2024 / Spring  
GEOL 4335/4035 001  
Introduction to Geophysics

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Office Hours: M-F 8 – 9:30; M, T, W 3:00-5:00 or by appointment  
Class meeting time and place: E.L. Miller Science Building RM# 323  
(Lec. TR 9:30-10:20 am, Lab. T 2:30-5:00 pm)

Text and Materials: Looking into the Earth - Alan Musset & M. Aftab Khan (required)  
Recommended (Introduction to Geophysical Exploration – Philip Keary et. al. &  
Introduction to Applied Geophysics – H. Robert Burger et.al.)

Tentative Course Schedule (GEOL 4335)

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<th>Topics</th>
<th>Reading Assignment</th>
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<tbody>
<tr>
<td>Intro Geop./Data Acquisition</td>
<td>Ch. 1 &amp; 2</td>
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<tr>
<td>Global Seismology and Seismic Waves</td>
<td>Ch. 4</td>
</tr>
<tr>
<td>Earthquakes and Seismotectonics</td>
<td>Ch. 5</td>
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<tr>
<td>Refraction Seismology</td>
<td>Exam #1 TBA</td>
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<tr>
<td>Reflection Seismology</td>
<td>Ch. 6</td>
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<td>Exam #2 TBA</td>
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<tr>
<td>Gravity on a Small-Scale</td>
<td>Ch. 7</td>
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<tr>
<td>Gravity on a large Scale and Isostacy</td>
<td>Ch. 8</td>
</tr>
<tr>
<td>Magnetic Surveying</td>
<td>Ch. 9</td>
</tr>
<tr>
<td>Magnetic Surveying</td>
<td>Ch. 10 &amp; 11</td>
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<tr>
<td>Resistivity Methods</td>
<td>Exam #3 TBA</td>
</tr>
<tr>
<td>Induced Polarization and Self-Potential</td>
<td>Ch. 12</td>
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<tr>
<td>Electromagnetic Methods</td>
<td>Ch. 13</td>
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<tr>
<td>Other Subsurface Geophysics</td>
<td>Ch. 14</td>
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<tr>
<td>Final Exam</td>
<td>TBA</td>
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PURPOSE OF THE COURSE:  
This course is designed to introduce students to basic theories and methodologies of the main geophysical methods: non seismic methods (gravity, magnetics), seismic methods (reflection, refraction, earthquake seismology), and electrical methods (self-potential, induced polarization, DC-resistivity, electromagnetic and ground penetrating radar). This course will review the benefits and limitations of each geophysical technique. The Labs are designed to stress the applied aspects of these techniques.
GRADING:

1st Lecture Exam: 18%
2nd Lecture Exam: 18%
3rd Lecture Exam: 18%
Final Exam (cumulative): 18%
Lab: 20%
Quizzes 8%
Total: 100%

Overall grading: >90% = A; 80-89% = B; 70-79% = C; 60-69% = D; <60% = E.

Student Learning Outcomes:

Upon completion of this course, the students will acquire an understanding of the following topics:
1. Geophysical data acquisition, processing, and application
2. Seismic Methods; seismology and waves, earthquake seismology, refraction seismology, reflection seismology
3. Non-Seismic Methods; Gravity, Magnetics
4. Electrical Methods; Resistivity, IP, SP, EM, and Ground Penetrating Radar (GPR).

Outline of topics

<table>
<thead>
<tr>
<th>Topic</th>
<th>Duration</th>
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<tbody>
<tr>
<td>Intro Geop./Data Acquisition</td>
<td>1 Week</td>
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<tr>
<td>Global Seismology and Seismic Waves</td>
<td>1 Week</td>
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<tr>
<td>Earthquakes and Seismotectonics</td>
<td>1 Week</td>
</tr>
<tr>
<td>Refraction Seismology</td>
<td>1.5 Week</td>
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<tr>
<td>Reflection Seismology</td>
<td>1.5 Week</td>
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<tr>
<td>Gravity on a Small Scale</td>
<td>1.5 Week</td>
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<tr>
<td>Gravity on a large Scale and Isostacy</td>
<td>1.5 Week</td>
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<tr>
<td>Magnetic Surveying</td>
<td>1.5 Week</td>
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<tr>
<td>Resistivity Methods</td>
<td>1.5 Week</td>
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<tr>
<td>Induced Polarization and Self-Potential</td>
<td>1 Week</td>
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<tr>
<td>Electromagnetic Methods</td>
<td>1 Week</td>
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<tr>
<td>Well Logging</td>
<td>1 Week</td>
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CLASSROOM POLICIES

