

**From:** [Vankeerbergen, Bernadette](#)  
**To:** [Smith, Randy](#); [Reed, Katie](#)  
**Cc:** [Martin, Andrew](#); [Jenkins, Mary Ellen](#); [Ottesen, Jennifer](#); [Steele, Rachel](#)  
**Subject:** Revision to the Earth Sciences minor  
**Date:** Friday, October 13, 2023 7:55:28 AM  
**Attachments:** [image001.png](#)  
[Earth Sciences Minor Revision.pdf](#)  
[Minor Earth Sciences Revision Letter of Motion.pdf](#)

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Dear Randy and Katie,

Please find attached a proposal to revise the Earth Sciences minor. The proposal was approved on Friday, October 6, 2023 by the ASC Curriculum Committee (ASCC).

We are now advancing the proposal for review by CAA. The attached documents are: (1) the actual proposal and (2) the Natural and Mathematical Sciences Subcommittee cover letter to ASCC .

Please use this email as a cover letter indicating that the proposal has been duly reviewed and approved by the appropriate ASC curricular bodies (including the full ASC Curriculum Committee).

Please let me know if you have any questions.

Best regards,  
Bernadette



**Bernadette Vankeerbergen, Ph.D.**

Assistant Dean, Curriculum

College of Arts and Sciences

114F University Hall, 230 North Oval Mall

Columbus, OH 43210

Phone: 614-688-5679

<http://ascas.osu.edu>

**From:** [Smith, Randy](#)  
**To:** [Lower, Steven](#); [Griffith, Elizabeth M.](#)  
**Cc:** [Leite, Fabio](#); [Reed, Katie](#); [Smith, Randy](#); [Duffy, Lisa](#); [Orr, James](#); [Vankeerbergen, Bernadette](#); [Martin, Andrew](#); [Olesik, Susan V.](#)  
**Subject:** Proposal to revise the Earth Sciences minor  
**Date:** Thursday, November 2, 2023 10:23:48 PM  
**Attachments:** [image001.png](#)

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Elizabeth and Steven:

The proposal from the School of Earth Sciences to revise the Earth Sciences minor was approved by the Council on Academic Affairs at its meeting on November 1, 2023.

No additional level of internal approval is necessary. This action will be included in the Council's next [Annual Activities Report](#) to the University Senate (July 2024).

The Office of the University Registrar will work you with any implementation issues.

Please keep a copy of this message for your file on the proposal and I will do the same for the file in the Office of Academic Affairs.

If you have any questions please contact the Chair of the Council, Professor Fábio Leite (.11), or me.

Randy



**W. Randy Smith, Ph.D.**

Vice Provost for Academic Programs

**Office of Academic Affairs**

University Square South, 15 E. 15<sup>th</sup> Avenue, Columbus, OH 43201

614-292-5881 Office

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THE OHIO STATE UNIVERSITY

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Chair, Arts and Sciences Curriculum Committee

October 3, 2023

Dear Chair and Members of the Arts and Sciences Curriculum Committee:

On September 28, 2023, the Natural and Mathematical Sciences Subcommittee reviewed a request from the the Department of Earth Sciences to revise the prerequisites and core courses of 8 subprograms of the Earth Sciences minor.

The proposed changes to the Earth Sciences minor are a consequence of the introduction of a new 4-credit-hour course, Earth Science 2122: Climate and Life over Billions of Years on Earth, which replaced two existing 1000-level Earth Science courses in the recently revised Earth Sciences major. The proposed changes to the minor move Earth Science 2122 from a pre-requisite of the Earth Sciences minor to a core course or an additional course in the minor. In addition, for several subprograms of the minor, additional prerequisites in biological sciences or chemistry have been added. Although newly listed as prerequisites to the minor, these courses were already required of students as they were prerequisites of one or more required courses in the minor.

The credit hours for the minor are unchanged with two exceptions: the Geoarchaeology subprogram, which changes from 13 credit hours to 12, and the Geochemistry subprogram, which changes from 15 credit hours to 12. These changes reflect the addition of Earth Science 2122 as a core course of these subprograms and redesignating one or more existing core courses as options for additional courses.

The NMS Subcommittee voted unanimously to approve the request with no recommendations, and the proposal is now advanced to the ASCC with a motion to approve.

Sincerely,

Ian Hamilton  
Professor  
Department of Evolution, Ecology, and Organismal Biology  
Department of Mathematics  
Chair, ASCC Natural and Mathematical Sciences Subcommittee

The School of Earth Sciences did an extensive review of the existing Earth Sciences Minor in Spring 2023 resulting in several updates that are outlined here. A small ad hoc group first met on April 11<sup>th</sup> (two undergraduate faculty advisors, undergraduate advisor staff, curriculum chair and associate director of administration). After discussion and review, updates were suggested and presented to the School of Earth Sciences Curriculum Committee. This group of four faculty members along with the curriculum chair met on April 21<sup>st</sup> to review and discuss the updates, which were unanimously approved (4 yes, 0 no, 0 abstentions). These updates were necessary due to the revision of the undergraduate major that went into effect in 2020. Specifically, these updates result from the creation in 2020 of the Earth Science 1200 Introductory Earth Science Lab (1 credit) and Earth Science 1122 to become Earth Science 2122 Climate and Life over Billions of Years on Earth (4 credits). These changes were shared with the entire SES faculty in the committee reports shared at the May faculty meeting.

The details of these updates are now included in the appropriate program and subprogram templates (advising sheets). Please contact us if you have any questions.

Steven Lower  
Professor and Director  
School of Earth Sciences

Elizabeth Griffith  
Assoc. Professor and Assoc. Director for Administration  
School of Earth Sciences

## Earth Sciences Minor Changes

### Earth Sciences Subprogram

Current pre-requisite hours/courses: 7-8 hours; 2 courses

Updated pre-requisite hours: 4 hours; 1-2 courses (if two courses, includes one 3+1 lecture + lab combo)

Current minor hours: 12 hours

Updated minor hours: 12 hours

Changes:

- Earth Science 2122 (formerly ES 1122) moves from pre-requisites into the minor
- Earth Science 2122 becomes “Core Course”
- All other course options become “Additional Courses”
- Total hours required (pre-req and in the minor) reduced from 19-20 to 16.

