COMMITTEE ON INSTRUCTION AND CURRICULUM

16-17 CIC 65
Monday, January 30, 2017

TO: The Academic Senate

FROM: Committee on Instruction and Curriculum (CIC)

SUBJECT: 16-17 CIC 65 Approval of M.S. Environmental Geosciences

PURPOSE: Approval of the Academic Senate

ACTION REQUESTED: That the Senate approve the request for M.S. Environmental Geosciences. Upon the President’s signature, effective with the semester Catalog, planned for Fall, 2018.

BACKGROUND INFORMATION:
The Senate process for approving transformed degree programs for the semester calendar is defined by 14-15 CIC 36. The Graduate Programs Subcommittee discussed the M.S. Geology program at its January 11, 2017 meeting, which was attended by representatives from the Department of Earth and Environmental Sciences. At that meeting, the curriculum was approved unanimously with the acknowledgement that some non-substantive changes may occur in the Catalog copy. The Subcommittee voted by email to recommend approval of the name change after the Department revised its name change proposal based on feedback from the subcommittee. The proposal may be viewed within Curriculog; the summary is attached as a PDF document per ExCom’s request.

Since the program is currently called M.S. Geology and is seeking to change its name to M.S. Environmental Geosciences, the name change requires Senate approval. Ultimately, if the Senate and the President approve the change, the program will also require approval from the Board of Trustees, as well. CIC voted unanimously to recommend approval of the name change at its January 30, 2017 meeting.

The justification provided by the Department is attached, as is the information from Curriculog.
The Cal State East Bay Department of Earth and Environmental Sciences is requesting to change the name of its graduate program from “Master of Science in Geology” to “Master of Science in Environmental Geosciences”. The purpose of the proposed name change is two-fold: 1) to more accurately reflect the emphasis of the coursework, direction of the Department, and faculty research areas; and 2) to enhance recruitment of students who plan a career in environmental consulting, hazards mitigation, regulatory compliance, or sustainability. Under the program transformation from quarters to semesters, the course curriculum is being modified to emphasize environmental science aspects of the geosciences, over the more traditional areas of geology. Furthermore, under quarters, the department offered an option in Environmental Geology and most students chose this option – there are no concentrations under the semester program so the new name more closely reflects the prior, popular option.

The M.S. in Geology degree program has a long history of providing an evening program for working professionals in the east bay. The program has a thesis track, requiring original research, a university thesis, and an oral defense, as well as a project track, with more course work and a research project approved by a faculty mentor. The total number of majors, or student headcount, in the Geology MS program was 19 in Fall Quarter 2014. This is a modest increase above the average number of majors from 2010-2014 which was 14.8. The graduation rate has increased as well, with the number of degrees awarded going from 1-2 in 2010-2012 to 6-8 in 2013-15.

In the transformed semester curriculum, environmental geoscience topics that will be presented in courses and available as areas of research include bay area tectonics and associated hazards such as earthquakes and landslides, climate change effects and mitigation, characterization and remediation of water resources, and characterization of near surface processes and materials. The list of elective courses reflects this new emphasis and de-emphasizes topics such as petrology, solid earth geophysics, and exploration geology. The Environmental Geosciences moniker is also more accurate because faculty expertise is in these areas, and because the department’s five year plan includes hiring additional faculty with research interests in these areas.

For at least ten years, a majority of the graduates of our program have been employed in environmental consulting (including hydrogeology, engineering geology, hazards assessment, site characterization). Other common jobs are in regulatory compliance and R&D. Even students who obtain employment in the traditional fields of fossil fuel production typically work on the environmental aspects of energy production at these companies. The degree name, Master of Science in Environmental Geosciences, is therefore likely to attract applicants who are working professionals and students with bachelor’s degrees in Geology, Environmental Science, and other Physical Sciences.

There is no clear consensus on a name for an M.S. degree program that includes both geology and environmental science courses. We compare our degree program to similar programs with various names in the chart below. Like our proposed degree program, electives or multiple choices from groups
of courses make up a large portion of the total units in many programs, and most programs allow electives from related STEM disciplines.

