Course title and number  GEOL 101: Principles of Geology
Term  Fall 2014

Course Description and Prerequisites
Physical and chemical nature of the Earth and dynamic processes that shape it; plate tectonics, Earth’s interior, materials it is made of; age and evolution, earthquakes, volcanism, erosion and deposition; introduces physical and chemical principles applied to the Earth. Not open to students who have taken GEOL 104 or GEOL 320.

Prerequisites: none

Learning Outcomes
Students who successfully complete GEOL 101 will demonstrate knowledge of the following general themes in the geological sciences¹:

- Rocks and other materials record the 4.6 billion year history of the Earth. A variety of rock types are distributed throughout the Earth’s surface and interior.
- The Earth is a complex system of interacting rock, water, air, and life.
- The Earth is continuously changing through geological, hydrological, physical, chemical, and biological processes that are explained by laws.
- Plate tectonics is a unifying theory that explains many dynamic features of the Earth.
- Water plays critical roles in a wide range of surface and subsurface Earth processes.
- Life evolves on a dynamic Earth and continuously modifies the Earth.
- Humans depend on the Earth for resources.
- Natural hazards pose risks to humans.
- Humans significantly alter the Earth.

Students will learn how to use and express the above bodies of geological knowledge through individual and group lab exercises that will also develop the following core skills. Students will be assessed on both knowledge and skills in exercises and tests in lab. (For instance, students may be asked to work in groups to identify specific rocks that would record information about the tectonic history of a region, analyze a map showing the distribution of their selected rocks, and then report their findings in writing.)

- Think critically about geological problems by 1) identifying data and areas of uncertainty, 2) distinguishing between data that are relevant and irrelevant to specific problems, and 3) logically testing hypotheses.
- Communicate about geological problems by 1) organizing written and oral discussions in order to emphasize relevant data and provide a logical flow to a well-supported conclusion, and 2) supporting written text with well-chosen diagrams or illustrations.
- Use empirical and quantitative skills to solve geological problems by 1) constructing and analyzing graphs, 2) describing three-dimensional structures or surfaces from two-dimensional representations (e.g. maps or projections), and 3) identifying patterns or trends from historical data.
- Work in teams to solve geological problems by 1) recognizing different points of view, 2) designing and executing plans to test or reconcile opposing hypotheses, and 3) identifying and reporting areas of uncertainty that prevent consensus.

¹ Learning outcomes are modified from *Earth Science Literacy Principles*, published by the Earth Science Literacy Project (http://www.earthsclieceliteracy.org)
Instructor Information
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Textbook and/or Resource Material
Tarbuck, Lutgens, and Tasa, Earth, 10th Ed., 2011
Busch, Physical Geology Laboratory Manual, 4th Ed.

Grading Policies
Grades will be assigned based on the following assessments: three tests (total of 30%), lab (30%), and final exam (40%). All grades will be rounded to the nearest tenth of a percent (i.e., 89.95% → 90.0%, 89.94% → 89.9%) and converted to a letter grade as follows: 90.0–100.0 = A, 80.0–89.9 = B, 70.0–79.9 = C, 60.0–69.9 = D, <60.0 = F.

Course Topics, Calendar of Activities, Major Assignment Dates

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Required Reading (Tarbuck page numbers)</th>
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<tbody>
<tr>
<td>1</td>
<td>Introduction to class and geology; the scientific method; introduction to geologic time; origin of the solar system; Earth's internal structure and external features; plate tectonics</td>
<td>1–22, 22–29</td>
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<td>2</td>
<td>Minerals and the rock cycle</td>
<td>29–34, 87–105</td>
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<td>3</td>
<td>Igneous rocks</td>
<td>107–128, 128–135</td>
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<td>4</td>
<td>Volcanoes; weathering and sedimentary rocks</td>
<td>137–171, 173–186, 199–214</td>
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<td>5</td>
<td>Test 1; sedimentary rocks</td>
<td>214–227</td>
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<td>6</td>
<td>Metamorphic rocks; relative time</td>
<td>229–253, 255–267</td>
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<td>7</td>
<td>Absolute time; crustal deformation</td>
<td>267–277, 279–290</td>
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<td>8</td>
<td>Crustal deformation</td>
<td>290–301</td>
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<td>9</td>
<td>Test 2; Earthquakes</td>
<td>303–331</td>
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<td>10</td>
<td>Divergent plate boundaries; convergent plate boundaries</td>
<td>381–403</td>
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<td>11</td>
<td>Convergent plate boundaries, groundwater</td>
<td>381–403, 401–407</td>
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<td>12</td>
<td>Groundwater and streams; deserts and winds</td>
<td>429–459, 515–535</td>
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<td>13</td>
<td>Test 3; glaciers and glaciations</td>
<td>489–517</td>
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<td>14</td>
<td>Geologic record of global climate change; petroleum geology</td>
<td>575–607</td>
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Americans with Disabilities Act (ADA)

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation...
requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit [http://disability.tamu.edu](http://disability.tamu.edu)

**Academic Integrity**

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