### Paleontology Subprogram

Current pre-requisite hours: 7-8 hours/2-3 courses (if three courses, includes one 3+1 lecture + lab combo)

Updated pre-requisite hours: 7 hours/2-3 courses (if three courses, includes one 3+1 lecture + lab combo)

Current minor hours: 12

Updated minor hours: 12

Changes:

- Pre-requisite was 2 Earth Sciences courses; now one Earth Science course and 3 CH in the Biological Sciences.
- Earth Science 2122 (formerly ES 1122) moves from pre-requisites into the minor
- Earth Science 2122 becomes a “Core Course”
- “Core Courses” now 8 hours, formerly 4 hours
- “Additional Courses” now 4 hours, formerly 8
- Elimination of 4 options in the “Additional Courses” section
- Note that the “new” required pre-req of 3 CH of Biological Sciences was previously a “hidden pre-requisite” – that is to say, it wasn’t technically a pre-requisite for the minor, but it WAS a pre-requisite for one of the required courses in the minor. On the Legacy GE, this was not an issue, because all students were required to take 3 Natural Science courses that HAD to include 3 CH of Biological Sciences but needs to be more visible now because not all students will have this.

## Economic Geology Subprogram

Current pre-requisite hours: 4 CH, 1-2 courses (if two courses, includes one 3+1 lecture + lab combo)

Updated pre-requisite hours: 9 CH, 2-3 courses (if three courses, includes one 3+1 lecture + lab combo)

Current minor hours: 12

Updated minor hours: 12

Changes:

- Addition of Chemistry 1210 as a pre-requisite to the minor
- Addition of one option to the “Core Courses” section
- Addition of several new options to the “Additional Courses” section
- Note that the addition of Chemistry 1210 as a pre-requisite to the minor is not really an addition, because it has always been a pre-requisite for one or more required courses in the minor. Making it officially a pre-requisite on the minor sheet is more transparent for students.

## Geoarchaeology Subprogram

Current pre-requisite hours: 8, 3 courses (includes one 3+1 lecture + lab combo)

Updated pre-requisite hours: 7, 3 courses (includes one 3+1 lecture + lab combo)

Current minor hours: 13

Updated minor hours: 12

Changes:

- Earth Science 2122 (formerly ES 1122) moves from pre-requisites into the minor
- Add 3 CH of Biological Science as pre-requisite
- “Core Courses” section goes from 10 CH to 8 CH
- ES 2122 becomes Core Course
- ES 4421 and 4423 move from “Course Courses” section to “Additional Courses” Section
- Note that the “new” required pre-req of 3 CH of Biological Sciences was previously a “hidden pre-requisite” – that is to say, it wasn’t technically a pre-requisite for the minor, but it WAS a pre-requisite for one of the required courses in the minor. On the Legacy GE, this was not an issue,

because all students were required to take 3 Natural Science courses that HAD to include 3 CH of Biological Sciences but needs to be more visible now because not all students will have this.

## Geophysics Subprogram

Current pre-requisite hours: 7-8

Updated pre-requisite hours: 4 (includes one 3+1 lecture + lab combo)

Current minor hours: 12

Updated minor hours: 12

Changes:

- Removes one option for pre-requisites
- Adds several options for “Core Courses”

## Geochemistry Subprogram

Current pre-requisite hours: 8, 2 courses

Updated pre-requisite hours: 9, 3 courses (includes one 3+1 lecture + lab combo)

Current minor hours: 15

Updated minor hours: 12

Changes:

- Earth Science 2122 (formerly ES 1122) moves from pre-requisites into the minor
- Adds Chemistry 1210 as a pre-requisite
- Adds ES 2122 as an option for one of the “Core Courses” requirements
- Removes Earth Sciences 4423 Introductory Petrology as a required “Core Course”.

Because our faculty and course offerings in geochemistry have increased and changed in the past decade, in order to maintain flexibility and an opportunity for students to build a minor with more low-temperature applications, we have removed Earth Sciences 4423 Introductory Petrology as a required “Core Course”. Students interested in environmental geochemistry, aqueous geochemistry, marine chemistry, or biogeochemistry will be able to choose two upper division electives in this minor. The Earth Sciences 4423 Introductory Petrology course is focused on many high-temperature geochemical applications and while this has traditionally been the focus of many of our faculty and courses in the past, faculty and student interest in geochemistry has broadened. In addition, the Earth Sciences 4423 Introductory Petrology course is no longer needed as a foundation for many of the more-detailed upper-level electives currently offered.

- Adds ES 4423 as an option for “Additional Courses”
- Note that the addition of Chemistry 1210 as a pre-requisite to the minor is not really an addition, because it has always been a pre-requisite for one or more required courses in the minor. Making it officially a pre-requisite on the minor sheet is more transparent for students.

## Mineralogy and Petrology Subprogram

Current pre-requisite hours: 4, 1 course

Proposed pre-requisite hours: 9, 3 courses (includes one 3+1 lecture + lab combo)

Current minor hours: 12

Proposed minor hours: 12

Changes:

- Adds Chemistry 1210 as a prerequisite
- Removes ES 5601.01 and .02 as options from “Additional Courses”
- Note that the addition of Chemistry 1210 as a pre-requisite to the minor is not really an addition, because it has always been a pre-requisite for one or more required courses in the minor. Making it officially a pre-requisite on the minor sheet is more transparent for students.

## Environmental Studies Subprogram

Current pre-requisite hours: 8, 2 courses

Proposed pre-requisite hours: 4 (includes one 3+1 lecture + lab combo)

Current minor hours: 12

Proposed minor hours: 12

Changes:

- Earth Science 2122 (formerly ES 1122) moves from pre-requisites into the minor
- Remove ES 2122/1122 as a pre-requisite
- Add ES 2122/1122 as an option in the “Additional Courses” section.

Students with majors in other areas come to minor in Earth Sciences to provide sufficient background for employment in the geosciences or in geoscience-related positions including the environmental field as is the case of the Environmental Studies Subprogram. All of the courses that constitute the pre-requisite course options include a significant component of what is considered “environmental studies”. Furthermore, the choice of one of two “Core courses” remains unchanged (either Earth Sciences 2203 Environmental Geoscience or Earth Sciences 2204 Exploring Water Issues). In order to maintain student choice within the present-day broader field of “environmental studies”, the updated subprogram does not add an additional requirement by making 2122 a required Core course. This allows a student to choose from a variety of environmental geosciences courses, as they have in the current subprogram.

