## Introductory Courses in Earth Sciences

All of the courses listed below are entry-level courses offered through Earth Systems, Energy Resources Engineering, Geological & Environmental Sciences, and Geophysics. There are no prerequisites; some have recommended background. Many fulfill GERs. Entry to freshman and sophomore seminars (indicated by N and Q, respectively) requires filling out an online application through Freshman and Sophomore Programs. For more information, refer to the Bulletin and Time Schedule.

### Autumn Quarter

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Instructor(s)</th>
<th>Units</th>
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<tbody>
<tr>
<td>EarthSys 15SI</td>
<td><strong>Reducing Stanford’s Carbon Footprint</strong></td>
<td>Stephen Schneider</td>
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<td></td>
<td>This student-initiated course will include guest lectures and field trips to local energy-efficient buildings. Students evaluate a campus building for submission to Facilities and Operations. Group project focused on reducing Stanford’s carbon emissions.</td>
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<tr>
<td>EarthSys 180B</td>
<td><strong>Local Sustainable Agriculture</strong> <em>(also offered Spring quarter – may be repeated for credit)</em></td>
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<td>Field-based training in ecologically sound agricultural practices at the Stanford Community Farm; guest lectures from Bay Area farmers, agricultural educators, and food policy advocates; and a field trip to an educational farm.</td>
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<td>GES 1</td>
<td><strong>Dynamic Earth: Fundamentals of Earth Science</strong> <em>(also offered Spring quarter)</em></td>
<td>Hannah Scherer</td>
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<td></td>
<td>An activity-based course in which you will spend time exploring processes that shape the landscape. Several field trips during class to local examples, and an all-day field trip to the coast. <strong>Satisfies GER:DB-NatSci</strong></td>
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<td>GES 3</td>
<td><strong>Current Topics in the Earth &amp; Environmental Sciences</strong> <em>(also offered Winter quarter)</em></td>
<td>Anne Egger and others</td>
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<td>The goal of this seminar is to introduce you to the range of research that is conducted in the School of Earth Sciences. Faculty from all departments in the school will give a weekly lecture, assuming no background knowledge.</td>
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<td>GES 37N</td>
<td><strong>Energy &amp; the Environment on the Back of an Envelope</strong></td>
<td>Ken Caldeira</td>
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<td>Problem-solving and discussions to develop a quantitative understanding of which energy sources might be scaled up to satisfy long-term global energy demand while preserving our environment. <strong>Satisfies GER:DB-NatSci</strong></td>
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GES 42N  Landscapes and Tectonics of the Bay Area  
George Hilley  
The diverse landscapes of the Bay Area result from active faulting and erosion. Field excursions will introduce concepts and skills through investigation of the local valley, mountain, and coastal areas. Satisfies GER:DB-NatSci  
4 units

GES 191  Field Trips: Thanksgiving Break in Owens Valley and the White Mountains  
Hannah Scherer  
November 17-21 field trip to Owens Valley, site of volcanic activity, hot springs, earthquakes, all in the shadow of the Sierra Nevada. Stay in Bishop, CA. $100 cost.  
1 unit

Geophys 25  Hands-on Intro to Astrobiology  
Norm Sleep  
Are human beings alone? Are microbes common in the universe? Outdoor lab experiments recreate the historical development of our modern understanding of space and time, and are designed to work in K-12 classrooms.  
3 units

Geophys 123:  Earth Sciences and War, Archaeology, National Security, Global Warming, & Music  
Amos Nur  
Topics include oil and war, Yergin’s The Prize, earthquakes and archaeology, petroleum and national security, global warming and Al Gore’s An Inconvenient Truth, earth systems and music, Gustav Mahler’s Third Symphony.  
1 unit

Winter Quarter

EarthSys 10  Introduction to Earth Systems  
Gary Ernst  
A multidisciplinary approach to case studies using the principles of geology, biology, engineering, and economics to describe how the Earth operates as an integrated, interconnected system. Satisfies GER:DB-NatSci  
4 units

EarthSys 45N  Energy Issues Facing the World  
David Howell and Steve Graham  
This core of this course is a game simulation of energy resources and policy in countries around the Pacific. You will develop an energy profile, and see how geologic and economic factors influence policy.  
3 units
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<td>GES 2</td>
<td>Earth System History</td>
<td>Hannah Scherer</td>
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<td>GES 3</td>
<td>Current Topics in the Earth &amp; Environmental Sciences (also offered Autumn quarter)</td>
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<tr>
<td>GES 43N</td>
<td>Environmental Problems</td>
<td>Keith Loague</td>
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<tr>
<td>GES 49N</td>
<td>Field Trip to Death Valley and Owens Valley</td>
<td>Gail Mahood</td>
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GES 55Q **The California Gold Rush: Geologic Background and Environmental Impact**

*Dennis Bird*

You will investigate the geologic processes that led to concentration of gold in the river gravels and rocks in the Mother Lode & the environmental impact of mining operations. *Satisfies WRITE-2 and GER:DB-NatSci*

GES 191 **Field Trips: STAY TUNED…**

Spring Break field trip to???

Spring Quarter

**EarthSys 180B Local Sustainable Agriculture** *(also offered Autumn quarter – may be repeated for credit)*

Field-based training in ecologically sound agricultural practices at the Stanford Community Farm; guest lectures from Bay Area farmers, agricultural educators, and food policy advocates; and a field trip to an educational farm.

**Energy 102 Renewable Energy Sources and Greener Energy Processes**

*Tony Kovscek and Roland Horne*

What is the potential for renewable energy? How can geothermal, wind, solar, biomass, and tidal energies be converted to useful forms and stored? *Satisfies GER:DB-EngrAppSci*

**Energy 104 Technology in the Greenhouse**

*Franklin Orr*

Discussion of technologies that may be used to reduce emissions of greenhouse gasses like methane, carbon dioxide, and nitrous oxide, as well as particulates like black soot. What are the limits of these technologies, and how can renewable energy sources contribute?

**GES 1 Dynamic Earth: Fundamentals of Earth Science** *(also offered Autumn quarter)*

*Hannah Scherer*

An activity-based course in which you will spend time exploring processes that shape the landscape. Several field trips during class to local examples, and an all-day field trip to the coast. *Satisfies GER:DB-NatSci*
### SES Introductory Courses 2007-08

**GES 8**  
**The Oceans: Intro to the Marine Environment**  
*Jim Ingle*  
How did the oceans evolve and how are they changing now? How do the oceans affect our climate? What happens at the boundary between the ocean and the continents?  
*Satisfies GER:DB-NatSci*  

**GES 46N**  
**Exploring the Critical Interface between the land and Monterey Bay: Elkhorn Slough**  
*Chris Francis*  
Students will explore Elkhorn Slough as a model ecosystem for understanding the importance and complexity of estuaries. Includes field trips to sites in the Slough, one of California’s largest and last coastal wetlands.  

**GES 56Q**  
**Changes in the Coastal Ocean: The View from the Monterey Bay**  
*Rob Dunbar*  
Using the Monterey and San Francisco Bays as examples, this seminar will investigate recent changes in climate, land use, and coastal ocean practices and conditions. Includes several field trips in the Bay Area.  

**Geophys 104**  
**The Water Course**  
*Rosemary Knight*  
The pathway that water takes from rainfall to the tap using students’ hometowns as examples. How the geological environment controls the quantity and quality of water, and current water supply issues in the US and abroad. *Satisfies GER:DB-NatSci*