

Geology 552—Applied Geophysics
WF 8:00-9:50 p.m., ES 223

Instructor: Jackie Caplan-Auerbach
Office: ES 236 (or find me in my lab, ES 105)
Phone: 360-650-4153
Email: caplanj@wwu.edu
Office hours: TF, 1-2 p.m., or by appointment

Text: *Intro to Applied Geophysics*, H.R. Burger, A. Sheehan, C.H. Jones, 1st Ed., Norton

| Date | Topic | Assignment/chapter |
|------------------|--|------------------------------|
| Wednesday, 9/21 | Introduction to class | Chapter 1 |
| Friday, 9/23 | Ellipse mapping (compass and tape) | Chapter 2 |
| Wednesday, 9/28 | Intro to surveying (JCA out of town) | Homework #1 due |
| Friday, 9/30 | Site map data collection (JCA out of town) | Chapter 3 |
| Wednesday, 10/5 | Seismic refraction background | |
| Friday, 10/7 | Refraction surveys | Chapter 8 Homework #2 due |
| Wednesday, 10/12 | Refraction surveys | |
| Friday, 10/14 | Seismic reflection | Chapter 3 Homework #3 due |
| Wednesday, 10/19 | Magnetism | |
| Friday, 10/21 | Magnetism surveys | Chapter 7 Homework #4 due |
| Wednesday, 10/26 | Ground penetrating radar | |
| Friday, 10/28 | GPR surveys | Chapter 7 |
| Wednesday, 11/2 | Resistivity | |
| Friday, 11/4 | Resistivity survey | Chapter 6 Homework #5 due |
| Wednesday, 11/9 | Field project into | |

| | | |
|------------------|---|---------------------|
| Friday, 11/11 | VETERAN'S DAY, NO CLASS | |
| Wednesday, 11/16 | Field projects | |
| Friday, 11/18 | Field projects | |
| Wednesday, 11/23 | THANKSGIVING HOLIDAY, NO CLASS | |
| Friday, 11/25 | THANKSGIVING HOLIDAY, NO CLASS | |
| Wednesday, 11/30 | Project presentations (graduate student speakers) | Final projects due! |
| Friday, 12/2 | Project presentations (graduate student speakers) | |
| | FINAL EXAM | |

PLEASE NOTE THAT THE SYLLABUS IS SUBJECT TO CHANGE DUE TO WEATHER OR OTHER UNANTICIPATED EVENTS (OR SIMPLY A DESIRE TO SPEND MORE OR LESS TIME ON A TOPIC). Please check Canvas often to see if the syllabus has been updated.

Class goals: In your geologic studies you have learned some geophysical theory and you've probably done lots of fieldwork looking at rocks. In this course, you will merge these two experiences, using the theory and instrumentation of geophysics to investigate the shallow subsurface in at least two environments. In so doing, you will learn how to design a geophysical investigation, you'll learn about geophysical data and analysis, and you will learn about the limitations of theory and instruments. Note that this course requires a significantly amount of independent work outside of the hours in which the class is scheduled, as there are a lot of you and equipment is limited.

Prerequisites: GEO 352 (Introduction to Geophysics), or the equivalent. If you have not taken this course, please recognize that you are responsible for learning any material expected to be included in the prerequisite classes (this includes the prerequisites to GEO 352 which are GEO 318, PHY 161, 162, and MATH 124). If material is unfamiliar to you, please see me for recommendations on textbooks or websites to get more background, and see me during office hours or at any other time that works for you.

Grades: Grades are based on your field project, mid-term and final exams, and a series of homework assignments. Note that many of the homework assignments are based on an on-campus field project. Homework makes up 50% of your grade, and the final is worth 20%. Your field project will be worth 30% of the grade, 10% of

which is a presentation. As graduate students in a mixed grad/undergrad class, you will be called upon to do several things that are above and beyond what the undergraduates will do. When we do problem sets you will have extra problems to tackle that will require a bit more challenge. You will be the primary speakers when the final projects are presented (although all students will contribute to the creation of the presentation).

Field projects: A large percentage of your course grade and the bulk of your educational experience will be based on two field projects. The first is an on-campus project that we will do as a class, although you will break into small groups to collect data and these reports will comprise most of the weekly homework assignments. We will use the on-campus project to learn how to do design geophysical surveys and work the equipment. It is also a good opportunity to learn what things affect a field survey and what type of data you will need to collect.

The second field project will likely also take place on campus, but may be off-campus, depending on project and student availability. You may do a real project, which is to say a project that has been requested of us by a community organization. Alternatively, I may invent a project that you should approach as if you have been hired to do the survey. In both cases, you should treat this as a professional project.