Our faculty, research areas, course offerings, and student interests have continued to broaden in the field of Environmental Studies since this track was last revised in 2011 (over a decade ago). Removing this course as a requirement will maintain student choice and program flexibility – by allowing them to choose one course that might more closely align with their interest, rather than requiring all students in this subprogram to take this 2000-level course in “Climate and Life over Billions of Years on Earth”.

- Added several courses to the list of options for the “Additional Courses” section
- Removed several courses to the list of options for the “Additional Courses” section

The Ohio State University  
College of Arts and Sciences

Earth Sciences Minor (Earth Sciences subprogram)

School of Earth Sciences, 275 Mendenhall Laboratory,  
125 South Oval Mall, Columbus, OH 43210-1398;  
Dr. Karen Royce; 614-292-6961; royce.6@osu.edu;  
<http://earthsciences.osu.edu/>

With this minor, students will have critical knowledge and hands-on experience to participate successfully in many public, private and international career opportunities such as government research, homeland security, environmental consulting, oil and natural gas exploration & production, international business, precious and industrial mineral exploration, mining, and processing, renewable and alternative energy resources, and education.

The subprogram in Earth Sciences requires a minimum of 12 semester credit hours in core courses. Preparation for the minor includes one or two courses (listed below), for a total minimum of 19-16 credit hours. Some of the core courses have additional pre-requisite courses that are not part of the minor.

To declare this minor, schedule an appointment to meet with the coordinating adviser in the School of Earth Sciences (SES) and discuss the minor requirements. Many of the Earth Sciences courses are taught on a specific course offering schedule and SES wants to help you schedule our classes accordingly. Also, any variation from the program described below needs the approval of the coordinating advisor in SES. For further information about the minor program, contact the coordinating advisor (contact information above).

*\*Some courses in this minor may have pre-requisites. Please consult the course bulletin before enrolling in courses.*

**Preparation for the minor (47-8 credit hours)**

Earth Sciences 1100 or 1200 and 1105 or 1108 or 1110 or 1121 or 1151

or 2155 (3 or 4 hours)

Earth Sciences 1122 (4 hours)

Where available, an Honors version can substitute for the equivalent non-Honors courses listed above.

**Core Course (4 credit hours required)**

Earth Sciences 2122 Climate and Life over Billions of years on Earth (4 hours)

**Additional courses (at least 8 additional hours are required)**

**Core Courses (12 credit hours required)**

Complete a minimum of 8-12 semester hours in Earth Sciences at the 2000-level or above, with at least 3 credit hours at the 3000-level or higher. A maximum of 3 total credit hours among internship (x191), research (x998, x999), or individual study (x193) can be counted towards the minor with prior approval.

**Additional courses**

None required.

**Earth Sciences (Earth Sciences subprogram) minor program guidelines**

Credit hours required A minimum of 12 credit hrs. 1000 level courses shall not be counted in the minor. At least 3 credits must be at the 3000 level or above.

Transfer and EM credit hours allowed A student is permitted to count up to 6 total hours of transfer credit and/or credit by examination.

Overlap with the GE A student is permitted to overlap up to 6 credit hours between the GE and the minor.

Overlap with the major and additional minor(s)

- The minor must be in a different subject than the major.
- The minor must contain a minimum of 12 hours distinct from the major and/or additional minor(s).

Grades required

- Minimum C- for a course to be listed on the minor.
- Minimum 2.00 cumulative GPA for all minor course work
- minor.
- Course work graded Pass/Non-Pass cannot count on the minor.
- No more than 3 credit hours of coursework graded Satisfactory/Unsatisfactory may count toward the minor.

X191, x998, x999, x193 No more than 3 credit hrs

Minor approval The minor program must be approved by the academic unit offering the minor.

Filing the minor program form The minor program form must be filed at least by the time the graduation application is submitted to a college/school advisor.

Changing the minor Once the minor program is filed in the college office, any changes must be approved by the academic unit offering the minor.

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The Ohio State University  
College of Arts and Sciences

Earth Sciences Minor (Paleontology subprogram)

School of Earth Sciences, 275 Mendenhall Laboratory,  
125 South Oval Mall, Columbus, OH 43210-1398;  
Dr. Karen Royce; 614-292-6961; royce.6@osu.edu;  
<http://earthsciences.osu.edu/>

With this minor, students will have critical knowledge and hands-on experience to participate successfully in many public, private and international career opportunities such as government research, homeland security, environmental consulting, oil and natural gas exploration & production, international business, precious and industrial mineral exploration, mining, and processing, renewable and alternative energy resources, and education.

The subprogram in paleontology requires a minimum of 12 credit hours in upper-level Earth Sciences courses. Preparation for the minor includes 7-~~or~~8 credit hours, for a total minimum of 19 credit hours. Some of the required courses have additional pre-requisite courses that are not part of the minor.

The minor in Earth Sciences with an emphasis in paleontology offers the background necessary for a better understanding of Earth's biosphere and of the chemical and physical processes affecting life on Earth.

To declare this minor, schedule an appointment to meet with the coordinating adviser in the School of Earth Sciences (SES) and discuss the minor requirements. Many of the Earth Sciences courses are taught on a specific course offering schedule and SES wants to help you schedule our classes accordingly. Also, any variation from the program described below needs the approval of the coordinating advisor in SES. For further information about the minor program, contact the coordinating advisor (contact information above).

*\*Some courses in this minor may have pre-requisites. Please consult the course bulletin before enrolling in courses.*

**Preparation for the minor (7 credit hours)**

Earth Sciences 1100 or 1200 and 1105 or 1108 or 1121 or 1151 ~~or 2155~~

(3-~~or~~4 hours)

And 3 hours in Biological Sciences

Earth Sciences 1122 (4 hours)

Honors versions of these courses, where they exist, may be substituted.

