The Sciences and Letters Curriculum in Geology (BSLAS), administered by the Department of Geology, is designed for students who want a more flexible course of study than is provided by the Specialized Curriculum in Geology and Geophysics. It may be used by those wishing to obtain a more liberal education and/or background in geology for use in fields such as anthropology, business, mineral economics, regional planning, journalism, law, sales, or library and information science. It is not intended to prepare a student for graduate work in the geological sciences unless the student selects additional courses in mathematics, chemistry, and physics comparable to those required in the Specialized Geology and Geophysics Curriculum. Students must choose from the following: Geology, Earth and Environmental Sciences, or Earth Science Teaching. The Earth Science Teaching Concentration is designed for students preparing to teach earth science at the secondary school level.

The Specialized Curriculum in Geology (BS) is designed for students who plan to pursue graduate study in geology or geophysics or who wish to work professionally in the environmental field upon obtaining the bachelor’s degree. It consists of geology, geophysics, and environmental geology areas, and offers more training in geology and related science than is required of students who make geology their major in the Sciences and Letters Curriculum. Students must choose one of the following: Geology, Geophysics, or Environmental Geology.

The Department of Geology also sponsors the Minor in Geology.

For the Degree of Bachelor of Science in Geology

Students select one of the following in consultation with an adviser:

- Major in Geology (Specialized Curriculum) (http://catalog.illinois.edu/undergraduate/las/academic-units/geology/geology-concentration/geology-concentration-specialized-curriculum)
- Major in Geology (http://catalog.illinois.edu/undergraduate/las/academic-units/geology/geophysics-concentration), Geophysics Concentration (http://catalog.illinois.edu/undergraduate/las/academic-units/geology/geophysics-concentration)
- Major in Geology (http://catalog.illinois.edu/undergraduate/las/academic-units/geology/environmental-geology-concentration), Environmental Geology Concentration (http://catalog.illinois.edu/undergraduate/las/academic-units/geology/environmental-geology-concentration)

Minor in Geology

The geology minor is designed for students who desire a significant background in Geology to support study and practice of their major field. Selection of courses at the 300- or 400-level will depend on the major and interests of the student.

E-mail: geology@illinois.edu

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOL 107</td>
<td>Physical Geology</td>
<td>4</td>
</tr>
<tr>
<td>GEOL 208</td>
<td>History of the Earth System</td>
<td>4</td>
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<tr>
<td></td>
<td>Select at least 10 hours of advanced geology courses from the following:</td>
<td>10-11</td>
</tr>
<tr>
<td>GEOL 333</td>
<td>Earth Materials and the Env</td>
<td></td>
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<tr>
<td>GEOL 380</td>
<td>Environmental Geology</td>
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<td></td>
<td>400-level courses taught by the Department of Geology</td>
<td></td>
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<tr>
<td></td>
<td>Total Hours</td>
<td>18-19</td>
</tr>
</tbody>
</table>

1 Students who decide to follow the curriculum after first taking GEOL 100 or GEOL 103 should enroll in GEOL 208. GEOL 100 or GEOL 103 will be accepted as a substitute for GEOL 107, but students should be aware that these courses are not intended for science majors.

GEOL Class Schedule (https://courses.illinois.edu/schedule/DEFAULT/DEFAULT/GEOL)

Information listed in this catalog is current as of 10/2018
Courses

GEOL 100 Planet Earth credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/GEOL/100)
Introduces non-science majors to physical aspects (earthquakes, volcanoes, floods, tsunamis, mountains, plate tectonics) and historical aspects (formation of earth and life, dinosaurs, ice age, evolution of climate) in earth science. Presents information on earth resources, natural hazards, and development of natural landscapes. Focuses on humanistic issues; provides context for understanding environmental change. Optional lab demonstrations and field trips with co-registration in GEOL 110. Credit is not given for both GEOL 100 and GEOL 101, GEOL 103 or GEOL 107.
This course satisfies the General Education Criteria for:
- Nat Sci Tech - Phys Sciences