These projects require a great deal of organization and independence. Graduate students will take a leadership role in the group, as if you were the project leader on a real consulting job. You will be required to use time out of class to collect data, and you will need to be proactive about collecting your data in a timely manner (something as simple as inclement weather can change your plans in a hurry). Your data will be collected in groups, so you will need to plan with your team members to find times that are conducive to group fieldwork. I will be available for guidance on all of these projects and will participate in as much of the field work as possible.

Academic integrity: During this class you will likely hear me talk about academic integrity. I use the word “integrity” because reflects the sum of who you are, and how you approach your collegiate experiences. In an academic sense, having integrity means challenging yourself to develop your own ideas and to credit those whose words, thoughts or results you use as a basis for your work. It includes working independently, striving for excellence, and behaving honorably in and out of the classroom. Note that exams in this class are take-home, but must be done independently (with no input from your classmates or other people). This is an excellent example of a situation in which integrity is paramount.

Information about what constitutes academic dishonesty may be found at Western’s new web page on integrity: <http://www.wvu.edu/integrity>. There you can find information on what constitutes plagiarism and how to avoid it. I will expect that

you have reviewed this information, but if you have any questions, please ask me rather than risk accidentally committing an act of academic dishonesty.

In a nutshell, any ideas or phrasing that are not your own must be properly cited. Furthermore, you must paraphrase what the source says and not present it in their words. Stealing their words is plagiarism just as stealing their ideas is plagiarism. The best way to avoid accidentally using someone else's words is to take notes on anything that you read, *set the original source aside*, and write your understanding of the material based on your notes, not on the original words. Changing a few words is still plagiarism. Changing the order of clauses in a sentence but using the same general words is still plagiarism. You **MUST** write your ideas, not their ideas rearranged. Not only is this important in terms of academic integrity, but it speaks to the very essence of education: your goal should be to learn the material such that you can explain it to others. Being able to find the answer in a textbook or on the internet doesn't equate to being educated, but being able to explain a concept in your words does. If you are uncertain as to how much rewriting is necessary to avoid plagiarism please see <http://owl.english.purdue.edu/owl/resource/563/02/> or <http://www.indiana.edu/~wts/pamphlets/plagiarism.shtml>.

Please note that unless it is explicitly stated in an assignment (i.e. you are doing a group project), you are expected to do all of your work yourself. This means that although you and a friend may discuss the assignment (unless otherwise stated, as on the take-home exams), you must write them up completely separately. This is so that each of you can get experience with tackling these ideas. If you and a friend do the work together I can't properly evaluate how much each of you truly knows. Assignments that are found to be plagiarized will earn a zero and can result in your failing the course. Formal paperwork will be written up on the episode and will be sent to the student, department chair, dean and registrar, per university policies.

Office hours and contact: Please do not hesitate to contact me during my office hours or by appointment if those hours do not work with your schedule. You may also email me at the address shown above. I am very flexible with meeting times, so if my office hours don't fit with your schedule, I promise that we will find a way to meet if need be.

Academic success and support services: Please feel free to talk to me anytime about your performance in the course or possible ways you can do better. Academic support services are also available if you need them. Tutors are available for a fee through the Tutorial and Academic Skills Center (TASC) at 650-3855 or <http://www.wvu.edu/depts/tutorialcenter/home.htm> . If you need disability-related accommodations, please notify Student Support Services at 650-3083 (phone) or 650-3725 (TTY) or <http://www.wvu.edu/depts/drs/>

Attendance, tardiness, leaving early: Attendance is not mandatory and you will not be marked down for any absences but please understand that in order to get the most out of this class you need to be in class taking notes. If you cannot attend a class, please get notes from your classmates. I'll be happy to answer any questions you have about the notes but I will not supply you with my own. Nor will I review what you missed unless you get a classmates' notes first.

Regarding cell phones...under NO circumstances should a cell phone ring or ever be answered in class, and under NO circumstances should you send or read text messages during class. If you are waiting for an important call, please let me know, but recognize that I may ask you to wait for your call outside. If there is a circumstance that requires you to be in cell phone contact (if, for example, you moonlight as an EMT or you're awaiting the birth of your first child), please discuss this with me in advance of class. If you have something better to do than to attend and pay attention in class, then by all means, please do it, but do not waste your classmates' time by doing it during class meetings.

Geology 552 provides information for the following degree/program outcomes:

| | |
|----------|---|
| | M.S. Geology |
| Outcomes | <i>2) Design and conduct scientifically-rigorous and relevant scientific research in their chosen geological discipline</i> <i>3) Analyze and interpret scientific data</i> <i>4) Communicate scientific concepts and results effectively through both written and oral means, and to a range of audiences.</i> |