**Core Course (4-8 credit hours required)**

Earth Sciences 2122 Climate and Life over Billions of years on

Earth (4 hours)

Earth Sciences 4501 Paleontology (4 hours)

**Additional courses (at least 8-4 additional hours are required)**

Earth Sciences 4502 Stratigraphy and Sedimentology (4 hours)

Earth Sciences 4911 Earth's climate: Past and Future (3 hours)

Earth Sciences 5602.01 (2 hours)

Earth Sciences 5602.02 (2 hours)

Earth Sciences 5613 (4 hours)

Earth Sciences 5614 (4 hours)

Earth Sciences 5615 Paleoecology (4 hours)

Earth Sciences 5621 Introduction to Geochemistry (3 hours)

Earth Sciences 5206 Advanced Oceanography (3 hours)

**Earth Sciences (Paleontology subprogram) minor program guidelines**

Credit hours required A minimum of 12 credit hrs. 1000 level courses shall not be counted in the minor.

Transfer and EM credit hours allowed A student is permitted to count up to 6 total hours of transfer credit and/or credit by examination.

Overlap with the GE A student is permitted to overlap up to 6 credit hours between the GE and the minor.

Overlap with the major and additional minor(s)

- The minor must be in a different subject than the major.
- The minor must contain a minimum of 12 hours distinct from the major and/or additional minor(s).

Grades required

- Minimum C- for a course to be listed on the minor.
- Minimum 2.00 cumulative GPA for all minor course work
- Course work graded Pass/Non-Pass cannot count on the minor.
- No more than 3 credit hours of coursework graded Satisfactory/Unsatisfactory may count toward the minor.

X193 credits No more than 3 credit hours.

Minor approval The minor program must be approved by the academic unit offering the minor.

Filing the minor program form The minor program form must be filed at least by the time the graduation application is submitted to a college/school advisor.

Changing the minor Once the minor program is filed in the college office, any changes must be approved by the academic unit offering the minor.

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The Ohio State University  
College of Arts and Sciences

**Earth Sciences Minor (Economic Geology subprogram)**

School of Earth Sciences, 275 Mendenhall Laboratory,  
125 South Oval Mall, Columbus, OH 43210-1398;  
Dr. Karen Royce; 614-292-6961; royce.6@osu.edu;  
<http://earthsciences.osu.edu/>

With this minor, students will have critical knowledge and hands-on experience to participate successfully in many public, private and international career opportunities such as government research, homeland security, environmental consulting, oil and natural gas exploration & production, international business, precious and industrial mineral exploration, mining, and processing, renewable and alternative energy resources, and education.

The subprogram in economic geology requires a minimum of 12 credit hours in upper-level Earth Sciences courses. Preparation for the minor includes Earth Sciences 1121 [and 1200 and Chemistry 1210](#), for a total minimum of ~~46-21~~ credit hours. Some of the required courses have additional pre-requisite courses that are not part of the minor.

The minor in Earth Sciences with an emphasis in economic geology offers the background necessary for a better understanding of the formation and exploitation of mineral and precious metal deposits.

To declare this minor, schedule an appointment to meet with the coordinating adviser in the School of Earth Sciences (SES) and discuss the minor requirements. Many of the Earth Sciences courses are taught on a specific course offering schedule and SES wants to help you schedule our classes accordingly. Also, any variation from the program described below needs the approval of the coordinating advisor in SES. For further information about the minor program, contact the coordinating advisor (contact information above).

*\*Some courses in this minor may have pre-requisites. Please consult the course bulletin before enrolling in courses.*

**Preparation for the minor (9 credit hours)**

Earth Sciences 1121 [and 1200](#) or ~~H1121H~~ (4 hours)  
[Chemistry 1210](#) (5 hours)

**Core Courses (9 credit hours required)**

Earth Sciences 2210 [Energy, Mineral Resources, and Society](#) (3 hours) OR  
[Earth Sciences 2155 Energy and Environment](#) (3 hours) and  
Earth Sciences 4421 [Earth Materials](#) (3 hours) and  
Earth Sciences 4423 [Intro Petrology](#) (3 hours)

**Additional courses (at least 1 additional course is required) to total at least 12 semester hours in the minor**

[Earth Sciences 4425 Energy Resources Sustainability](#) (3 hours)  
Earth Sciences 5621 [Introduction to Geochemistry](#) (3 hours)  
Earth Sciences 5660 [Geology of Mineral Resources](#) (4 hours)  
Earth Sciences 5670 [General and Economic Geology of Selected Areas](#) (2-4 hours)  
[Earth Sciences 5687 Borehole Geophysics](#) (3 hours)  
[Earth Sciences 5780 Reflection Seismology](#) (4 hours)

**Earth Sciences (Economic Geology subprogram) minor program guidelines**

Credit hours required A minimum of 12 credit hrs. 1000 level courses shall not be counted in the minor.

Transfer and EM credit hours allowed A student is permitted to count up to 6 total hours of transfer credit and/or credit by examination.

Overlap with the GE A student is permitted to overlap up to 6 credit hours between the GE and the minor.

Overlap with the major and additional minor(s)

- The minor must be in a different subject than the major.
- The minor must contain a minimum of 12 hours distinct from the major and/or additional minor(s).

Grades required

- Minimum C- for a course to be listed on the minor.
- Minimum 2.00 cumulative GPA for all minor course work
- Course work graded Pass/Non-Pass cannot count on the minor.
- No more than 3 credit hours of coursework graded Satisfactory/Unsatisfactory may count toward the minor.

X193 credits No more than 3 credit hours.

Minor approval The minor program must be approved by the academic unit offering the minor.

Filing the minor program form The minor program form must be filed at least by the time the graduation application is submitted to a college/school advisor.

Changing the minor Once the minor program is filed in the college office, any changes must be approved by the academic unit offering the minor.

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The Ohio State University  
College of Arts and Sciences

Earth Sciences Minor (Geoarcheology subprogram)

School of Earth Sciences, 275 Mendenhall Laboratory,  
125 South Oval Mall, Columbus, OH 43210-1398;  
Dr. Karen Royce; 614-292-6961; royce.6@osu.edu;  
<http://earthsciences.osu.edu/>

With this minor, students will have critical knowledge and hands-on experience to participate successfully in many public, private and international career opportunities such as government research, homeland security, environmental consulting, oil and natural gas exploration & production, international business, precious and industrial mineral exploration, mining, and processing, renewable and alternative energy resources, and education.