<table>
<thead>
<tr>
<th>Campus</th>
<th>Degree Program Name</th>
<th>Degree Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSU East Bay</td>
<td>MS Environmental Geosciences*</td>
<td>32 units&lt;br&gt;GEOL 601 Professional Ethics (1)&lt;br&gt;GEOL 602 Graduate Seminar (2)&lt;br&gt;One course from:&lt;br&gt;GEOL 621 Near Surface Geophysics (4)&lt;br&gt;GEOL 622 Seismic Exploration (4)&lt;br&gt;GEOL 641 Earthquake Geology (4)&lt;br&gt;One course from:&lt;br&gt;GEOL 631 Isotope Geochemistry (4)&lt;br&gt;GEOL 634 Biogeochemistry (4)&lt;br&gt;GEOL 633 The Science of Soils (4)&lt;br&gt;GEOL 646 Quaternary Science (4)&lt;br&gt;One course from:&lt;br&gt;GEOL 632 Contaminant Transport in Groundwater (4)&lt;br&gt;GEOL 643 Tectonic Geomorphology (4)&lt;br&gt;GEOL 644 Structural Styles (4)&lt;br&gt;GEOL 646 Engineering Geology (4)&lt;br&gt;GEOL 650 Professional Certification Preparation (3)&lt;br&gt;GEOL 671 Field Experience (1-2)&lt;br&gt;Up to 9 units may be in courses from other STEM disciplines&lt;br&gt;Capstone Experience: Thesis or Project (6 or 2)</td>
</tr>
<tr>
<td>Chico State</td>
<td>MS Geosciences</td>
<td>30 units&lt;br&gt;Required Core: 11&lt;br&gt;Seminar I and II&lt;br&gt;Hydrogeochemistry&lt;br&gt;Advanced Topics in Geology&lt;br&gt;Geotectonic Development of California&lt;br&gt;Numerical Analysis or Environmental Monitoring (2-3)&lt;br&gt;thesis (1-6)&lt;br&gt;Courses approved by graduate advisory committee (10-16)</td>
</tr>
<tr>
<td>Chico State</td>
<td>MS Environmental Science</td>
<td>30 units&lt;br&gt;Required Core: 12-15&lt;br&gt;Seminar I and II&lt;br&gt;Hydrogeochemistry&lt;br&gt;Numerical Analysis&lt;br&gt;600 level course in Biology or Chemistry&lt;br&gt;Environmental Monitoring OR Geotectonic Development of California&lt;br&gt;Thesis (1-6)&lt;br&gt;Courses approved by the graduate advisory committee (9-16)</td>
</tr>
<tr>
<td>Institution</td>
<td>Program</td>
<td>Credits</td>
</tr>
<tr>
<td>-------------------</td>
<td>--------------------------------</td>
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</tr>
</tbody>
</table>
| Humboldt State    | MS Environmental Systems, Geology option | 30 units | Required: (23-28)  
Colloquium in Environmental Systems (1-3)  
Data Collection & Analysis (4)  
Fluvial Processes (3)  
Hillslope Processes (3)  
Quaternary Stratigraphy (4)  
Advanced Geology Field Methods (2)  
Neotectonics (3)  
+thesis (3-6)  
Electives: approved upper division and graduate electives to reach 30 unit minimum from other programs |
| Michigan State U  | MS Environmental Geosciences    | 30 units | Required:  
Environmental Geosciences (1)  
3 or 4 units from:  
Pollutants in the Soil Environment  
Clay Mineralogy and Soils Genesis  
Interfacial Environmental Chemistry  
3 units from:  
Environmental Geochemistry  
Aqueous Geochemistry  
Isotope Geochemistry  
3 or 4 units from:  
Engineering Hydrology  
Groundwater Hydraulics  
Hydrogeology  
Thesis (4-7)  
Elective: 13-16 units |
| Fresno State      | MS Geology                      | 30 units | Required: (9)  
Graduate Seminar (3)  
Thesis (6)  
Elective: 21 units, upper division and graduate electives in geology and related fields such as chemistry, biology, physics, engineering, mathematics |
of courses make up a large portion of the total units in many programs, and most programs allow electives from related STEM disciplines.

