TO: The Academic Senate  
FROM: Committee on Instruction and Curriculum (CIC)  
SUBJECT: 16-17 CIC 13: Revision request for B.S. Geology  
PURPOSE: Information to the Academic Senate  
ACTION REQUESTED: That the Senate accept the information that the revision request for B.S. Geology has been approved by CIC.

BACKGROUND INFORMATION:  
The Senate process for approving transformed degree programs for the semester calendar is defined by 14-15 CIC 36. The Committee discussed the B.S. Geology program at its October 10 meeting, which was attended by representatives from the Department of Earth and Environmental Sciences. It was approved by CIC unanimously with the acknowledgement that some non-substantive changes may occur in the Catalog copy. The proposal may be viewed within Curriculog; the summary is attached as a PDF document per ExCom’s request.
Geology, B.S.

2. Semester Conversion Request for Approval of Revision of the Undergraduate Degree Program/Major

General Catalog Information

***READ BEFORE YOU BEGIN***

Use this form to request a revision to your Undergraduate Degree Program/Major and its concentration(s).

To change the title of your degree program, a narrative will need to be submitted to APGS for review by CIC and the state chancellor's office. Click here to submit your narrative.

To move an existing degree to online, complete form #7. Semester Conversion Request for Online/Hybrid Program Modification.

To elevate an option to a degree or change the degree type, a narrative will need to be submitted to APGS for review by CIC and the state chancellor's office, Click here to submit your narrative.

Turn on Help Text by clicking the Show Help Text icon above this section of the form.

Effective Term: Fall 2018
Catalog: 2018-2019

Select Shared Core unless otherwise instructed by APGS

Notes: If you want to move an existing degree program to online (i.e. 50% or more of the program can be completed online (a hybrid course counts as .50 online), elevate an option to a degree, or change the degree type, please e-mail Donna Wiley, Interim Associate Vice President, Academic Programs and Graduate Studies; and copy Sarah Aubert, Catalog and
Curriculum Specialist, Academic Programs and Graduate Studies, for additional instructions as soon as possible.

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<tr>
<th>Department:*</th>
<th>Department of Earth and Environmental Sciences</th>
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<tr>
<th>Full and exact title of Major including degree earned:*</th>
<th>Geology, B.S.</th>
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<tr>
<th>Has your program received transformation funding?*</th>
<th>Yes</th>
<th>No</th>
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If the program received transformation funding, please summarize the transformative changes made:

The BS degree program was transformed to emphasize the emerging importance of strong field training, near surface geologic environments and processes and to focus on topics relevant to our community especially in the areas of natural hazards and anthropogenic global change. Both our 5-year review and the following CAPR review identified a dedicated field program as a required goal for our program. Our new field experience sequence returns a crucial field component to our curriculum, and replaces a traditional 5-week field course with a series of 3 field courses: a 1-week lower-division, general introductory field course, and a choice of two 2-week upper-division field courses that specialize in areas of faculty expertise (c.f. field mapping, hydrogeology, geophysics, soil geochemistry, etc.). This will allow students to gain 5 weeks of focused field experience within our program, and without having to apply to- and attend intensive field course at other institutions. The program will more effectively prepare our students for entry-level field positions and subsequent academic study.
Program Description

Geology is the study of the earth and of life and the natural processes occurring on the planet through time. Students learn about the causes of processes such as earthquakes, volcanoes, the formation of mountains, the effect of erosion and deposition, and the formation of rocks and minerals and their uses. Coursework combined with observations on field trips provide Cal State East Bay students with an understanding of natural processes and the human impact on the environment.

The undergraduate degree programs consist of required courses plus electives designed to meet the needs of students with objectives including employment at the Bachelor's degree level, preparation for a secondary school teaching credential, and graduate study in Geology. The Geology, B.S. program is the primary professional degree program in Geology offered by the department, and serves as preparation for employment in the field, usually in a technical capacity. The Geology, B.A. program offers the student a greater degree of flexibility and may be more appropriate for those who do not necessarily plan to become professional geologists or pursue graduate study. (Note: Transfer from the Geology, B.A. to the Geology, B.S. program or vice versa can be accomplished.) Students wishing to do independent geological work professionally should plan on graduate study; see the M.S. program in Environmental Geosciences in the Department of Earth and Environmental Sciences.

