Getting started in the Earth and Environmental Sciences

Below are entry-level courses offered through Earth Systems, Energy Resources Engineering, Environmental Earth System Science, Geological & Environmental Sciences, and Geophysics. Most have no prerequisites; many fulfill GERs and GEEs. For scheduling information, refer to Axess. [https://pangea.stanford.edu/academics/courses/introductory-courses](https://pangea.stanford.edu/academics/courses/introductory-courses)

### Autumn Quarter, 2014

#### Broad Introductory Exploration.  
Survey a major discipline in the School of Earth Sciences and prepare for deeper inquiry.

<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 10</td>
<td>Introduction to Earth Systems</td>
<td>Gary Ernst and others</td>
<td>4</td>
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<tr>
<td>GES 1B</td>
<td>Introduction to Geology: California Desert Geology</td>
<td>Ken Befus</td>
<td>4</td>
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- **Introduction to Earth Systems**
  - Apply principles of geology, biology, engineering, and economics to explore how the Earth operates as an integrated, interconnected system. Investigate multidisciplinary solutions to environmentally critical challenges. Satisfies GER: GER: DB-NatSci, WAY-SMA

- **Introduction to Geology: California Desert Geology**
  - California’s majestic deserts provide natural laboratories for studying active geologic processes that shape Earth's surface. You’ll trace a billion years of Earth history, climate change, and historic human impacts through hands-on lab exercises. Satisfies GER: GER: DB-NatSci, WAY-SMA, WAY-FR

#### Introductory Field Studies.  
Gain field-based perspectives on topics in the Earth sciences as you learn with faculty and students in interesting and beautiful outdoor settings.

<table>
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<tr>
<td>GES 5</td>
<td>Field Trip: Living on the Edge</td>
<td>Elizabeth Miller, Marty Grove and others</td>
<td>1</td>
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<tr>
<td>EarthSci 193</td>
<td>Natural Perspectives: Geology, Environment, and Art in Owens Valley</td>
<td>Richard Nevle and others</td>
<td>1</td>
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- **Field Trip: Living on the Edge**
  - October 25-26 field trip. Tour local beaches, geology and landforms. Enjoy a BBQ dinner and stay overnight in cabins along the Santa Cruz coast. Enrollment limited, preference given to first year students.
  - Contact Marty Grove (mgrove@stanford.edu).

- **Natural Perspectives: Geology, Environment, and Art in Owens Valley**
  - November 22-26 field trip. Experience the wild beauty of California’s singular Owens Valley through scientific and aesthetic perspectives. Explore the region’s geological and environmental history. Observe its landscapes closely through guided drawing exercises.
  - $75 cost. Contact Richard Nevle (rnevle@stanford.edu)

#### Focused Introductory Exploration

- **EARTHSCI 1**: Current Research in the Earth and Environmental Sciences (1 unit)
- **EARTHSYS 1B**: Promoting Sustainability Behavior Change at Stanford (2 units)
- **EARTHSYS 41N**: The Global Warming Paradox (3 units. Satisfies WAY-SMA)
- **EARTHSYS 144**: Fundamentals of Geographic Information Science (EESS 164) (3-4 units. Satisfies GER:DB-NatSci)

Questions? Contact Richard Nevle (rnevle@stanford.edu) or visit [http://earthsciences.stanford.edu](http://earthsciences.stanford.edu)
Focused Introductory Exploration, Autumn Quarter (continued)

- EARTHSYS 180B: Principles and Practices of Sustainable Agriculture (EESS 280B) (3-4 units. Satisfies WAY-SMA)
- EARTHSYS 185: Feeding Nine Billion (4-5 units, Satisfies WAY-AQR)
- GES 42N: Landscapes and Tectonics of the San Francisco Bay Area (4 units. Satisfies WAY-SMA, WAY-AQR). Download a course flyer.
- GEOPHYS 130: Introductory Seismology (3 units. Satisfies GER: DB-NatSci, WAY-AQR, WAY-SMA)

Winter Quarter, 2015

Broad Introductory Exploration

Energy 101 Energy and the Environment
Tony Kovscek and Lou Durlak
How we use energy in modern society, the consequences of that energy use on environment and economies, and estimates of resources available for use in the future. (EARTHSYS 101) Satisfies GER: DB-EngAppSci, WAY-AQR, WAY-SMA

Geophys 110 Earth on the Edge Jerry Harris
Introduction to the foundations of contemporary geophysics through exploring themes in whole Earth geodynamics, geohazards, natural resources, and the environment and sustainability. Satisfies GER: GER: DB-NatSci, WAY-AQR, WAY-SMA

Focused Introductory Exploration

- EARTHSYS 56Q: Changes in the Coastal Ocean: The View from Monterey and San Francisco Bays (3 units, Satisfies GER: DB-NatSci)
- EARTHSYS 57Q: Climate Change from the Past to the Future (EESS 57Q) (3 units, Satisfies WAY-SMA)
- EARTHSYS 105A: Jasper Ridge Docent Training (BIO 105A) (4 units). First of two-quarter sequence training program to join the Jasper Ridge education program.
- ENERGY 160: Modeling Uncertainty in the Earth Sciences (3 units, Satisfies WAY-AQR)
- GES 43Q: Environmental Problems (3 units. Satisfies GER: DBNatSci)
- GES 46Q: Environmental Impact of Energy Systems: What are the Risks? (3 units, Satisfies WAY-SMA, WAY-AQR)
- GES 90: Introduction to Geochemistry (3-4 units. Satisfies GER: DB-NatSci, WAY-SMA)
- GEOPHYS 50N: Planetary Habitability, World View, and Sustainability (3 units, Satisfies GER: DB-NatSci, WAY-SMA)
- THINK 40: Meeting the Global Sustainability Challenge (4 units. Satisfies THINK, WAY-SMA)