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<th>Campus</th>
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</table>
| CSU East Bay   | MS Environmental Geosciences*        | 32 units  
|                | **Required Core: (5 to 9)**          | Professional Ethics (1)  
|                |                                    | Graduate Seminar (2)  
|                |                                    | thesis or project (6 or 2)  
|                | **Electives: (course schedule rotates through A, B, C groups, 24 to 27 units)** | A Near Surface Geophysics (4)  
|                |                                    | A Seismic Exploration (4)  
|                |                                    | A Earthquake Geology (4)  
|                |                                    | B Isotope Geochemistry (4)  
|                |                                    | B Biogeochemistry (4)  
|                |                                    | B The Science of Soils (4)  
|                |                                    | B Quaternary Science (4)  
|                |                                    | C Contaminant Transport in Groundwater (4)  
|                |                                    | C Tectonic Geomorphology (4)  
|                |                                    | C Structural Styles (4)  
|                |                                    | C Engineering Geology (4)  
|                |                                    | Professional Certification Preparation (3)  
|                |                                    | Field Experience (1-2)  
|                |                                    | up to 9 units may be in courses from other STEM disciplines |
| Chico State    | MS Geosciences                       | 30 units  
|                | **Required Core: 11**                | Seminar I and II  
|                |                                    | Hydrogeochemistry  
|                |                                    | Advanced Topics in Geology  
|                |                                    | Geotectonic Development of California  
|                |                                    | Numerical Analysis or Environmental Monitoring (2-3)  
|                |                                    | thesis (1-6)  
|                |                                    | Courses approved by graduate advisory committee (10-16) |
| Chico State    | MS Environmental Science             | 30 units  
|                | **Required Core: 12-15**             | Seminar I and II  
|                |                                    | Hydrogeochemistry  
|                |                                    | Numerical Analysis  
|                |                                    | 600 level course in Biology or Chemistry  
<p>|                |                                    | Environmental Monitoring OR Geotectonic Development of California |</p>
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<th>Required Courses</th>
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<td>Humboldt State</td>
<td>MS Environmental Systems, Geology</td>
<td>30</td>
<td>Colloquium in Environmental Systems (1-3), Data Collection &amp; Analysis (4), Fluvial Processes (3), Hillslope Processes (3), Quaternary Stratigraphy (4), Advanced Geology Field Methods (2), Neotectonics (3), +thesis (3-6)</td>
</tr>
<tr>
<td>Michigan State U</td>
<td>MS Environmental Geosciences</td>
<td>30</td>
<td>Environmental Geosciences (1), 3 or 4 units from: Pollutants in the Soil Environment, Clay Mineralogy and Soils Genesis, Interfacial Environmental Chemistry, 3 units from: Environmental Geochemistry, Aqueous Geochemistry, Isotope Geochemistry, 3 or 4 units from: Engineering Hydrology, Groundwater Hydraulics, Hydrogeology, Thesis (4-7), Elective: 13-16 units</td>
</tr>
<tr>
<td>Fresno State</td>
<td>MS Geology</td>
<td>30</td>
<td>Graduate Seminar (3), Thesis (6), Elective: 21 units, upper division and graduate electives in geology and related fields such as chemistry, biology, physics, engineering, mathematics</td>
</tr>
</tbody>
</table>
Master of Science in Environmental Geosciences

1. Semester Conversion Request for Approval of Revision of the Graduate Degree Program/Major

General Catalog Information

Please see the Guidelines for Master’s Program Conversion

Select Shared Core unless otherwise instructed by APGS

Select SHARED CORE

Program

Shared Core

First Year of Offering: Fall 2018

Effective Catalog: 2018-2019

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 hybri 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.

Department:*

Department of Earth and Environmental Sciences

Full and exact title of Major including degree earned:* Master of Science in Environmental Geosciences

Has your program recieved transformation funding? Yes No

If the program received transformation funding, please summarize the transformative changes made: The degree program was transformed to emphasize near surface geologic processes and to include more environmental science topics. The new program adds a field course component, a professional ethics component, and new course offerings tailored to the vocation as currently practiced at the professional level. The program will prepare students who enter into either the professional or academic career track.
Program Description

The Department of Earth and Environmental Sciences offers graduate study leading to the Master of Science degree in Environmental Geosciences, focusing on near surface and environmental geology, seismic hazards and Bay Area tectonics, and water and soil characterization and remediation.