GEOL 103 Planet Earth QRII credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/GEOL/103)
Topics covered are very similar to those of GEOL 101. Emphasizes application of quantitative methods in deriving geological knowledge. A weekly computer laboratory is an essential component of the course. Credit is not given for both GEOL 103 and GEOL 100, GEOL 101 or GEOL 107.
This course satisfies the General Education Criteria for:
- Nat Sci Tech - Phys Sciences
- Quantitative Reasoning II

GEOL 104 Geology of the National Parks credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/GEOL/104)
Develops geologic background, concepts, and principles through study of selected national parks and monuments. Examines the geologic framework and history, modern geologic processes, and factors influencing the present day landscape for each park area. Same as ESE 104.
This course satisfies the General Education Criteria for:
- Nat Sci Tech - Phys Sciences

GEOL 107 Physical Geology credit: 4 Hours. (https://courses.illinois.edu/schedule/terms/GEOL/107)
Introduces Earth phenomena and processes. Includes minerals and rocks, continental drift, plate tectonics, rock deformation, igneous and sedimentary processes, geologic time, landscape evolution, internal structure and composition of the earth, groundwater, seismology and earthquakes, and formation of natural resources. Emphasizes the chemical and physical aspects of the Earth, and the basis for geological inference. Field trip required. Additional fees may apply. See Class Schedule. Credit is not given for both GEOL 107 and GEOL 100, GEOL 101 or GEOL 103. Prerequisite: Intended for science and science-oriented students.
This course satisfies the General Education Criteria for:
- Nat Sci Tech - Phys Sciences

GEOL 110 Exploring Geology in the Field credit: 1 Hour. (https://courses.illinois.edu/schedule/terms/GEOL/110)
Introduces practical techniques for identification of rocks, minerals, and fossils; interpretation of geologic maps and cross-sections; appreciation of Midwestern geologic history and geologic features and landforms in the field. Additional fees may apply. See Class Schedule.

GEOL 111 Emergence of Life credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/GEOL/111)
Examines important theoretical and practical questions regarding the origin and evolution of life, as well as the search for life elsewhere in the universe. Uses the pioneering work of Carl Woese, whose "Tree of Life" revolutionized our understanding of the fundamental structure and evolutionary relatedness of all living entities on Earth. Same as ESE 111. Additional fees may apply. See Class Schedule.
This course satisfies the General Education Criteria for:
- Nat Sci Tech - Life Sciences

GEOL 117 The Oceans credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/GEOL/117)
Integrated introduction to oceanography and marine geology and geophysics. Topics include ocean-basin formation and evolution (in the context of plate tectonics), ocean ecology, the hydrologic cycle, water chemistry, currents and waves, the interaction of oceans with climate, coastal hazards, resources, pollution, and the Law of the Sea. Course is oriented toward students not majoring in science. Same as ESE 117.
This course satisfies the General Education Criteria for:
- Nat Sci Tech - Phys Sciences

GEOL 118 Natural Disasters credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/GEOL/118)
Introduces the nature, causes, risks, effects, and prediction of natural disasters including earthquakes, volcanoes, landslides, subsidence, global climate change, severe weather, coastal erosion, floods, mass extinctions, and meteorite impacts; covers scientific principles and case histories of natural disasters as well as human responses (societal impact, mitigation strategies, and public policy). Same as ESE 118 and GLBL 118.
This course satisfies the General Education Criteria for:
- Nat Sci Tech - Phys Sciences

GEOL 143 History of Life credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/GEOL/143)
Evolution of life from its beginning, illustrating changing faunas and floras through time; the invasion of land and of the skies; the effects of a changing atmosphere, changing climates, and continental drift. Emphasis on dinosaur evolution, ecology, and extinction; also other vertebrates, including mammal-like reptiles, mammals, and the emergence of humans, as well as plants and invertebrates. Same as ESE 143.
This course satisfies the General Education Criteria for:
- Nat Sci Tech - Life Sciences

GEOL 199 Undergraduate Open Seminar credit: 1 to 5 Hours. (https://courses.illinois.edu/schedule/terms/GEOL/199)
May be repeated.