The subprogram in geoarcheology requires a minimum of 12.3 credit hours in upper-level Earth Sciences courses. Preparation for the minor includes Earth Sciences 1121 and 1200 and 3 hours of Biological Sciences and 1122, for a total minimum of 24.19 credit hours. Some of the required courses have additional pre-requisite courses that are not part of the minor.

The minor in Earth sciences with an emphasis in geoarcheology offers the background necessary for a better understanding of the physical nature of natural and artifactual discoveries.

To declare this minor, schedule an appointment to meet with the coordinating adviser in the School of Earth Sciences (SES) and discuss the minor requirements. Many of the Earth Sciences courses are taught on a specific course offering schedule and SES wants to help you schedule our classes accordingly. Also, any variation from the program described below needs the approval of the coordinating advisor in SES. For further information about the minor program, contact the coordinating advisor (contact information above).

*\*Some courses in this minor may have pre-requisites. Please consult the course bulletin before enrolling in courses.*

**Preparation for the minor (7 credit hours)**

Earth Sciences 1121 (3.4 hours)  
Earth Sciences 1200 (1 hour)  
And 3 hours in Biological Sciences  
Earth Sciences 1122 (4 hours)

Honors versions of the above courses can be substituted.

**Core Courses (40.8 credit hours required)**

Earth Sciences 2122 Climate and Life over Billions of years on Earth (4 hours)  
Earth Sciences 4421 (3 hours)  
Earth Sciences 4423 (3 hours)  
Earth Sciences 4501 Paleontology (4 hours)

**Additional courses (at least 1 additional course is required) to total at least 12 semester hours in the minor**

Earth Sciences 4421 Earth Materials (3 hours)  
Earth Sciences 4423 Intro Petrology (3 hours)  
Earth Sciences 4502 Stratigraphy and Sedimentology (4 hours)  
Earth Sciences 4560 Applied Geophysics (3 hours)  
Earth Sciences 5242 Natural History of The Bahamas (4 hours)  
Earth Sciences 5550 Geomorphology (4 hours)  
Earth Sciences 5622 Stable Isotope Biogeochemistry (3 hours)  
Earth Sciences 5650 Glaciology (4 hours)

**Earth Sciences (Geoarcheology subprogram) minor program guidelines**

Credit hours required A minimum of 12.3 credit hrs. 1000 level courses shall not be counted in the minor.

Transfer and EM credit hours allowed

A student is permitted to count up to 6 total hours of transfer credit and/or credit by examination.

Overlap with the GE A student is permitted to overlap up to 6 credit hours between the GE and the minor.

Overlap with the major and additional minor(s)

- The minor must be in a different subject than the major.
- The minor must contain a minimum of 12 hours distinct from the major and/or additional minor(s).

Grades required

- Minimum C- for a course to be listed on the minor.
- Minimum 2.00 cumulative GPA for all minor course work
- Course work graded Pass/Non-Pass cannot count on the minor.
- No more than 3 credit hours of coursework graded Satisfactory/Unsatisfactory may count toward the minor.

X193 credits No more than 3 credit hours.

Minor approval The minor program must be approved by the academic unit offering the minor.

Filing the minor program form The minor program form must be filed at least by the time the graduation application is submitted to a college/school advisor.

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The Ohio State University  
College of Arts and Sciences

**Earth Sciences Minor (Geophysics subprogram)**

School of Earth Sciences, 275 Mendenhall Laboratory,  
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<http://earthsciences.osu.edu/>

With this minor, students will have critical knowledge and hands-on experience to participate successfully in many public, private and international career opportunities such as government research, homeland security, environmental consulting, oil and natural gas exploration & production, international business, precious and industrial mineral exploration, mining, and processing, renewable and alternative energy resources, and education.

The subprogram in geophysics requires a minimum of 12 credit hours in upper-level Earth Sciences courses. Preparation for the minor includes two-one Earth Sciences introductory course and labs, for a total minimum of 168 credit hours. Some of the required courses have additional pre-requisite courses that are not part of the minor.

The minor in Earth Sciences with an emphasis in geophysics offers the background necessary to use of physics to understand Earth's subsurface environment.

To declare this minor, schedule an appointment to meet with the coordinating advisor in the School of Earth Sciences (SES) and discuss the minor requirements. Many of the Earth Sciences courses are taught on a specific course offering schedule and SES wants to help you schedule our classes accordingly. Also, any variation from the program described below needs the approval of the coordinating advisor in SES. For further information about the minor program, contact the coordinating advisor (contact information above).

*\*Some courses in this minor may have pre-requisites. Please consult the course bulletin before enrolling in courses.*

**Preparation for the minor (complete 2 of the following courses 4 credit hours)**

Earth Sciences 1121 (34 hours) or

~~Earth Sciences 1122 (4 hours)~~

Earth Sciences 1151 (3 hours),

And Earth Sciences 1200 (1 hour)

~~Earth Sciences 2155 (3 hours)~~

Honors versions can substitute for 1121 and 1122 of the above courses can be substituted.

**Core Courses (12 credit hours required)**

Complete 12 hours in Earth Sciences at the 2000-level or above, with at least 9 of the credit hours chosen from the following.

~~Earth Sciences 2205 The Planets (3 hours)~~  
~~Earth Sciences 4340 (3 hours)~~

Earth Sciences 4421 Earth Materials (3 hours)

Earth Sciences 4423 Intro Petrology (3 hours)

Earth Sciences 4560 Applied Geophysics (3 hours)

Earth Sciences 5205 Planetary Science (3 hours)

Earth Sciences 5310 Remote Sensing in the Earth Sciences (3 hours)

Earth Sciences 5680 Deep Earth Geophysics (3 hours)

Earth Sciences 5687 Borehole Geophysics (3 hours)

Earth Sciences 5780 Reflection Seismology (4 hours)

**Earth Sciences (Geophysics subprogram) minor program guidelines**

Credit hours required A minimum of 12 credit hrs. 1000 level courses shall not be counted in the minor.

Transfer and EM credit hours allowed A student is permitted to count up to 6 total hours of transfer credit and/or credit by examination.