This program is designed to prepare students for:

- 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.);
- professional licensing requirements;
- doctoral study in environmental science, geology, geochemistry, and geophysics; and
- teaching at the Community College level

The department also provides continuing education for professional geologists, engineers, planners, etc.

Our M.S. program is unique in the bay area in that many courses are offered in the evenings, and augmented by field experiences. Graduate seminars 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.

Candidates for the M.S. degree will engage in significant, guided, individual research. Recent M.S. thesis and project research topics include near surface geophysics, groundwater dating, groundwater nitrate source identification, local catchment characterization, surface water-groundwater interaction, geologic mapping, slope stability, geochemistry, Bay Area structural geology, engineering geology, and neotectonics. Prospective candidates should determine whether their research interests coincide with
those of the faculty members before applying to the program. We invite interested persons to contact the department faculty directly for more details on the program. The Graduate Coordinator provides guidance that enables students to complete the requirements for advancement in the graduate program.

Career Opportunities

a. Scientist for federal, state, or local regulatory, governmental, or research agency
b. Project leader, geologist, or hydrogeologist at environmental consulting company
c. Geologist or geophysicist for energy company
d. Instructor at community college
e. Engineering geologist for consulting company or regulatory agency
f. Research scientist at National Laboratory

Admission Requirements

The M.S. degree program is open to any student in possession of a baccalaureate degree in Geology, Environmental Science, or a closely related field, with coursework substantially equivalent to the core requirements for the B.S. degree in Geology or Environmental Science at CSU East Bay. Students who do not meet those requirements will be considered on an individual basis and accepted only after approval by a majority of regular faculty members.

Students may be admitted with "Conditionally Classified Graduate" until the qualifications listed under "Classified Graduate" status below are satisfied.

Applicants must have a GPA of at least 2.75 in all undergraduate work. Any undergraduate core course with a "D" grade will have to be repeated. Students transferring from another graduate program must have a GPA of at least 3.0 in all graduate geology or environmental science courses. (No more than 12 units may be transferred.)

Applications must be accompanied by two letters of recommendation from faculty members or work supervisors.

Student Standing and Progress Toward the Degree

Conditionally Classified Graduate Status
Students who are otherwise qualified but have course deficiencies and/or have not satisfied the University Writing Skills requirement, will be accepted as "Conditionally Classified Graduate" students. Course deficiencies may be removed by enrolling on either a "CR/NC" or graded basis.

**Classified Graduate Status**

Students who fulfill all the requirements for admission to the program will be accorded "Classified Graduate" status once they have satisfied the University Writing Skills requirement. All deficiencies have to be removed, and the University Writing Skills requirement satisfied no later than the completion of 12 units of coursework applicable to the degree or the student may be disqualified.

**Selection of Thesis/Project or Academic Advisor**

Students should meet with an academic advisor upon enrollment. Students will choose a thesis or project advisor based on their area of interest and faculty availability. Students should contact a prospective research advisor prior to applying but research topics may change during the first year when the focus is on coursework.

**Advancement to Candidacy**

In order to be Advanced to Candidacy, the student must have:

- been accorded "Classified Graduate" status
- been assigned a thesis or graduate project advisor; and
- submitted to the department an acceptable Prospectus describing the thesis research or graduate project work to be attempted (guidelines for preparation of the Prospectus may be obtained from the department office). The research topic must be approved in advance by the advisor.

**Program Learning Outcomes**

**Students graduating with an M.S. in Environmental Geosciences will:**

Demonstrate advanced knowledge of geologic materials, processes & time (Knowledge)
ILO: 5, 6

Recognize and understand the fundamental geological processes, complex system interactions, distribution of natural resources, the magnitude and importance of geologic time, and its role in geologic processes and evolution. Understand and apply principles of chemistry and physics to geologic and environmental issues. Understand the fundamental principles and subjects that form the core topics of Earth Science.

