team activity; you need to get to work immediately and work efficiently because the exercises are designed to fill this time. Still, you may not always get to finish the work – you are not penalized for incomplete team activities *as long as you have shown a concerted, reasonable effort to make progress*. You must submit the team activity at the end of each class period. These are essential for the instructor and TA to gauge progress towards mastery of the material. As long as you have made a concerted, reasonable effort to complete the exercises, your grade will be based on correct use of units and significant figures only. The grade will be on a 0 to 2 point scale:

- 2 points: no substantial errors
- 1 point: good effort, but units are missing or sig. figs are incorrect.
- 0 points: insufficient progress made, all units missing, sig figs not used correctly.

I will randomly draw one person's worksheet from the group to grade; everyone in the group will receive the same grade based on the randomly selected sheet. Grades are only awarded to those who hand in the exercise sheet by the end of the class period. It is not possible to get points anytime after the class period, though you are welcome to work through missed assignments for your own benefit.

To alleviate any concern with variable effort of team members given that a random submission will be chosen for grading, you will complete a peer-evaluation at the end of the semester. The rankings calculated from that evaluation will be used as to individually weight the Team Exercises portion of your grade (see *Grades* below for details). You are required to attend the class period at the end of semester where peer rankings are awarded, otherwise the only grade that you can get for this component of the course is zero.

**Labs:** The two-hour labs will alternate between field use of geophysical equipment and computer-based analysis of those data. At UW we are fortunate to have a world-class facility of geophysical equipment, including seismic, resistivity, ground-penetrating radar, magnetometers, gravimeters, and electromagnetic induction instruments. You'll learn to use all of them, and to analyze the data from them. We think you'll enjoy this hands-on approach to geophysics. Due to weather restrictions, we will likely front-load the semester with outdoor data acquisition activities, so there may be several weeks between the acquisition of a data set and its analysis in the lab. (We'll do our best to keep things coordinated.) Be aware that it can be cold in Wyoming even in September or October, so please dress accordingly. When we are having field-based labs, we will announce the meeting place in advance (e.g., the Old Main lawn). Do NOT meet in the lab classroom on field days unless otherwise instructed.

Data analysis labs will take place in the computer lab (ESB 1006). Each lab writeup is due one week after the lab, at the beginning of the lab period, e.g. if you have lab on Wednesday afternoon starting at 1pm, your lab is due the next Wednesday that lab is held, at 1pm.

**Required examinations and quizzes:**

*Quizzes.* Quizzes will be completed on WyoCourses before class.

*Midterm Exams.* The three test scores will be weighted according to your performance -- i.e., your lowest score will only count 8%, while your best score will count for 15% of your final grade. Each midterm will only test the material covered since the previous midterm. You may bring one 8.5" x 11" sheet of notes to the final, but you may write notes on only one side of that sheet. There will be no make-up tests during the semester unless you have a University Authorized Absence; if you have to miss a class due to a medical emergency, please contact the instructor as soon as possible.

**Final Examination Date:**

The final examination will be comprehensive and will be held on December 12, 1:15pm – 3:15pm. Please double-check the date and make your end-of-semester travel plans accordingly; no early or make-up final exam will be given without a University excused absence. You will be permitted to bring one 8.5" x 11" sheet of notes to the final, and you may write notes on both sides of that sheet.

Exam Schedule:

- 26 Sept. Exam 1
- 24 Oct. Exam 2
- 19 Nov. Exam 3
- 12 Dec. Final Exam

**Grading Scale and Grading Policies:**

Grading will be on the straight 100%-90% = A/89.9% - 80% = B/79.9% - 70% = C/69.9% - 60% = D/ <59.9% = F scale (that is, no "plus" or "minus" grades). Your grade will be based on four components: quizzes, tests, homework/lab reports, and the final exam. Grades will be weighted in the following proportions:

Quizzes	=	10%
Team Exercises	=	10%
Three tests	=	8, 12, 15% of grade
Comprehensive Final	=	20%
Lab work	=	25%

To calculate the final grade, I will tabulate all scores for the class and "curve" the grade relative to the average maximum performance. The average of the top five semester grades will be used as a scaling factor for the rest of the class. For example if the top five grades average out to be a 93.4%, then all grades in the class will have 6.6% added to them.

**Attendance and Absence policies:**

*Attendance:* There is no explicit attendance taken in GEOL33005, however you must attend class meetings in order to engage in team exercises that form the core of the course. Lab attendance is mandatory in order to conduct the planned experiments and prepare lab reports.