Overlap with the GE A student is permitted to overlap up to 6 credit hours between the GE and the minor.

Overlap with the major and additional minor(s)

- The minor must be in a different subject than the major.
- The minor must contain a minimum of 12 hours distinct from the major and/or additional minor(s).

Grades required

- Minimum C- for a course to be listed on the minor.
- Minimum 2.00 cumulative GPA for all minor course work
- Course work graded Pass/Non-Pass cannot count on the minor.
- No more than 3 credit hours of coursework graded Satisfactory/Unsatisfactory may count toward the minor.

X193 credits No more than 3 credit hours.

Minor approval The minor program must be approved by the academic unit offering the minor.

Filing the minor program form The minor program form must be filed at least by the time the graduation application is submitted to a college/school advisor.

Changing the minor Once the minor program is filed in the college office, any changes must be approved by the academic unit offering the minor.

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The Ohio State University  
College of Arts and Sciences

Earth Sciences Minor (Geochemistry subprogram)

School of Earth Sciences, 275 Mendenhall Laboratory,  
125 South Oval Mall, Columbus, OH 43210-1398;  
Dr. Karen Royce; 614-292-6961; royce.6@osu.edu;  
<http://earthsciences.osu.edu/>

With this minor, students will have critical knowledge and hands-on experience to participate successfully in many public, private and international career opportunities such as government research, homeland security, environmental consulting, oil and natural gas exploration & production, international business, precious and industrial mineral exploration, mining, and processing, renewable and alternative energy resources, and education.

The subprogram in Geochemistry requires a minimum of ~~12~~<sup>5</sup> credit hours in upper-level Earth Sciences courses. Preparation for the minor includes Earth Sciences 1121 and ~~1200~~ and ~~Chemistry 1210~~<sup>1122</sup>, for a total minimum of ~~21~~<sup>3</sup> credit hours. Some of the required courses have additional pre-requisite courses that are not part of the minor.

The minor in Earth Sciences with an emphasis in geochemistry offers the background necessary for a better understanding of the chemical nature of Earth's environment.

To declare this minor, schedule an appointment to meet with the coordinating adviser in the School of Earth Sciences (SES) and discuss the minor requirements. Many of the Earth Sciences courses are taught on a specific course offering schedule and SES wants to help you schedule our classes accordingly. Also, any variation from the program described below needs the approval of the coordinating advisor in SES. For further information about the minor program, contact the coordinating advisor (contact information above).

*\*Some courses in this minor may have pre-requisites. Please consult the course bulletin before enrolling in courses.*

**Preparation for the minor (9 credit hours)**

Earth Sciences 1121 (3~~4~~ hours)

~~Earth Sciences 1200~~ (1 hour)

~~Chemistry 1210~~ (5 hours)

~~Earth Sciences 1122~~ (4 hours)

Honors version of these courses may be substituted.

**Core Courses (6-~~7~~<sup>9</sup> credit hours required)**

Complete 1 of the following courses:

~~Earth Sciences 2122~~ Climate and Life over Billions of years on Earth (4 hours)

Earth Sciences 2203 Environmental Geoscience (3 hours)

Earth Sciences 2204 Exploring Water Issues (3 hours)

Earth Sciences 2206 Oceanography (3 hours)

Complete ~~both~~ of the following course~~s~~

Earth Sciences 4421 Earth Materials (3 hours)

~~Earth Sciences 4423~~ (3 hours)

**Additional courses (at least 2 additional courses are required from the list below)**

~~Earth Sciences 4423~~ Intro Petrology (3 hours)

Earth Sciences 5621 Introduction to Geochemistry (3 hours)

Earth Sciences 5622 Stable Isotope Biogeochemistry (3 hours)

Earth Sciences 5627 Global Biogeochemical Cycles (3 hours)

Earth Sciences 5628 Environmental Isotope Geochemistry (3 hours)

**Earth Sciences (Geochemistry subprogram) minor program guidelines**

Credit hours required A minimum of ~~12~~<sup>5</sup> credit hrs. 1000 level courses shall not be counted in the minor.

Transfer and EM credit hours allowed A student is permitted to count up to 6 total hours of transfer credit and/or credit by examination.

Overlap with the GE A student is permitted to overlap up to 6 credit hours between the GE and the minor.

Overlap with the major and additional minor(s)

- The minor must be in a different subject than the major.
- The minor must contain a minimum of 12 hours distinct from the major and/or additional minor(s).

Grades required

- Minimum C- for a course to be listed on the minor.
- Minimum 2.00 cumulative GPA for all minor course work
- Course work graded Pass/Non-Pass cannot count on the minor.
- No more than 3 credit hours of coursework graded Satisfactory/Unsatisfactory may count toward the minor.

X193 credits No more than 3 credit hours.

Minor approval The minor program must be approved by the academic unit offering the minor.

Filing the minor program form The minor program form must be filed at least by the time the graduation application is submitted to a college/school advisor.

Changing the minor Once the minor program is filed in the college office, any changes must be approved by the academic unit offering the minor.

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The Ohio State University  
College of Arts and Sciences

**Earth Sciences Minor (Mineralogy and Petrology subprogram)**

School of Earth Sciences, 275 Mendenhall Laboratory,  
125 South Oval Mall, Columbus, OH 43210-1398;  
Dr. Karen Royce; 614-292-6961; royce.6@osu.edu;  
<http://earthsciences.osu.edu/>

With this minor, students will have critical knowledge and hands-on experience to participate successfully in many public, private and international career opportunities such as government research, homeland security, environmental consulting, oil and natural gas exploration & production, international business, precious and industrial mineral exploration, mining, and processing, renewable and alternative energy resources, and education.

The subprogram in mineralogy and petrology requires a minimum of 12 credit hours in upper-level Earth Sciences courses. Preparation for the minor includes Earth Sciences 1121 [and 1200 and Chemistry 1210](#), for a total minimum of **16-21** credit hours. Some of the required courses have additional pre-requisite courses that aren't part of the minor.

To declare this minor, schedule an appointment to meet with the coordinating adviser in the School of Earth Sciences (SES) and discuss the minor requirements. Many of the Earth Sciences courses are taught on a specific course offering schedule and SES wants to help you schedule our classes accordingly. Also, any variation from the program described below needs the approval of the coordinating advisor in SES. For further information about the minor program, contact the coordinating advisor (contact information above).