Demonstrate proficiency in geological and environmental field, computing and laboratory applications (Synthesis)

ILOs: 1, 4, 5, 6

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

Perform original research by integration and analysis of geologic and environmental information and data sets (Research)

ILOs: 1, 2, 6

Can 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.).
Can access, critically read and critique research literature and geologic datasets (2D and 3D) using discipline-specific methods, techniques and equipment.
Can analyze, interpret, and integrate diverse datasets to address and solve geological and scientific problems.

**Demonstrate skills in effective oral and written communication in multiple contexts, including collaborative work and professional settings (Communication)**

**ILOs: 2, 3, 4, 6**

Can effectively communicate orally using prepared presentations at the professional meeting level
Understands the importance of hearing, considering and integrating competing and/or contrary points of view to the scientific process.
Can work responsibly as a member of a team, demonstrate professional levels of conduct, and communicate effectively with team members through personal and electronic means.

**Participate in an ethical community of scientists who recognize the importance of sustainability, the role of science in society, and the value of life-long learning (Global)**

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

Understands 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.
Has 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.
Applies knowledge of contemporary issues, such as sustainable resource development and the prediction of geological hazards.
Carries out responsibilities in a professional and ethical manner.
Please read before completing Major Requirements Section

Instructions:

Start with the View Curriculum Courses icon directly beneath the Major Requirements field. Select the Add Courses button to enter each individual course that will be used in your Major Program. (Optional: Include the Course Units in the Course Title (name) field for ease of review by campus committees). Next select the View Curriculum Schema icon (to the left of the Curriculum Courses icon). Select Add Core to build the headers and requirements for your catalog page. i.e. add headers for Prerequisites, Core Requirements, Electives, Capsone. (If you have a concentration(s), add a core titled Concentrations and list only the total concentration units. You do not need to list each individual concentration.)

Preview your catalog chapter by selecting the Preview Curriculum icon.

Degree Requirements

GEOL 601 Professional Ethics in Environmental Geosciences (1)
GEOL 602 Graduate Seminar (2)
GEOL 689 Project (1-2)
GEOL 691 University Thesis (1-6)
Core Courses (3 units)

Requirements: GEOL 601 Professional Ethics (1), GEOL 602 Graduate Seminar (2).

GEOL 601 Professional Ethics in Environmental Geosciences (1)
GEOL 602 Graduate Seminar (2)

Electives (24 units thesis or 27 units project)

In addition to the 3 units of core courses, any combination of graduate environmental geosciences courses except GEOL 642 (Internship), GEOL 690 (Independent Study), and GEOL 691 (University Thesis) or GEOL 689 (Project), must be taken for a minimum of 14 (thesis track) or 18 (project track) units.

Up to nine of the elective units may be completed in courses selected from a list of approved upper division courses in Geology, Environmental Science, and related disciplines, or approved graduate courses in related disciplines, which is available from the department office.

GEOL 633 The Science of Soils (4)
GEOL 646 Quaternary Geology (4)
GEOL 621 Near Surface Geophysics (4)
GEOL 622 Seismic Exploration (4)
GEOL 631 Isotope Geochemistry (4)
GEOL 632 Contaminant Transport in Groundwater (4)
GEOL 634 Biogeochemistry (4)
GEOL 641 Earthquake Geology (4)
GEOL 643 Tectonic Geomorphology (4)
GEOL 644 Structural Styles (4)
GEOL 645 Engineering Geology (4)
GEOL 650 Professional Certification Preparation (3)
GEOL 671 Field Experience (1-2)

Capstone (6 thesis, 2 project)

Choose one of the following:

GEOL 690 University Thesis (6 units)

OR
GEOL 680 Project (2 units)

**University Thesis**

Requirements: Students must submit to the Thesis Committee, and defend orally, an acceptable University Thesis. The University Thesis is a formal paper reporting the results of original research. This research normally involves modeling, field, and/or laboratory investigation. The thesis is submitted to the university in the format specified in the "University Thesis Writing Guide," [www.csueastbay.edu/thesiswritingguide](http://www.csueastbay.edu/thesiswritingguide). The Thesis Committee comprises the faculty thesis advisor plus either (1) two other faculty members from the Department of Earth and Environmental Sciences or other appropriate California State University East Bay faculty, or (2) one other faculty member from the department and one or more qualified individuals from outside the university.