GEOL 201 History of Geology credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/GEOL/201)
Traces the development of key ideas in the science, beginning with musings of the ancient Greek and Roman philosophers and early observations of the Earth by European and Arab scholars. Considers advances in mapmaking that span thousands of years and examines the origins of the Geologic Time Scale, including determination of the ages of rocks. Looks at early geologists from around the world, in the US, in Illinois, and at the U of I. Reads some classic papers establishing the grand unifying theory of geology: plate tectonics. Prerequisite: A 100-level geology course (excluding GEOL 110 and GEOL 143). Intended for both non-science students and geology majors.
This course satisfies the General Education Criteria for:
- Advanced Composition
- Humanities - Hist Phil
Information listed in this catalog is current as of 10/2018
GEOL 440 Sedimentology and Stratigraphy  
**credit: 4 Hours.**
Introduces dynamics of sedimentation, geology of sedimentary basins, the distribution of geologic processes through time, definition and correlation of stratigraphic units, principles of paleogeography, stratigraphy and tectonics. Additional fees may apply. See Class Schedule. 4 undergraduate hours. 4 graduate hours. Prerequisite: GEOL 208 or consent of instructor.

GEOL 450 Probing the Earth's Interior  
**credit: 3 Hours.**
Overview of how seismology, magnetics, gravity, geodesy, and surface geology can help us understand the Earth from its surface to its core as well as its temporal evolution. Topics include the internal composition and dynamics of Earth, generation of Earth’s gravitational and geomagnetic fields, driving mechanisms for tectonic plate motion, continental deformation, and surface topography. Students wanting a more quantitative treatment of geophysics should enroll in GEOL 452.

GEOL 451 Env and Exploration Geophysics  
**credit: 4 Hours.**
Discusses geophysical methods to reveal subsurface structures. Topics include seismic methods, gravity, magnetics, electrical methods, ground penetrating radar, borehole geophysics, and their applications to hydrocarbon and mineral exploration as well as engineering and environmental investigations. 4 undergraduate hours. 4 graduate hours. Several required local trips for field experiments. Prerequisite: MATH 241 and PHYS 212; or consent of instructor.

GEOL 452 Introduction to Geophysics  
**credit: 4 Hours.**
Provides a broad overview of basic concepts and fundamental knowledge of the physics of the Earth. Topics include seismology, gravity, geomagnetism, Earth's thermal state, and geodynamics. Intended for undergraduates in the geophysics concentration and other students who want a more quantitative treatment of the subject than GEOL 450.

GEOL 454 Introduction to Seismology  
**credit: 3 or 4 Hours.**
Introducing the basic theory of seismic wave generation and propagation and its application to Earth structure and earthquakes, including body waves, surface waves, inference of Earth structure, seismic prospecting, earthquake mechanisms, and strong ground motions. 3 or 4 undergraduate hours. 3 or 4 graduate hours. Students participating in optional class projects receive an additional hour of credit. Prerequisite: MATH 285 or consent of instructor.

GEOL 460 Geochemistry  
**credit: 3 Hours.**
Fundamental chemical and physical concepts applied to geological processes; topics include: origin, distribution, and geochemical behavior of elements; chemical evolution of the Earth; geochemistry of natural waters and sedimentary rocks; isotope geochemistry, crystal chemistry, trace element geochemistry and organic geochemistry. 3 undergraduate hours. 3 graduate hours. Prerequisite: GEOL 101 or GEOL 107; CHEM 104; CHEM 105; MATH 220 or MATH 221; or consent of instructor.