*Missed or Late Work.* You will only be able to make up missed exams if you have a valid Authorized Absence (granted by the Dean of Students, according to The University policies on excused absences is as outlined in [UW Regulation 2-108 \(Student Attendance Policy\)](#). Work turned in late (without prior consent of the instructor) will be docked points at a rate of 10% per day

### **Classroom Behavior Policy:**

At all times, treat your presence in the classroom and your enrollment in this course as you would a job. Act professionally, arrive on time, pay attention, complete your work in a timely and professional manner, and treat all deadlines seriously. You will be respectful towards your classmates and instructor. Spirited debate and disagreement are to be expected in any classroom and all views will be heard fully, but at all times we will behave civilly and with respect towards one another. Personal attacks, offensive language, name-calling, and dismissive gestures are not warranted in a learning atmosphere. As the instructor, I have the right to dismiss you from the classroom, study sessions, electronic forums, and other areas where disruptive behavior occurs. No video or audio recording during class is allowed to protect the privacy of your fellow students.

### **Classroom Statement on Diversity:**

The University of Wyoming values an educational environment that is diverse, equitable, and inclusive. The diversity that students and faculty bring to class, including age, country of origin, culture, disability, economic class, ethnicity, gender identity, immigration status, linguistic, political affiliation, race, religion, sexual orientation, veteran status, worldview, and other social and cultural diversity is valued, respected, and considered a resource for learning.

### **Disability Support:**

The University of Wyoming is committed to providing equitable access to learning opportunities for all students. If you have a disability, including but not limited to physical, learning, sensory or psychological disabilities, and would like to request accommodations in this course due to your disability, , please register with and provide documentation of your disability as soon as possible to Disability Support Services (DSS), Room 128 Knight Hall. You may also contact DSS at (307) 766-3073 or [udss@uwyo.edu](mailto:udss@uwyo.edu). It is in the student's best interest to request accommodations within the first week of classes, understanding that accommodations are not retroactive. Visit the DSS website for more information at: [www.uwyo.edu/udss](http://www.uwyo.edu/udss)

### **Academic Dishonesty Policies:**

Academic dishonesty will not be tolerated in this class. Cases of academic dishonesty will be treated in accordance with UW Regulation 2-114. The penalties for academic dishonesty can include, at my discretion, an "F" on an exam, an "F" on the class component exercise, and/or an "F" in the entire course. Academic dishonesty means anything that represents someone else's ideas as your own without attribution. It is intellectual theft – stealing - and includes (but is not limited to) unapproved assistance on examinations, plagiarism (use of any amount of another person's writings, blog posts, publications, and other materials without attributing that material to that person with citations), or fabrication of referenced information. Facilitation of another person's academic dishonesty is also considered academic dishonesty and will be treated identically.

### **Duty to Report:**

UW faculty are committed to supporting students and upholding the University's non-discrimination policy. Under Title IX, discrimination based upon sex and gender is prohibited. If you experience an incident of sex- or gender-based discrimination, we encourage you to report it. While you may talk to a faculty member, understand that as a "Responsible Employee" of the University, the faculty member MUST report information you share about the incident to the university's Title IX Coordinator (you may choose whether you or anyone involved is identified by name). If you would like to speak with someone who may be able to afford you privacy or confidentiality, there are people who can meet with you. Faculty can help direct you or you may find info about UW policy and resources at <http://www.uwyo.edu/reportit>

You do not have to go through the experience alone. Assistance and resources are available, and you are not required to make a formal complaint or participate in an investigation to access them.

**Substantive changes to syllabus:**

All deadlines, requirements, and course structure is subject to change if deemed necessary by the instructor. Students will be notified verbally in class, on our WyoCourses page announcement, and via email of these changes.

***CAMPUS RESOURCES***

*DISABILITY SUPPORT SERVICES:* [udss@uwyo.edu](mailto:udss@uwyo.edu), 766-3073, 128 Knight Hall, [www.uwyo.edu/udss](http://www.uwyo.edu/udss)

*COUNSELING CENTER:* [uccstaff@uwyo.edu](mailto:uccstaff@uwyo.edu), 766-2187, 766-8989 (After hours), 341 Knight Hall, [www.uwyo.edu/ucc](http://www.uwyo.edu/ucc)

*ACADEMIC AFFAIRS:* 766-4286, 312 Old Main, [www.uwyo.edu/acadaffairs](http://www.uwyo.edu/acadaffairs)

*DEAN OF STUDENTS OFFICE:* [dos@uwyo.edu](mailto:dos@uwyo.edu), 766-3296, 128 Knight Hall, [www.uwyo.edu/dos](http://www.uwyo.edu/dos)

*UW POLICE DEPARTMENT:* [uwupd@uwyo.edu](mailto:uwupd@uwyo.edu), 766-5179, 1426 E Flint St, [www.uwyo.edu/uwupd](http://www.uwyo.edu/uwupd)

*STUDENT CODE OF CONDUCT WEBSITE:* [www.uwyo.edu/dos/conduct](http://www.uwyo.edu/dos/conduct)