*Units Required:* GEOL 690, University Thesis, for a total of 6 units; students may not register for more than 50% of the total units prior to starting the writing of their thesis.

**Graduate Project**

Requirements: Project students must submit to the department an abstract and acceptable graduate project (for example: manuscript, map, computer model, education module). An oral defense may be required.

*Units Required:* GEOL 680, Project, for a total of 2 units.

To revise an existing concentration (formerly option) or create a new concentration, select form 1a. *Semester Conversion Request for Approval of New or Revised Graduate Concentration.*
<table>
<thead>
<tr>
<th>Quarter Based Program:</th>
<th>45</th>
<th>Semester Based Program:</th>
<th>32</th>
</tr>
</thead>
</table>

### Any additional major information

*Students cannot receive credit toward the master's degree for:*

- Courses taken to remove deficiencies
- Independent Study, GEOL 690, in excess of 3 units
- Internship, GEOL 642, in excess of 3 units
- University Thesis (GEOL 691) in excess of 6 units, or Project (GEOL 689) in excess of 2 units.
- Cooperative Education (GEOL 389)

### 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 [ ]

### Resource implications of the proposed revision, if any:

Proposed field experience course(s) (GEOL 671) 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:

GEOL 601 and GEOL 650 are intended to help prepare students for licensure as a California Professional Geologist and/or California Professional Hydrogeologist. However, there is no university accreditation associated with the certification.
Consultation with other affected departments and programs:

The following department(s) has (have) been consulted and raised no objections:

N/A

The following department(s) has (have) been consulted and raised concerns:


Attachments

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

- [ ] Yes
- [ ] No

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

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

Catalog Item Types

<table>
<thead>
<tr>
<th>Degree Type*</th>
<th>Master of Science</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program Type*</td>
<td>Master</td>
</tr>
</tbody>
</table>
Steps for Master of Science in Environmental Geosciences

Originator

Participants

Jean Moran 2/5/2016 4:35 PM

Activity

Required for Approval: 100% required
Date Completed: 2/5/2016 4:35 PM
Changes: Yes
Comments: Yes

Department Chair

Participants

Jean Moran 2/5/2016 4:36 PM

Activity

Required for Approval: 100% required
Date Completed: 2/5/2016 4:36 PM
Changes: No
Comments: No

Dean's Office Review

Participants

Michael Leung
Jason Singley
Sarah Aubert (System Administrator)

Activity

Required for Approval: 100% required
Date Completed: 2/11/2016 9:56 AM
Changes: No
Comments: No

Dean's Office Review

Status: Approved
<table>
<thead>
<tr>
<th>Participants</th>
<th>Activity</th>
</tr>
</thead>
</table>
| **College of Science Curriculum Committee** | Required for Approval: 100% required  
Date Completed: 2/18/2016 5:14 PM  
Changes: No  
Comments: Yes  
* Agenda Administrator |
| **College Curriculum Committee Approval** | Status: Approved |
| **Dean's Office Approval** | Status: Approved |
| **APGS (Technical Review)** | Status: Approved |

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**Participants**

- **Jason Singley** 2/11/2016 1:51 PM

**Activity**

- Required for Approval: 100% required  
Date Completed: 2/11/2016 1:51 PM  
Changes: No  
Comments: Yes  
* Agenda Administrator
APGS (AVP Review)

Participants

- Lindsay McCrea
- Donna Wiley  3/28/2016 3:50 PM
- Sarah Aubert (System Administrator)  3/29/2016 9:35 AM

Activity

- Required for Approval: 100% required
- Date Completed: 3/29/2016 9:35 AM
- Changes: No
- Comments: Yes

CIC Graduate Subcommittee

Participants

- CIC Graduate Program Subcommittee
  - Donna Wiley *  8/11/2016 1:16 PM
- Additional Participants