GEOL 470 Introduction to Hydrogeology  
**credit: 4 Hours.**
Introduction to environmental and economic aspects of the occurrence and movement of groundwater through the earth's crust; topics include the hydrologic cycle, groundwater contamination, petroleum migration, formation of mineral resources, and groundwater chemistry. Same as ESE 470. 4 undergraduate hours. 4 graduate hours. Prerequisite: MATH 220 or MATH 221; senior standing is recommended; or consent of instructor.

GEOL 481 Earth Systems Modeling  
**credit: 4 Hours.**
Same as ATMS 421, ESE 421, GEOG 421 and NRES 422. See ATMS 421.

GEOL 483 Challenges of Sustainability  
**credit: 3 Hours.**
Same as ESE 482 and GEOG 482. See ESE 482.

GEOL 484 Paleoclimatology  
**credit: 4 Hours.**
Survey of Earth’s past climate variability, ranging from million-year to interannual time scales. Introduction to paleoclimate proxies including tree rings, marine and lake sediment cores, ice cores, corals, and speleothems. Focus on the drivers of climate change, major modes of climate variability, and how paleoclimatic data can inform projections of future climate change. Same as IB 484. 4 undergraduate hours. 4 graduate hours. Prerequisite: Junior standing required.

GEOL 485 Risk Analysis in Earth Science  
**credit: 3 or 4 Hours.**
Same as ATMS 421, ESE 421, GEOG 421 and NRES 422. See ATMS 421.

GEOL 486 Environmental Consulting  
**credit: 3 Hours.**
Same as ESE 486. See ESE 486.

GEOL 490 Undergraduate Research  
**credit: 1 to 3 Hours.**
Students will conduct research under the direct supervision of a geology faculty member. Research topics will vary, and either a summary paper or a poster presentation at a regional or national science conference is required. 1 to 3 undergraduate hours. No graduate credit. Approved for Letter and S/U grading. May be repeated up to six hours. A maximum of 6 credit hours of GEOL 490 and GEOL 491 may be counted toward graduation. Prerequisite: GEOL 208 or equivalent; Consent of supervising faculty member; advance approval by Department of Geology. Intended primarily for sophomores and juniors; not available to freshman students.

GEOL 491 Honors Undergraduate Research  
**credit: 1 to 3 Hours.**
Students will conduct research for honors credit under the direct supervision of a geology faculty member. Research topics will vary, and either a summary paper or a poster presentation at a regional or national science conference is required. 1 to 3 undergraduate hours. No graduate credit. May be repeated up to 6 hours. A maximum of 6 credit hours of GEOL 490 and GEOL 491 may be counted toward graduation. Prerequisite: GEOL 208 or equivalent; Consent of supervising faculty member; advance approval by Dept. of Geology. Intended primarily for sophomores and juniors who are James Scholars or Chancellor's Scholars; not available to freshman students.
GEOL 492  Senior Thesis  credit: 2 to 8 Hours. (https://courses.illinois.edu/schedule/terms/GEOL/492)
Research in geology, with thesis; a thesis must be submitted for credit to be received. 2 to 8 undergraduate hours. No graduate credit. May be repeated. A maximum of 10 hours of GEOL 492 plus GEOL 493 may be counted toward graduation. Prerequisite: Consent of supervising faculty member.

GEOL 493  Honors Senior Thesis  credit: 2 to 8 Hours. (https://courses.illinois.edu/schedule/terms/GEOL/493)
Research in geology with honors thesis; a thesis must be submitted for credit to be received. 2 to 8 undergraduate hours. No graduate credit. May be repeated. A maximum of 10 hours of GEOL 492 plus GEOL 493 may be counted toward graduation. Prerequisite: Consent of supervising faculty member and of departmental honors advisor.

GEOL 497  Special Topics in Geology  credit: 1 to 4 Hours. (https://courses.illinois.edu/schedule/terms/GEOL/497)
Seminar or lectures in subjects not covered by regular course offerings; for advanced undergraduates and graduate students. Additional fees may apply. See Class Schedule. 1 to 4 undergraduate hours. 1 to 4 graduate hours. May be repeated if topics vary. Prerequisite: Consent of instructor.