REVIEW OF THE B.S. IN GEOLOGY
Classification of Instructional Programs (CIP) Code: 40.0601
Geology/Earth Science, General

OVERVIEW

The B.S. in Geology program at Illinois State University is housed within the Department of Geography, Geology, and the Environment in the College of Arts and Sciences. The department offers three undergraduate degrees in Geography, Geology, and Environmental Systems Science and Sustainability and a graduate M.S. in Hydrogeology, along with several minor programs. The Geology major includes three sequences: Traditional, Accelerated, and Earth and Space Science Education (ESSE), with the latter preparing students for licensure in secondary science education. The curriculum emphasizes both foundational geoscience knowledge and practical skills in fieldwork, laboratory techniques, and data analysis, including GIS, remote sensing, and geospatial modeling. Students benefit from small class sizes, individualized attention from tenure-track faculty, and extensive hands-on learning opportunities through field courses, research projects, and a capstone Field Camp. Graduates are well prepared for careers in geoscience or further study in graduate programs.

Enrollment, Fall Census Day, 2017-2024
B.S., in Geology, Illinois State University
First Majors Only

	2017	2018	2019	2020	2021	2022	2023	2024
Geology sequence	51	48	44	46	32	35	46	46
Traditional Geology accelerated sequence	-	-	-	-	-	-	-	0
Earth and Space Science Teacher Education sequence	17	18	16	16	24	25	26	16
Total	68	66	60	62	56	60	72	62

Degrees Conferred, Graduating Fiscal Year, 2017-2024
B.S., in Geology, Illinois State University
First Majors Only

	2017	2018	2019	2020	2021	2022	2023	2024
Geology sequence	20	9	14	8	5	16	15	10
Traditional Geology accelerated sequence	-	-	-	-	-	-	-	-
Earth and Space Science Teacher Education sequence	6	3	4	4	0	4	4	4
Total	26	12	18	12	5	20	19	14

*Graduating Fiscal Year consists of summer, fall, and spring terms, in that order. For example, Graduating Fiscal Year 2019 consists of the following terms: summer 2020, fall 2020, and spring 2021. Degrees by sequence for 2015 were not available. The accelerated sequence became effective May 20, 2024.

EXECUTIVE SUMMARY
PROGRAM REVIEW SELF-STUDY REPORT

Self-Study Process

The Geology Program self-study process has, in many ways, been ongoing throughout the program review period (2016–2023), either as part of regular Departmental retreats, faculty meetings, or informal conversations among faculty. That this program review year made no difference in our regular operations regarding curriculum discussions, assessment, budgeting, and planning. The Geology Program Faculty (7 TT and 1 AP) meets regularly on a roughly weekly basis provided a quorum can be present. Our meetings during Fall 2023 focused largely on Program Review discussions, including what data we wanted, discussions about those data as they became available, and potential areas of further inquiry. Data were compiled from the Office of Planning, Research, and Policy Analysis (PRPA), the ISU Alumni Office, and our own records. We requested and received help from our subject area librarian, Mr. Joshua Newport, on topics related to Milner Library resources. We administered surveys through Qualtrics to our current students (n=5 respondents) and our alumni (n=70 respondents) especially for this program review. Other annual assessment data is also included. Data reports were generated via PRPA and other internal resources by Interim Chair Dr. Eric Peterson. Dr. Tenley Banik was responsible for data compilation and writing the first draft of the program review, with input from program faculty. The first draft of the report was shared with the faculty and Chair prior to our annual retreat on August 16th, 2024, and was discussed at the retreat and faculty meetings prior to the preparation of the final draft.

Program curriculum

The Geology B.S. curriculum provides specialized training for those students who wish to pursue entry-level employment following completion of the program while simultaneously ensuring the breadth of academic background for those who will pursue graduate studies. Students earn a Geology B.S. degree through one of two sequences: Traditional Geology or Earth and Space Science Education (ESSE). Our curriculum provides a balance between theory and application and includes significant field and laboratory components. As such, new courses are regularly considered and developed to stay in step with new advances in technology and understanding. Both the Geology B.S. ESSE and the Traditional Geology curriculum are in the middle of overhauls.

Program faculty

The Geology Program has seven tenure-line faculty. One faculty member has been on leave since Fall 2022, and one has served as Chair since Summer 2023. All faculty members have Ph.D.s from leading research institutions. Faculty members are recognized university-wide, state-wide, nationally, and internationally as subject-matter experts and for their teaching, scholarship, and service to their specialization. We anticipate a series of hirings during the upcoming program review cycle.

Program goals and quality indices

The specific goals of the ISU Geology Program are:

1. To provide all students with the opportunity to learn about the nature of science and basic scientific principles through the study of geology.
2. To introduce all students to the many ways geology is interwoven into modern civilization.
3. To provide Geology majors with a solid background in the natural sciences.
4. To prepare Geology majors to apply mathematics and computer science as tools for performance in Geology.
5. To provide Geology majors with the range of basic geologic concepts covering the breadth of the discipline.
6. To help students develop the communication, analytical, quantitative, and critical thinking skills necessary for success as a professional scientist.
7. To provide specialized training for those students who wish to pursue entry-level employment following completion of the program while simultaneously ensuring the breadth of academic background for those students who will pursue graduate studies in geology.