Activity

- Required for Approval: 100% required
- Date Completed: 8/11/2016 2:44 PM
- Changes: No
- Comments: Yes
- Agenda: Yes
  * Agenda Administrator

Custom Route

Participants

- Jean Moran  12/4/2016 6:24 PM

Activity

- Required for Approval: 100% required
- Date Completed: 12/4/2016 6:24 PM
- Changes: Yes
- Comments: Yes

CIC Graduate Subcommittee
## Participants

### CIC Graduate Program Subcommittee

| Activity | Required for Approval: 100% required  
Date Completed: 1/11/2017 2:49 PM  
Changes: No  
Comments: Yes  
Agenda: Yes  
* Agenda Administrator |
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<tr>
<td>Donna Wiley</td>
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### Committee on Instruction and Curriculum

| Activity | Required for Approval: 100% required  
Time Spent: 23 days  
Changes: No  
Comments: Yes  
Agenda: Yes  
* Agenda Administrator |
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<td>Sophie Rollins</td>
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<tr>
<td>Mitch Watnik</td>
<td>2/3/2017 11:08 AM</td>
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### Executive Committee

| Activity | Required for Approval: 100% required  
Work: comment  
Agenda: Yes  
* Agenda Administrator |
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<td>Mark Karplus</td>
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<td>Sophie Rollins</td>
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### Participants

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<th>Academic Senate</th>
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<td>Sophie Rollins *</td>
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### Step Details

- **Required for Approval:**
  - 100% required
- **Work:** comment
- **Agenda:** Yes
- *Agenda Administrator*

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### President's Office

#### Participants

- Mary Barnum

#### Step Details

- **Required for Approval:**
  - 100% required
- **Work:** comment

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### APGS (Final Review & Export)

#### Participants

- Sarah Aubert
- Sandra Claflin

#### Step Details

- **Required for Approval:**
  - 100% required
- **Work:** edit, comment
Attachments for Master of Science in Environmental Geosciences

- PLO_ILO_matrix_MS degree.xlsx (uploaded by Jean Moran, 2/4/2016 5:03 pm)
- M.S._AssessmentPlans_Q2S_18to23.docx (uploaded by Jean Moran, 2/4/2016 5:03 pm)
- MS roadmap Dec 16.xlsx (uploaded by Jean Moran, 12/4/2016 5:53 pm)
- MS matrix PLO_courses_F2.xlsx (uploaded by Jean Moran, 12/4/2016 5:53 pm)
Comments for Master of Science in Environmental Geosciences

Mitch Watnik  
2/3/2017 11:08 am Reply

CIC unanimously recommended approval of this at its meeting on January 30, 2017. This is documented as 16-17 CIC 65.

Donna Wiley  
1/11/2017 2:49 pm Reply

The CIC Graduate Program Subcommittee unanimously approved. However, the committee was still concerned about the curriculum map showing the alignment of courses to PLOS. Since the majority of units in the program are electives, the members could not see how it was guaranteed that all students would take courses that achieved all PLOS. This seemed be accomplished by scheduling (i.e. only offering courses from particular group in certain semesters), but this seems somewhat haphazard. Also, some PLOS are only introduced in one or two electives, so again no guarantee that all students would get this introduction. Also, there is no sequencing of courses, so students may take electives were a PLO is expected to be developed before taking courses where they are introduced. The program might think about adding some structure to its curriculum, either with a larger core, or with grouping of courses with requirements that students take one course from a group, rather than leaving this as a by-product of course scheduling.

In addition, the committee has not received a full proposal requesting the degree title change. Preliminary justification was given in a Curriculog comments, but a more detailed justification is required for Chancellor's Office approval. So the degree title will remain M.S. in Geology until a name change is officially approved.

Donna Wiley  
1/11/2017 1:51 pm Reply

Revise title of electives section (units with thesis, etc.)

Donna Wiley  
1/4/2017 3:38 pm Reply

Thanks Jean. I will put it back on the CIC Grad Subcommittee agenda for our 1/11 meeting. I don't think it's necessary for you to attend.

