

# GEOPHYSICS - BS

Graduates with a BS in Geophysics go on to careers in the energy and environmental industries, and advanced study at top-ranked graduate programs. The first two years are similar to the BS in Geology, providing students with the fundamentals of geology, chemistry, physics, and mathematics. Courses during the junior and senior years emphasize knowledge transfer from the fields of math and physics to techniques and problems in both theoretical and applied geophysics. Technical electives allow students to focus on specific career objectives. Students are also encouraged to become involved in research problems with faculty members and can receive course credit for this activity through GEOP 291 and GEOP 491.

While graduates from the Geophysics program will have employment opportunities in industry, the rigor of this degree is designed to prepare students for advanced study. The MS degree is generally considered to be the preferred entry degree for professionals in the petroleum industry. Students interested in teaching in a university or research in an academic, government or industrial laboratory should seek the PhD.

Some courses in geophysics require field trips. Students must pay expenses incurred on such trips.

Geophysicists contribute to the field of environmental science by working on traditional and emerging methods used for hydrogeological, structural and stratigraphic characterization of the uppermost 100 meters, with applications to shallow resource and groundwater assessment and the solution of environmental and engineering problems. Environmental geophysicists typically work as independent environmental consultants or with industrial corporation or government agencies.

Many geophysics find eventual employment in the petroleum industry, in which reflection seismology is the primary subsurface exploration tool. Students aiming for this field will supplement their background in seismic theory with electives that focus on subsurface structures and processes and industry techniques. These students will be prepared for graduate study, as well as service jobs in the oil and gas industry between their undergraduate and graduate education.

## Program Requirements

### First Year

		Semester Credit Hours
<b>Fall</b>		
GEOL 150	Introduction to the Solid Earth	4
GEOL 180	Introduction to Geology and Geophysics	1
CHEM 107 & CHEM 117	General Chemistry for Engineering Students and General Chemistry for Engineering Students Laboratory	4
ENGL 104	Composition and Rhetoric	3
MATH 151	Engineering Mathematics I	4
Semester Credit Hours		16

### Spring

GEOL 152	History of the Earth	4
MATH 152	Engineering Mathematics II	4
Select one of the following:		3

American history ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history</a> )		
Government/Political science ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#government-political-science">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#government-political-science</a> )		
Communication elective ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#communication">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#communication</a> )		3
Semester Credit Hours		14

### Second Year

<b>Fall</b>		
GEOL 203	Mineralogy	4
GEOL 210	Geological Communication	3
MATH 251	Engineering Mathematics III	3
PHYS 206	Newtonian Mechanics for Engineering and Science	3
PHYS 226	Physics of Motion Laboratory for the Sciences	1
Semester Credit Hours		14

### Spring

GEOL 304	Igneous and Metamorphic Petrology	4
GEOL 250	Geological Field Methods	4
MATH 308	Differential Equations	3
PHYS 207	Electricity and Magnetism for Engineering and Science	3
PHYS 227	Electricity and Magnetism Laboratory for the Sciences	1
Semester Credit Hours		15

### Third Year

<b>Fall</b>		
GEOP 341	Fundamentals of Geophysics	3
GEOL 306	Sedimentology and Stratigraphy	4
MATH 311	Topics in Applied Mathematics I	3
PHYS 221	Optics and Thermal Physics	3
Select one of the following:		3
American history ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history</a> )		
Government/Political science ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#government-political-science">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#government-political-science</a> )		
Semester Credit Hours		16

### Spring

GEOL 312	Structural Geology and Tectonics	4
GEOP 313	Geophysical Field Methods	4
GEOP 361	Geophysical Signal Processing	3
Select one of the following:		3
American history ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history</a> )		
Government/Political science ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#government-political-science">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#government-political-science</a> )		

Technical elective <sup>1</sup>	3
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Semester Credit Hours	17
<b>Fourth Year</b>	
<b>Fall</b>	
GEOP 421 Seismology	4
GEOP 413 Near-surface Geophysics	3
GEOL 450 Geology Senior Project	3
Language, philosophy and culture elective ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#language-philosophy-culture">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#language-philosophy-culture</a> ) <sup>2</sup>	3
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Semester Credit Hours	13
<b>Spring</b>	
Select one of the following:	3
American history ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history</a> )	
Government/Political science ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#government-political-science">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#government-political-science</a> )	
Creative arts elective ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#creative-arts">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#creative-arts</a> ) <sup>2</sup>	3
Social and behavioral science elective ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#social-behavioral-sciences">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#social-behavioral-sciences</a> ) <sup>2</sup>	3
Geophysics elective <sup>3</sup>	3
Technical electives <sup>1</sup>	3
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Semester Credit Hours	15
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Total Semester Credit Hours	120

<sup>1</sup> Any science, math or engineering course that augments the degree with the approval of the advisor.

<sup>2</sup> The Graduation requirements include a requirement for three hours of international and cultural diversity courses and three hours of cultural discourse courses. A course satisfying a Core category, a college/department requirement, or a free elective can be used to satisfy this requirement. See academic advisor.

<sup>3</sup> Any approved 400-level geophysics course not already required.