Student learning outcomes assessment plan and process

Students who complete the B.S. in Geology are expected to:

1. Be able to identify, describe, and classify common, and some uncommon, Earth materials (minerals and rocks); make scientific observations of these Earth materials in the field and in the laboratory; and interpret their observations in a scientifically sound manner.
2. Be familiar with the arrangement and structure of these Earth materials, including how they originally form and how they are affected by physical, chemical, and biological activity after they form.
3. Develop skill in constructing and interpreting geologic maps.
4. Develop models of the geometry and spatial relations of Earth materials at depth.
5. Develop an appreciation for the enormity of time and the history of the Earth.
6. Develop an appreciation of society's dependence on Earth resources and on the interaction between human activities and the natural environment.
7. Learn the theoretical bases of geology and utilize opportunities to apply theoretical knowledge to field based problems.
8. Develop appropriate analytical and quantitative skills for a career or advanced study in geology.
9. Develop appropriate written and oral communication skills for a career or advanced study in geology.

Our annual assessment procedures have three parts. The first part of assessment occurs in May in GEO 296 Stratigraphy, which is required of all Traditional Geology majors and addresses learning outcomes six and nine. This assessment is based on rubrics used for the GEO 296 research project. The second part our assessment is an exit interview survey that is given electronically to all Geology graduates each May. Response rates for the program review period average ~50%. The third part of our annual assessment occurs at the end of GEO 395 Field Geology, where scores of our students are evaluated in comparison to our expected benchmarks and to the performance of external students who complete the camp. In other words, we expect a minimum level of performance for our outcomes, and we also like to see our cohort of students outperform the external students in their capstone experiences. We also closely evaluate the transcripts of each of our graduates, and we monitor their first career steps.

Specialized accreditation

The Geology B.S. program has no specialized accreditation agency. The Earth and Space Science Education (ESSE) sequence is also part of the teacher education unit at Illinois State accredited by the Council for the Accreditation of Educator Preparation (CAEP).

Responses to recommendations resulting from the previous program review

The previous program review asked the Geology Program to consider 15 issues broadly grouped into areas of maintenance, areas of improvement regarding student retention, recruitment, and diversification; and areas for expansion. We were successful in the ‘maintenance’ items and made improvements in the areas of enrollment and increased racial/ethnic diversity in the program. We have added significant diversity to our capstone field geology course by recruiting international students and students from underrepresented groups from other universities. We increased our community-building efforts and made several curricular changes to attract a greater number of and more diverse students and get students engaged in the program early on to boost retention. Our alumni involvement increased substantially. Several situation-specific items from the last program review were not addressed because those situations did not arise.

Changes in the academic discipline, field, societal need, and program demand

This is an exciting time to be a newly trained geologist in terms of diversity of career avenues, likelihood of gainful career prospects, and ability to change the world. Our program goals and curriculum are currently adequate to meet societal need and workforce demands, as evidenced by >90% of our graduates obtaining employment in the geosciences or going to graduate school. Bachelor-level geoscientists make up much of the geoscience workforce, and positions for entry-level geoscientists are expected to grow rapidly and at a faster-than-average rate over the next decade, with some jobs anticipating upward of 10% growth. Environmental Scientists and Environmental Engineers are expected to enjoy the most growth. This is good for our program and good for the economy of Illinois, which is rich in such employment opportunities. Also on an increasingly upward trajectory is employment related to discovery and acquisition of critical minerals and development of green technologies. As the U.S. looks to increase

low and no-emissions technologies and become more energy-independent, many more jobs will become available nationwide to support this effort. For example, between 2019 and 2022, more than 180,000 jobs were added in critical mineral mining, with the workforce growing at an average of 8% per year and by 25% in 2022 along due to rising demand from battery manufacturers. Current Geology curricular offerings provide opportunities to build all the skills and competencies employers desire; however, certain areas, especially 'computer skills' are rapidly changing in the workforce and therefore merit continual updating and revisiting.

Major findings of this program review self-study

The B.S. in Geology at Illinois State is exemplary at fulfilling its mission and is in an aspirational position relative to other Geology programs in Illinois. Per Geology faculty FTE, Geology at Illinois State has the greatest number of Geology majors served per year and greatest number of graduates than any public Geology program in Illinois. Since the last program review, that position has been strengthened through numerous program improvements. However, significant opportunities for program improvement and growth remain, including continuing to increase diversity in our students and faculty; implementing modern technologies into the curriculum more; and diversifying and growing our field, lab, and research experiences for students.