Donna

Jean Moran  
12/4/2016 6:24 pm Reply

We made changes to the PLO_courses matrix and the degree roadmap in order to ensure that all PLOS will be covered in a four semester plan. Courses are grouped into categories (A, B, C) and groups are rotated through on the roadmap.

I believe the other comments have been addressed, though there is some minor repetition between the 'Student Standing and Progress Toward the Degree' and 'Degree Requirements' sections.

Donna Wiley  
8/11/2016 1:16 pm Reply
Hi Jean,

I'm routing this back to you so you can make the edits noted in our email exchange and attach any additional files.

Thanks,

Donna

Donna Wiley

3/28/2016 3:50 pm

I'm approving this proposal pending a completed justification of degree title change from the department that must be submitted to the Chancellor's Office. In addition, I have the following comments/questions:
- There are two Advancement to Candidacy sections and they are not consistent. There should only be one. Which is correct?
- The "Degree Requirements" section should be a brief overview of the program requirements - not a repeat of the entire curriculum requirements section. See the Degree Requirements section of the current M.S.W. program in the current catalog for an example. The curriculum details should be removed from this section.
- The number of the units for each component of the Curricular Requirements section should be displayed in () following the heading, e.g. Core Courses (3)
- The electives section is confusing. The first sentence refers to "graduate environmental geosciences classes" - what classes does this refer to? The following paragraph refers to graduate Geology classes. Are these the same? Different? That paragraph also refers to a list of approved upper division and graduate courses that is available from the department office, and then there is a list, but no text that explains what this list is - what is this list and how is it different from the list available in the department office? The wording here needs to be clarified.
- the listing of the two capstone experiences at the very end of the proposal is redundant (and inconsistent) with the information under the Capstone heading. This should be removed.

Anne Kotchevar

2/18/2016 3:46 pm

Unanimously approved by the College of Science curriculum committee

Jason Singley

2/11/2016 1:50 pm

Check formatting of degree requirements

Jean Moran

2/4/2016 5:25 pm

This proposal involves a name change from "Master of Science in Geology" to "Master of Science in Environmental Geosciences". The following narrative will be submitted to the Chancellor's Office, as justification:
Justification of degree program name change from Master of Science in Geology to Master of Science in Environmental Geosciences:
The purpose of the proposed name change is two-fold: 1) to more accurately reflect the emphasis of the coursework, direction of the Department, and faculty research areas; and 2) enhance recruitment of students who plan a career in environmental consulting, hazards mitigation, regulatory compliance, or sustainability. Under the program transformation from quarters to semesters, the course curriculum is being modified to emphasize environmental science aspects of the geosciences, over the more traditional areas of geology. Environmental geoscience topics that will be presented in courses and available as areas of research include bay area tectonics and associated hazards such as earthquakes and landslides, climate change effects and mitigation, characterization and remediation of water resources, and characterization of near
surface processes and materials. The list of elective courses reflects this new emphasis and de-emphasizes topics such as petrology, solid earth geophysics, and exploration geology and geophysics. The Environmental Geosciences moniker is also more accurate because faculty expertise is in these areas, and because the department’s five year plan that includes hiring additional faculty with research interests in these areas.

For at least ten years, a majority of the graduates of our program have been employed in environmental consulting (including hydrogeology, engineering geology, hazards assessment, site characterization). Other common jobs are in regulatory compliance and R&D. Even students who obtain employment in the traditional fields of energy production typically work on the environmental side at these companies. The degree name, Master of Science in Environmental Geosciences, is therefore likely to attract applicants who are working professionals and students with bachelors degrees in Geology, Environmental Science, and other Physical Sciences.

Crosslistings for Master of Science in Environmental Geosciences

Master of Science in Environmental Geosciences (parent proposal)

This proposal does not have any active crosslisted proposals.
Decision Summary for Master of Science in Environmental Geosciences

Committee on Instruction and Curriculum

Step Summary
This step requires 100% approval from all participants to move forward.

Participants

Total

▲ CIC
Sophie Rollins *

Users Approved: 1
Users Rejected: 0

☑ Mitch Watnik * 2/3/2017 11:08 AM