

UNDERGRADUATE COUNCIL
Request for Change(s)

Originating unit requesting change Geological Sciences

Type of Change requested:

- | | | |
|---|---|--|
| <input type="checkbox"/> Course number(s) | <input type="checkbox"/> Course prerequisite(s) | <input checked="" type="checkbox"/> Program title |
| <input type="checkbox"/> Course title | <input type="checkbox"/> Drop course(s) | <input checked="" type="checkbox"/> Program description |
| <input type="checkbox"/> Course description | <input type="checkbox"/> Drop program(s) | <input checked="" type="checkbox"/> Program requirements |

Semester and year change(s) take effect: Fall 2020

Appropriate computer abbreviation if course title is more than 30 spaces: _____

Briefly summarize the change requested:

We are requesting a change in program title and description for our Applied Geosciences undergraduate degree. The new program title will be "Earth System Science" and the new catalog description should read as provided below.

Catalog copy

Present catalog copy (paste-up from catalog is acceptable).

Applied Geoscience

The major in applied geoscience is available on the BS degree. The degree combines geology, environmental science and geospatial technology; students completing it analyze, manage and map earth resources, water and groundwater resources, soils and sediment, pollution/contaminants and regulations.

Students completing this degree have the potential to pursue their Geoscientist-in-Training (GIT) license for the state of Texas and select from four geoscience certificate options.

Administration and Advising
Each student prepares a program of study designed, with an adviser,

Pass/No-Credit Option
See the Bachelor's Degree Definitions and

Proposed change(s). (Include exact catalog copy as desired. Underline changes)

Earth Systems Science

The major in Earth System Science is available on the BS degree. The curriculum uses a hands-on, systems thinking approach in preparing students, while focusing on the integration of the natural sciences, data science and modern geospatial technologies to understand and develop science-based solutions to addressing current and future challenges of a rapidly changing Earth including areas such as climate, energy, natural hazards, natural resources, pollution control and remediation.

The degree is suitable for students with interest in graduate school within a geoscience discipline, interdisciplinary sciences and academic or industry careers at the nexus of science, engineering and technology.

Regulations (p. 36) in the Bachelor's Degree section of the University requirements.

Up to (but no more than) 3 hours earned in elective courses offered only on a pass/no-credit basis may be applied to meet major or minor requirements within the College of Science & Engineering. Additional hours in such courses may be used as free electives or for majors or minors in other colleges (as permitted by those colleges).

Geoscience Fundamentals Exam

The Fundamentals of Geoscience (FG) exam is administered in the spring and fall by the Association of State Boards of Geology (ASBOG). Students pursuing licensing as a professional geoscientist are advised to take the fundamentals exam immediately following graduation. More information is available from the Texas Board of Professional Geoscientists at <https://tbpge.state.tx.us> and ASBOG at www.asbog.org.

Administration and Advising

Each student will work closely with a faculty advisor to prepare a customized program of study with options for pursuing a general track or one of several specialized tracks in Geospatial Science and Technology, Hydrologic Sciences, Biogeochemistry or Earth Science Education.

Pass/No-Credit Option

See the Bachelor's Degree Definitions and Regulations (p. 36) in the Bachelor's Degree section of the University requirements.

Up to (but no more than) 3 hours earned in elective courses offered only on a pass/no-credit basis may be applied to meet major or minor requirements within the College of Science & Engineering. Additional hours in such courses may be used as free electives or for majors or minors in other colleges (as permitted by those colleges).

1. What is the justification for the change(s) requested?

National trends point to the increasing diversification of the Geological Sciences to address grand global challenges related to a rapidly changing Earth and increasing pressures on its limited resources. This has led to many departments introducing Earth System Science, or similar degrees, in addition to the traditional Geology degree. The continued rise in these complementary degrees at both undergraduate and graduate levels can be seen via a google search of "Earth System Science degrees". The emergence of this field of study has also been chronicled in several recent peer-reviewed articles e.g. [The emergence and evolution of Earth System Science](#)

The focus of Earth System Science degrees and the impetus for this requested change is to provide students with the transdisciplinary and integrative skillset needed for understanding 1) Earth as a system driven by interactions between its geology, chemistry, biology and physics; 2) the integration of technology, data science and modeling into the study of Earth system dynamics and 3) cause, impacts and solutions to a changing Earth from a fundamental science perspective.

The current Applied Geoscience degree, while useful as a technical degree, is limited in the scope of skill set and does not offer many post-graduation prospects for students. That is, scope for the current Applied Geosciences degree is limited to local and regional entry-level support/technician roles in the energy or environmental sectors with little prospects for graduate school. With recent unit alignments and strategic hiring of faculty - at the departmental, college and university-level - coinciding with the University's Lead-On initiative we see this as the optimal time to be pro-active in taking steps to revamp our programs in-line with emerging trends and peers across the nation.

We believe that such a shift will enhance our student numbers as well as put our students in more a competitive position for jobs and graduate education in emergent and inter-disciplinary opportunities at the nexus of science, engineering and technology.

2. If applicable, explain how the change(s) will affect the current program outcomes and assessment mechanisms.

We anticipate, and is targeting, two specific program outcomes with this change. The first is an increase in enrollment of students, who do not want a traditional geology degree, but are interested in understanding how the Earth works as system and subsequently, how this understanding can be parlayed into the development of the critical-thinking and practical skills needed to address grand challenges associated with complex issues such as climate, pollution or resource scarcity. We believe there is a great probability of this happening based on 1) increasing student interest in interdisciplinary education and 2) evidence from literature and other geology programs which show increasing or stable numbers with introduction of Earth System Science degrees. For example, it is quite normal for the number of students in traditional geology programs to fluctuate with crude oil prices. Evidence coming out of programs with an Earth System Science, or similar degree, option point to increasing or stable student numbers irrespective of crude oil prices.

Our second targeted outcome is an increase in the placement of students in entry-level level jobs and graduate programs across the country.

3. **Faculty Resources:** How will the unit provide faculty support for this change and any other impact this change may have on other current departmental listings.

We do not anticipate any immediate change in the support needed by faculty. We recognize that some modifications of course offerings may be necessary as the curriculum evolves but we will address those on an as-needed basis.

4. **Educational Resources:** Will this change require additional resources not currently available (e.g. space, equipment, library, other)? ☐ YES
If yes, list additional resources needed. ☒ NO

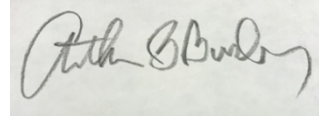
No additional resources needed for current requested change to program.

5. If this change affects other units of the University, include a statement signed by the chairperson(s) of the affected unit(s).

We do not anticipate that the request will would affect the functioning of other departments. However, we anticipate that as the curriculum evolves, collaboration with other departments may be necessary. We will engage such departments as the need arises.

6. If cross-listed, provide evidence of approval by all curriculum committees appropriate to both the originating and cross-listed units.

Not Applicable

A handwritten signature in dark ink, appearing to read "Arthur B. Borden". The signature is written in a cursive style with a large, prominent initial "A".

Approval signature of chairperson of originating unit