Initiatives and plans for the next program review cycle

- Remain vigilant in increasing our student diversity, recruitment, and retention efforts
- Modernize our curriculum to stay true to our roots, yet stay in step with industry trends and technologies, and provide more flexible degree pathways to attract and retain students
- Ensure that we continue to be able to offer field experiences in existing and new courses
- Renovate and upgrade research facilities and teaching spaces
- Identify new, stable revenue streams that are outside of state-appropriated funds
- Explore developing metrics to include student research mentoring in an individual faculty member's teaching load and, ideally, reduce teaching loads overall

PROGRAM REVIEW OUTCOME AND RECOMMENDATIONS FROM THE ACADEMIC PLANNING COMMITTEE

Review Outcome. The Academic Planning Committee, as a result of this review process, finds the B.S. in Geology to be in Good Standing.

The Academic Planning Committee commends the B.S. in Geology program for producing an exceptionally thorough and forward-looking self-study report. The program's rigorous curriculum, enriched by field and laboratory experiences, is delivered by a dedicated faculty who are actively engaged in research, mentoring, and curriculum refinement. Alumni testimonies and exit surveys confirm that graduates are well-prepared for advanced study or direct entry into the workforce, contributing to the program's strong reputation and sustained placement success.

In terms of enrollment, despite national trends of fluctuating interest in geosciences, the B.S. in Geology program at Illinois State University has maintained steady to slightly increasing enrollments, demonstrating resilience in attracting both first-time-in-college and transfer students. This stability is attributed in part to intentional recruitment efforts, successful transition support for transfer students, and internal pathways for students who discover geology through General Education courses. The program's early-intervention advisement model, flexible curricular pathways, and accessible faculty have all been instrumental in fostering student retention and timely degree completion.

Student success activities are a particular strength of the program. Well-structured academic advising, proactive mentoring, and hands-on learning opportunities—such as collaborative research projects, internships secured through alumni networks, and a signature field camp capstone experience—nurture a sense of belonging and professional readiness. Ongoing climate surveys and curriculum assessments lead to targeted actions such as adjusting course prerequisites to enhance course accessibility, introducing new scholarships to reduce financial barriers, and developing first-year and transfer student cohort meetings to build community from the start. These

efforts ensure that students not only acquire disciplinary expertise but also develop the broader skill sets—analytical, communicative, cultural—that are increasingly in demand in the geoscience workforce.

Overall, the B.S. in Geology program's data-informed, student-centered, and industry-aligned strategies position it well to adapt to changing educational and professional landscapes. Commitment to equity, diversity, and inclusion; thoughtful curriculum evolution; and robust faculty-student engagement all reflect a program poised for continued success.

Recommendations

In addition to the program's noteworthy efforts and accomplishments, the Academic Planning Committee provided recommendations for consideration. The committee's recommendations outlined below are to be addressed within the next regularly scheduled review cycle. Details describing the actions and outcomes associated with each of the committee's recommendations should be included in the next program review self-study report that is tentatively due October 1, 2032.

Continue implementing and refining the student learning outcomes assessment plan. The committee encourages faculty to continue their implementation of the student learning outcomes assessment plan for the program during the next program review cycle, to continue to utilize information gathered through plan implementation to make program revisions as necessary, and to document how that has been done. The committee encourages faculty to periodically evaluate the effectiveness of the plan in assessing student learning to identify any modifications to the plan faculty may deem necessary.

Continue curricular innovation. Explore opportunities for more substantive curriculum changes that reflect the new geology program goals. Monitor and assess the impact of experiential learning activities.

Addressing the language requirement challenge. Explore strategies to help students complete the foreign language requirement earlier or better understand its relevance. Highlighting how language skills can enhance international collaborations or field work abroad may reduce barriers to timely graduation.

Maintaining and enhancing faculty research and grant activity. Investigate the factors behind recent declines in external funding and scholarly output. Consider faculty development opportunities, mentoring new faculty researchers, or targeted hires in emerging research areas. Strengthening partnerships with external agencies and leveraging alumni networks could also bolster a sustainable research ecosystem.

Succession planning and resource sustainability. Anticipate faculty retirements, changing industry demands, and resource shifts (e.g., closure of the Laboratory for Environmental Analysis). Proactive succession planning, strategic faculty searches, and exploring alternative funding sources will help maintain field camp excellence, ensure research continuity, and preserve the program's distinct hands-on experiences.

Continue collaborations with Milner Library. Build upon a strong existing relationship to evaluate and maintain resource availability. Consider expanding digital resources, integrating information fluency outcomes and assessment into the curriculum, and integrating library tools into assessment plans. Such efforts ensure that both faculty and students have ongoing access to the information and skills needed for effective scholarship.

Stakeholder engagement. Maintaining an ongoing dialogue with appropriate stakeholders throughout the college, university, and external audiences. Consider leveraging the program's high job placement rates to further improve relationship with alumni and employers. Utilize tools such as SteppingBlocks to improve knowledge of alumni outcomes and maintain post-graduation connections.