Exams

Exam may include a multiple-choice section; however, you will not be required to take a scantron to the exam room. Other sections may include matching, true/false questions, short answers, fill in the blanks, and/or short essay questions. The final exam will be comprehensive. However, most of its content will be related to material covered over the final block of the lecture series. All exams will take place in room 323 unless otherwise stated. The use of cell phones and programmable calculators will not be
permitted during exams. A review sheet for the upcoming exam may be issued prior to the date of the exam.

If you have a scheduling conflict with an exam for an officially sanctioned University reason, you may take the exam at a different time or date. However, you must inform me at least a week before the exam. Make-up exams will only be given in documented cases of illnesses, official university activities, or deaths in the family. Bear in mind that this is a “relatively small” upper-level class and if there is going to be a scheduling conflict, I will be able to discuss it with you on a one to one basis. If the final exam is missed for a legitimate excuse, an "Incomplete" will be given and the final can be taken next semester. Make-up exams may be in essay format.

Late Policy
All labs are due a week after they were assigned. At the instructor’s discretion, late assignments may be collected up to a week after it is due, with a mandatory fifty percent deduction. No assignment will be collected or graded if it is more than seven days overdue.

Lecture:
You are expected to be prepared for each lecture period by reading the material to be covered in lecture prior to attending class. This will help you to better comprehend the material given during the lecture.

Workload:
You are expected to spend time on this course outside of lecture and lab periods. This time should be spent 1) completing assignments (readings, labs, problem solving); 2) reviewing/studying your lecture notes, lecture slides, readings, and assignments on a regular basis; and 3) studying for quizzes and exams.

Electronic Devices: Please turn off all cell phones and audio pagers before class.

Credit hour Justification
GEOL 4335 Geophysics meets for a minimum of 25 lecture contact hours during the semester, including the final exam. The lecture and laboratory must be completed concurrently. The grades for lecture and laboratory are combined into one single grade for the course. Students are required to complete assignments based on selected readings, along with periodic quizzes and exams over the course content. Successful completion of all elements for the course (both lecture and laboratory) requires at least six hours of additional out-of-class work each week.

GEOL 4035 Geophysics Lab meets for a minimum of 37.5 laboratory contact hours during the semester, including the final exam. The lecture and laboratory must be completed concurrently. The grades for lecture and laboratory are combined into one single grade for the course. Students are required to complete written assignments that analyze data generated during laboratory meetings.
Office Hours:
I have listed my scheduled office hours at the top of this syllabus. Please feel free to drop by or call to raise questions or concerns regarding this course. If you need to speak to me but cannot come to my office during the posted hours, I will make an appointment to meet with you at another time. You can also email me at any time.

HELPFUL HINTS:
• Attend classes regularly and punctually
• Review both lecture and laboratory material regularly (Don’t cram).
• Read your textbook(s)
• Form study groups.
• Participate fully in lab exercises.
• Develop and practice good note taking skills.
• Ask questions in class.

UNIVERSITY POLICIES

Add/Drop Policy
Students may add courses through the 2nd class day during the summer semesters and through the 4th class day during the fall or spring semesters. Academic Department Chairs may reconcile class schedules through the official reporting date. Students may drop classes through five working days past mid-semester or mid-session as applicable. A student will not be allowed to drop a course after these dates, unless he or she withdraws from the University. For information please visit: (http://www.sfasu.edu/upp/pap/academic_affairs/add_drop.html)

Academic Integrity
Academic dishonesty includes both cheating and plagiarism. Cheating includes but is not limited to (1) using or attempting to use unauthorized materials to aid in achieving a better grade on a component of a class; (2) the falsification or invention of any information, including citations, on an assigned exercise; and/or (3) helping or attempting to help another in an act of cheating or plagiarism. Plagiarism is presenting the words or ideas of another person as if they were your own. In the hopes of deterring incidents of cheating and/or plagiarism this class employs a "zero tolerance" policy meaning that if a student commits cheating or plagiarism they receive a grade of F for the class.