The Department of Earth and Environmental Sciences offers undergraduate study leading to the Bachelor of Science degree in Geology, focusing on developing strong foundational knowledge and a broad set of field and laboratory skills that allow students to seek employment, or prepare them for continued academic study in the Earth sciences.

The Bachelor of Science (B.S.) program is designed to prepare students for:

- Entry-level employment as geologists and environmental scientists in government (city, county, regional, state, and federal) and private consulting firms (environmental, engineering, and geotechnical firms, mining and oil companies, etc.).
- Graduate study in environmental science, geology, geochemistry and geophysics.
- K-12 earth science teaching.

The undergraduate Geology programs emphasize field and laboratory training. Many opportunities for field and laboratory research exist throughout northern California and elsewhere. Our B.S. and B.A. programs reflect departmental expertise by focusing on near-surface processes, hazards and resources, and concentrates on issues of regional and local importance to our community. Rigorous coursework is augmented by embedded and sequential field experiences that integrate classroom concepts in natural laboratories. Seminars and topical courses address diverse subjects, for example: geochemical evolution of groundwater,
natural tracers of geologic processes, tectonic geomorphology, earthquake hazards, bay area tectonics, near-surface geophysics, and modern depositional environments. We maintain strong connections with East Bay Regional Parks, the California Environmental Protection Agency, Lawrence Livermore National Laboratory, NASA Ames, the U.S. Geological Survey in Menlo Park, and SLAC National Accelerator Laboratory.

Students with strong records in the B.S. degree may be able to engage in guided, individual research, working with faculty on their research. Students wishing to pursue senior thesis should make contact with a faculty advisor at least one full semester in advance to discuss topic and feasibility.

The Earth & Environmental Science Club, a student-run organization, sponsors a variety of activities including guest speakers, field trips, employment workshops, and student-faculty gatherings. The club is an important part of department life, providing students with opportunities to make professional contacts, to explore graduate school and professional options, and to enjoy the company of others with similar interests.

Career Opportunities

- Engineering Geologist
- Environmental Geologist
- Geochemist
- Geologist
- Geophysicist
- Hydrologist
- Mineralogist
- Paleontologist
- Park Ranger
- Petrologist
- Seismologist
- Soils Engineer
- Stratigrapher
- Oceanographer

Program Learning Outcomes

Students graduating with a BS/BA in Geology will be able to:

I. Develop foundational knowledge in geologic materials, processes & time

ILOs: 1, 4, 6

Identify and classify geologic materials and know their material and/or biological properties or characteristics. Recognize and understand the fundamental geological processes, distribution of natural resources, the magnitude and importance of geologic time, and its role in geologic processes and evolution. Understand and apply basic principles of chemistry and...
Understand and apply basic principles of chemistry and physics to geologic issues.
Understand the fundamental principles and subjects that form the core topics of Earth Science.

II. Develop fundamental geological field and laboratory skills and computer competence

ILOs: 1, 3, 4, 5, 6

Identify and classify, in the field, basic geologic materials, including minerals, rocks, fossils, structures, and landforms. Collect, describe and organize samples of geologic materials in support of field investigations. Create basic types of geologic maps with standard geology symbols, using standard field measurement techniques and equipment. Perform basic types of geologic analysis, such as lithostratigraphic and biostratigraphic correlation, map construction, geophysical and hydrogeological studies, and cross-section construction. Visualize and comprehend geological materials or structures in 3D based on 1D and 2D data sets. Demonstrate competence in basic computer tools and software, and Internet utilization, and can utilize appropriate software for geological analysis.

III. Integrate and analyze geologic information through synthesis & critical thinking

ILOs: 1, 4, 5, 6

Interpret geological terrains (local & regional) by synthesis of literature, field and laboratory studies, to create maps, sections and reports that accurately and effectively illustrate the surficial distribution and 3D geometry of geologic materials and structures (rock, faults, geo-fluids, hazardous waste, etc.). Access, critically read and critique research literature and geologic datasets (2D and 3D) using discipline-specific methods, techniques and equipment. Analyze, interpret, and integrate diverse datasets to address and solve geological and scientific problems.