*\*Some courses in this minor may have pre-requisites. Please consult the course bulletin before enrolling in courses.*

**Preparation for the minor (9 credit hours)**

Earth Sciences 1121 [\(3 hours\)](#)  
[Earth Sciences 1200 \(1 hour\)](#)  
[Chemistry 1210 \(5 hours\)](#)

The Honors version of this course can be substituted.

**Core Courses (6 credit hours required)**

Earth Sciences 4421 [Earth Materials](#) (3 hours)  
Earth Sciences 4423 [Intro Petrology](#) (3 hours)

**Additional courses (at least 6 additional hours are required, chosen from among these courses)**

~~Earth Sciences 5601.01 (4 hours)~~  
~~Earth Sciences 5601.02 (4 hours)~~  
Earth Sciences 5617 [Petrology of Earth and Planets](#) (4 hours)  
Earth Sciences 5621 [Introduction to Geochemistry](#) (3 hours)  
Earth Sciences 5625 [Igneous Petrology](#) (4 hours)  
Earth Sciences 5636 [Advanced Topics in Mineralogy and Crystallography](#) (3 hours)

**Earth Sciences (Mineralogy and Petrology subprogram) minor program guidelines**

**Credit hours required** A minimum of 12 credit hrs. 1000 level courses shall not be counted in the minor.

**Transfer and EM credit hours allowed** A student is permitted to count up to 6 total hours of transfer credit and/or credit by examination.

**Overlap with the GE** A student is permitted to overlap up to 6 credit hours between the GE and the minor.

**Overlap with the major and additional minor(s)**

- The minor must be in a different subject than the major.
- The minor must contain a minimum of 12 hours distinct from the major and/or additional minor(s).

**Grades required**

- Minimum C- for a course to be listed on the minor.
- Minimum 2.00 cumulative GPA for all minor course work
- Course work graded Pass/Non-Pass cannot count on the minor.
- No more than 3 credit hours of coursework graded Satisfactory/Unsatisfactory may count toward the minor.

**X193 credits** No more than 3 credit hours.

**Minor approval** The minor program must be approved by the academic unit offering the minor.

**Filing the minor program form** The minor program form must be filed at least by the time the graduation application is submitted to a college/school advisor.

**Changing the minor** Once the minor program is filed in the college office, any changes must be approved by the academic unit offering the minor.

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The Ohio State University  
College of Arts and Sciences

**Earth Sciences Minor (Environmental Studies subprogram)**

School of Earth Sciences, 275 Mendenhall Laboratory,  
125 South Oval Mall, Columbus, OH 43210-1398;  
Dr. Karen Royce; 614-292-6961; royce.6@osu.edu;  
<http://earthsciences.osu.edu/>

With this minor, students will have critical knowledge and hands-on experience to participate successfully in many public, private and international career opportunities such as government research, homeland security, environmental consulting, oil and natural gas exploration & production, international business, precious and industrial mineral exploration, mining, and processing, renewable and alternative energy resources, and education.

The subprogram in environmental studies requires a minimum of 12 credit hours in upper-level Earth Sciences courses. Preparation for the minor includes one [introductory Earth Sciences course chosen from 7 Earth Sciences courses \(listed below\)](#), plus with a lab [Earth Sciences 4422](#), for a total minimum of **19-16** credit hours for the minor. Some of the required courses have additional pre-requisite courses that are not part of the minor.

The subprogram in environmental studies offers an introduction to the increasingly complex issues and problems affecting Earth's environment.

To declare this minor, schedule an appointment to meet with the coordinating adviser in the School of Earth Sciences (SES) and discuss the minor requirements. Many of the Earth Sciences courses are taught on a specific course offering schedule and SES wants to help you schedule our classes accordingly. Also, any variation from the program described below needs the approval of the coordinating advisor in SES. For further information about the minor program, contact the coordinating advisor (contact information above).

*\*Some courses in this minor may have pre-requisites. Please consult the course bulletin before enrolling in courses.*

**Preparation for the minor (7-94 hours)**

Earth Sciences 1100 or [1200](#) and 1105 or 1108 or 1110 or 1121 or 1151\_ or 2155 (3 or 4 hours)

[Earth Sciences 1422](#) (4 hours)

Where available, an Honors course can substitute for an equivalent non-Honors course listed above

**Core Course (3 credit hours)**

**Complete one of these courses**

Earth Sciences 2203 [Environmental Geoscience](#) (3 hours)

Earth Sciences 2204 [Exploring Water Issues](#) (3 hours)

**Additional courses (at least 9 additional hours are required). At least 3 credit hours must be at or above the 3000-level**

[Earth Sciences 2122 Climate and Life over Billions of years on Earth](#) (4 hours)

Earth Sciences 2203 or 2204 (if not used as "Core Course")

[Earth Sciences 2205 The Planets](#) (3 hours)

Earth Sciences 2206 [Oceanography](#) (3 hours)

Earth Sciences 2210 [Energy, Mineral Resources, and Society](#) (3 hours)

[Earth Sciences 2242](#) (4 hours)

Earth Sciences 4450 [Water, Ice, and Energy in the Earth System](#) (3 hours)

Earth Sciences 5206 [Advanced Oceanography](#) (3 hours)

[Earth Sciences 5242 Natural History of The Bahamas](#) (4 hours)

Earth Sciences 5550 [Geomorphology](#) (4 hours)

Earth Sciences ~~5489-03, 5489-04~~, 5189.05, 5189\_0-6 (2 hours)

Earth Sciences 5621 [Introduction to Geochemistry](#) (3 hours)

Earth Sciences 5622 [Stable Isotope Biogeochemistry](#) (3 hours)

Earth Sciences 5627 [Global Biogeochemical Cycles](#) (3 hours)

Earth Sciences 5628 [Environmental Isotope Geochemistry](#) (3 hours)

[Earth Sciences 5650 Glaciology](#) (4 hours)

[Earth Sciences 5651 Hydrogeology](#) (4 hours)

[Earth Sciences 5663 Global Change and Sustainability in the Earth System](#) (4 hours)

[Earth Sciences 5717 Critical Issues in World Freshwater Resources](#) (4 hours)

[Earth Sciences 5751 Quantitative Ground-Water Flow Modeling](#) (4 hours)

[Earth Sciences 5752 Contaminants in Aqueous Systems](#) (4 hours)

**Earth Sciences (Environmental Studies subprogram) minor program guidelines**

Credit hours required A minimum of 12 credit hrs. 1000 level courses shall not be counted in the minor. At least 3 credit hours must be at or above the 3000-level.