Withheld Grades
Ordinarily, at the discretion of the instructor of record and with the approval of the academic chair/director, a grade of WH will be assigned only if the student cannot complete the course work because of unavoidable circumstances. Students must complete the work within one calendar year from the end of the semester in which they receive a WH, or the grade automatically becomes an F. If students register for the same course in future terms the WH will automatically become an F and will be counted as a repeated course for the purpose of computing the grade point average. For additional information, go to http://www.sfasu.edu/policies/course-grades-5.5.pdf.
Disability Services (DS)

If you have a documented disability that may require assistance, you will need to contact the Disability Services (DS) for coordination in your academic accommodations. Disability Services is located within The Human Services Building, Room # 325. The DS phone number is (936) 468 3004. You may also visit their website at http://www.sfasu.edu/disabilityservices/index.htm. If you have a special need/disability, please let me know outside of class sometime during the first week of the course. This helps me to adjust or alter plans so that problems can be minimized, and your learning experience can be maximized.

Brightspace/D2L:

Course content (lecture slides, handouts, assignments, rubrics, etc.) and useful resources (e.g., websites, FAQ topics) will be posted using the Brightspace learning environment, which you can access through mySFA. Grades will be posted on Brightspace but note that calculated grades shown on Brightspace may differ slightly from my Excel grade determinations, which are final. Brightspace will also be used for important notifications. It is your responsibility to check the site regularly and set up notifications for access to course materials and information.

COVID-19 MASK POLICY

Masks (cloth face coverings) are recommended but will not be enforced.

Mental Health and Wellness

SFA values students’ mental health and the role it plays in academic and overall student success. SFA provides a variety of resources to support students' mental health and wellness. Many of these resources are free, and all of them are confidential.

On-campus Resources:

SFA Counseling Services www.sfasu.edu/counselingservices Rusk Building, 3rd Floor 936.468.2401

SFA Human Services Counseling Clinic
www.sfasu.edu/humanservices/139.asp
Human Services, Room 202 936.468.1041

Crisis Resources:

Burke 24-hour crisis line: 1.800.392.8343
Suicide Prevention Lifeline: 1.800.273.TALK (8255)
Crisis Text Line: Text HELLO to 741-741
A note on Artificial Intelligence (AI)
Academic integrity is a core value of this course, and any form of academic dishonesty, including using artificial intelligence (AI) to cheat, will not be tolerated. Cheating with AI includes, but is not limited to, using AI-generated content for assignments or exams, using AI chatbots to communicate with others during exams, or using AI tools to generate responses to exam questions. Any student caught engaging in academic dishonesty using AI will face serious consequences, including but not limited to, failing the course and being reported to the appropriate academic authorities. It is important to remember that AI is a tool to assist in learning and not to replace it, and that academic dishonesty undermines the learning experience for everyone.
### Tentative Course Schedule

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<th>Wk #</th>
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<th>Lab Topics</th>
<th>Reading Assignments</th>
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<td>Introduction</td>
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<td>Data Collection</td>
<td>Contouring</td>
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<td>12-Jan</td>
<td>Data Collection</td>
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<td>Muss. Ch. 2</td>
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<td>Seismic Waves</td>
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<td>Global Seismology</td>
<td>Focal Mechanisms</td>
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<td>Exam 1 Revision</td>
<td>Nape</td>
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<td>13-Feb</td>
<td>Processing</td>
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<td>Muss. Ch. 3</td>
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<td>20-Feb</td>
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<td>Burger Ch. 3</td>
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<td>Refract/reflec</td>
<td>Reflection</td>
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<td>Migration</td>
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<td>Exam 2 ??</td>
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<td>Geo Magnetism 1</td>
<td>Gravity 2</td>
<td>Muss. Ch. 10</td>
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<td>Muss. Ch. 11</td>
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<td>2-Apr</td>
<td>Geo Magnetism 3</td>
<td>Magnetism</td>
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<td>Grav/Mag. Rev</td>
<td>GCAGS Conf.</td>
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<td>9-Apr</td>
<td>Exam 3 Revision</td>
<td>Presentations</td>
<td>Break</td>
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<td>Resistivity 1</td>
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<td>Exam 3</td>
<td>Burger Ch. 5</td>
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<td>23-Apr</td>
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<td>30-Apr</td>
<td>Electromag Meth.</td>
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<td>7-May</td>
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<td>9-May</td>
<td>Finals Exam (8-10)</td>
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