IV. Develop oral and written communication, and collaborative skills

ILOs: 1, 2, 3, 4, 5, 6

Critically analyze geological and environmental issues by evaluation of scientific literature, and then present their positions clearly and persuasively in written form through words, graphs, and tables, using appropriate formats. Effectively communicate orally using prepared presentations.
Effectively communicate orally using prepared presentations. Understand the importance of hearing, considering and integrating competing and/or contrary points of view to the scientific process.
Understand the complex issues and relationships that exist between local community and global needs for earth materials (fossil fuels, mineral reserves, water, etc.) and the effects of climate change on vulnerable populations.
Work responsibly as a member of a team, demonstrate professional levels of conduct, and communicate effectively with team members through personal and electronic means.

V. Understand the impact of the Earth Sciences on local-to-global sustainability and their role as an ethical scientist

ILOs: 1, 2, 3, 4, 5

Understand Earth’s place in the Universe, global-scale processes such as climate change, plate tectonics, earth systems interactions and rates, and the forcing factors/feedbacks that control them.
Have the breadth of education necessary to understand the importance of the Earth Sciences and technology in a global and societal context, and understands the effect of resource consumption on, and the importance of local-to-global-scale sustainability efforts.
Have knowledge of contemporary issues, such as sustainable resource development and the prediction of geological hazards.
Carry out responsibilities in a professional and ethical manner.

See instructions here before completing the following Major Requirements field.

Major Requirements:

To revise an existing concentration (formerly option) or create a new concentration, select form 3a. Semester Conversion Request for Approval of New or Revised Undergraduate Concentration.

Total Units Required

<table>
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<tr>
<th>Quarter Based Program:*</th>
<th>108 major, 180 total</th>
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</thead>
<tbody>
<tr>
<td>Semester Based Program:*</td>
<td>70-71 major, 119 total</td>
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</tbody>
</table>
Total Units should not exceed **120 Semester Units** unless previously approved by Chancellor's Office for exemption.

**B.A. Programs**: Major requirements are a minimum of 24 units with at least 12 upper division units.

**B.S. Programs**: Major requirements are a minimum of 36 units with at least 18 upper division units.

See [Unit Calculator](https://csueastbay.curriculog.com/proposal:2288/print) for assistance.

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**Additional Notes/Information**

i. Students may take the three semester physics sequence (PHYS 135, 136, 137) as an alternative to PHYS 125 and 126, in place of one upper division elective

ii. The advanced field class, GEOL 397 will be taken twice, but with different subject matter.

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If the program has a similar transfer model curriculum (TMC), please e-mail Kyle Burch, Articulation Officer, Academic Programs and Graduate Studies, to verify that the revised program meets the TMC requirements prior to submitting the program revision request form.

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**Is the major approved as a "similar" degree under the STAR Act (SB 1440)?**

- Yes
- No
- I'm not sure (Articulation Office will contact you)

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**If yes, explain how this modification will affect the "similar" degree agreement**

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**Were any concentrations (options) discontinued?**

- Yes
- No
| Resource implications of the proposed revision, if any: | Proposed field experience course(s) (GEOL 297 & GEOL397) will require funds for transportation, lodging, and food. Estimated costs per unit per student are $600. Anticipated sources of funding are: EIRA fund for transportation, Student course fee for lodging and food. |
| Relationship of Revised Program to requirements for teaching credentials, accreditation, and/or licensing, if any: | Consultation with other affected departments and programs: |
| The following department(s) has (have) been consulted and | The following department(s) has (have) been |

If yes, please explain below. If no, please enter "N/A" or "not applicable."* N/A

Is this major approved as an online degree program?* Yes  No

If no, is there any pathway in the revised degree that is more than 50% online? Yes  No
raised no objections:

- Department of Biological Sciences
- Department of Chemistry and Biochemistry
- Department of Physics

consulted and raised concerns:

- No objections raised from consulted departments.

Attachments

Please scroll to the top of this form and select the Files icon to attach the following documents to your proposal:

- Bachelor's Degree Roadmap
- Curriculum Map 1 - PLOs to Courses
- Curriculum Map 2 - PLOs to ILOs
- Five Year Assessment Plan

Did you attach your Curriculum Maps, Five Year Assessment Plan or other supporting documents to this proposal?*

- Yes
- No

Catalog Item Types

Degree Type*

- Bachelor of Science

Program Type*

- Bachelor