Questions? Contact Richard Nevle (rnevle@stanford.edu) or visit http://earthsciences.stanford.edu
Introductory Field Studies, Winter Quarter

GES 191  **GES Field Trip**  
*Sara Cina*  
In this *field course* over Spring Break (*March 24-29*), you’ll investigate the story recorded in California’s beautifully exposed geology. Discover how plate tectonic forces, acting over millions of years, have shaped the landscape, climate, and ecology of the American West. Contact Sara Cina (*mailto:saracina@stanford.edu*).

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Spring Quarter, 2014

**Broad Introductory Exploration**

GES 1A  **Introduction to Geology: Dynamic Earth**  
*George Hilley*  
Focus is on the physical and chemical processes of heat and mass transfer within the earth and its fluid envelopes, including deep-earth, crustal, surface, and atmospheric processes. *Labs and field trips. Satisfies GER:DB-NatSci, WAY-AQR, WAY-SMA*

GES 4  **Evolution and Extinction: Introduction to Historical Geology**  
*Jon Payne*  
Explore how geologists and paleontologists reconstruct the history of the Earth and its life. Use data to investigate theories for critical events in Earth history such as mass extinctions. Two half-day *field trips*. (EARTHSYS 4) *Satisfies GER:DBNatSci, WAY-SMA*)

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**Introductory Field Studies**

Energy 101A  **Energizing California Field Trip**  
*Roland Horne and Margot Gerritsen*  
Visit energy production and transmission facilities in Northern California. Investigate engineering solutions to the energy and climate challenge. Learn how you can be part of a cleaner energy future. Dates TBA. Contact Roland Horne (*horne@stanford.edu*) or Margot Gerritsen (*margot.gerritsen@stanford.edu*).

GES 191  **GES Field Trip**  
*Sara Cina*  
In this *field course* over Memorial Day Weekend (*May 22-25*), you’ll investigate the story recorded in California’s beautifully exposed geology. Discover how plate tectonic forces, acting over millions of years, have shaped the landscape, climate, and ecology of the American West. Contact Sara Cina (*mailto:saracina@stanford.edu*).

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Questions? Contact Richard Nevle (*rnevle@stanford.edu*) or visit [http://earthsciences.stanford.edu](http://earthsciences.stanford.edu)
Focused Introductory Exploration, Spring Quarter

- EARTHSYS 46N: Exploring the Critical Interface between the Land and Monterey Bay: Elkhorn Slough (3 units. Satisfies WAY-SMA)
- EARTHSYS 105: Food and Community: New Visions for a Sustainable Future (EESS 105) (3-5 units)
- EARTHSYS 105B: Jasper Ridge Docent Training (BIO 105B) (4 units. Prerequisite EARTHSYS 105A)
- EARTHSYS 180B: Principles and Practices of Sustainable Agriculture (EESS 280B) (3-4 units. Satisfies WAY-SMA)
- GES 40N: Diamonds (Satisfies GER: DB-NatSci, WAY-SMA)
- GES 105: Introduction to Field Methods (3 units. Satisfies WAY-AQR) (Field portion of course takes place during two weeks after commencement.)
- GEOPHYS 113: Earthquakes and Volcanoes (EARTHSYS 113) (3 units. Satisfies GER: DB-EngAppSci, WAY-SMA)
- GEOPHYS 190: Near-Surface Geophysics (3 units. Satisfies DB-EngAppSci, WAY-SMA)

Summer 2015 Opportunities

*Sophomore College course descriptions may change. Consult soco.stanford.edu for more information.

GES 12SC

**Sophomore College*: Environmental and Geological Field Studies in the Rocky Mountains Page Chamberlain
Spend three weeks hiking through the Rocky Mountains, while exploring its geologic history and environmental issues related to changing land-use patterns and increased demand for the natural resources of the American West.

2 units

EarthSys

**Sophomore College*: In the Age of the Anthropocene: Coupled-Human Natural Systems of Southeast Alaska Rob Dunbar
Explore Southeast Alaska’s forests, streams, and coastal waters. Learn from people who make their livelihoods from these natural resources, gaining insight into broader resource management and conservation issues and the global challenges of sustainability.

2 units

School of Earth Sciences

Natural Perspectives
Sara Cina, Richard Nevle, and others
*June 15-30.* Gain insight into solutions to environmental challenges informed by scientific, cultural, historical, and aesthetic perspectives as we explore the coupled human and natural systems of Eastern California’s Owens Valley and nearby Sierra Nevada and White Mountains.

2 units

School of Earth Sciences

Undergraduate Research Program
School of Earth Sciences Faculty
Collaborate with faculty to investigate a question in the Earth and environmental sciences. Engage in a challenging and rewarding research project and gain practical experience through writing a proposal, participating in fieldwork, data collection and analysis, and presenting your findings. Students earn a $6000 summer stipend.

$6k stipend

Questions? Contact Richard Nevle (rnevle@stanford.edu) or visit http://earthsciences.stanford.edu