Transfer and EM credit hours allowed A student is permitted to count up to 6 total hours of transfer credit and/or credit by examination.

Overlap with the GE A student is permitted to overlap up to 6 credit hours between the GE and the minor.

Overlap with the major and additional minor(s)

- The minor must be in a different subject than the major.
- The minor must contain a minimum of 12 hours distinct from the major and/or additional minor(s).

Grades required

- Minimum C- for a course to be listed on the minor.
- Minimum 2.00 cumulative GPA for all minor course work.
- Course work graded Pass/Non-Pass cannot count on the minor.
- No more than 3 credit hours of coursework graded Satisfactory/Unsatisfactory may count toward the minor.

X193 credits No more than 3 credit hours.

Minor approval The minor program must be approved by the academic unit offering the minor.

Filing the minor program form The minor program form must be filed at least by the time the graduation application is submitted to a college/school advisor.

Changing the minor Once the minor program is filed in the college office, any changes must be approved by the academic unit offering the minor.

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- Earth Sciences 5650 (4 hours)
- Earth Sciences 5651 (4 hours)
- Earth Sciences 5663 (4 hours)
- Earth Sciences 5717 (4 hours)
- Earth Sciences 5751 (4 hours)
- Earth Sciences 5752 (4 hours)
- Earth Sciences 5754 (4 hours)

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Earth Sciences (Environmental Studies subprogram) minor program guidelines

Credit hours required A minimum of 12 credit hrs. 1000-level courses shall not be counted in the minor. At least 3 credit hours must be at or above the 3000-level.

Transfer and EM credit hours allowed A student is permitted to count up to 6 total hours of transfer credit and/or credit by examination.

Overlap with the GE A student is permitted to overlap up to 6 credit hours between the GE and the minor.

Overlap with the major and additional minor(s)

- The minor must be in a different subject than the major.
- The minor must contain a minimum of 12 hours distinct from the major and/or additional minor(s).

Grades required

- Minimum C- for a course to be listed on the minor.
- Minimum 2.00 cumulative GPA for all minor course work
- Course work graded Pass/Non-Pass cannot count on the minor.
- No more than 3 credit hours of coursework graded Satisfactory/Unsatisfactory may count toward the minor.

X193 credits No more than 3 credit hours.

Minor approval The minor program must be approved by the academic unit offering the minor.

Filing the minor program form The minor program form must be filed at least by the time the graduation application is submitted to a college/school advisor.

Changing the minor Once the minor program is filed in the college office, any changes must be approved by the academic unit offering the minor.

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The Ohio State University  
College of Arts and Sciences

**Earth Sciences Minor (Earth Sciences subprogram)**

School of Earth Sciences, 275 Mendenhall Laboratory,  
125 South Oval Mall, Columbus, OH 43210-1398;  
Dr. Karen Royce; 614-292-6961; royce.6@osu.edu;  
<http://earthsciences.osu.edu/>

With this minor, students will have critical knowledge and hands-on experience to participate successfully in many public, private and international career opportunities such as government research, homeland security, environmental consulting, oil and natural gas exploration & production, international business, precious and industrial mineral exploration, mining, and processing, renewable and alternative energy resources, and education.

The subprogram in Earth Sciences requires a minimum of 12 semester credit hours in core courses. Preparation for the minor includes one or two courses (listed below), for a total minimum of 16 credit hours. Some of the core courses have additional pre-requisite courses that are not part of the minor.

To declare this minor, schedule an appointment to meet with the coordinating adviser in the School of Earth Sciences (SES) and discuss the minor requirements. Many of the Earth Sciences courses are taught on a specific course offering schedule and SES wants to help you schedule our classes accordingly. Also, any variation from the program described below needs the approval of the coordinating adviser in SES. For further information about the minor program, contact the coordinating adviser (contact information above).

*\*Some courses in this minor may have pre-requisites. Please consult the course bulletin before enrolling in courses.*

**Preparation for the minor (4 credit hours)**

Earth Sciences 1100 or 1200 and 1105 or 1108 or 1110 or 1121 or 1151 (4 hours)

Where available, an Honors version can substitute for the equivalent non-Honors courses listed above.

**Core Course (4 credit hours required)**

Earth Sciences 2122 Climate and Life over Billions of years on Earth (4 hours)

**Additional courses (at least 8 additional hours are required)**

Complete a minimum of 8 semester hours in Earth Sciences at the 2000-level or above, with at least 3 credit hours at the 3000-level or higher. A maximum of 3 total credit hours among internship (x191), research (x998, x999), or individual study (x193) can be counted towards the minor with prior approval.

**Additional courses**

None required.

**Earth Sciences (Earth Sciences subprogram) minor program guidelines**

Credit hours required A minimum of 12 credit hrs. 1000 level courses shall not be counted in the minor. At least 3 credits must be at the 3000 level or above.

Transfer and EM credit hours allowed A student is permitted to count up to 6 total hours of transfer credit and/or credit by examination.

Overlap with the GE A student is permitted to overlap up to 6 credit hours between the GE and the minor.

Overlap with the major and additional minor(s)

- The minor must be in a different subject than the major.
- The minor must contain a minimum of 12 hours distinct from the major and/or additional minor(s).

Grades required

- Minimum C- for a course to be listed on the minor.
- Minimum 2.00 cumulative GPA for all minor course work
- minor.
- Course work graded Pass/Non-Pass cannot count on the minor.
- No more than 3 credit hours of coursework graded Satisfactory/Unsatisfactory may count toward the minor.

X191, x998, x999, x193 No more than 3 credit hrs

Minor approval The minor program must be approved by the academic unit offering the minor.

Filing the minor program form The minor program form must be filed at least by the time the graduation application is submitted to a college/school advisor.

Changing the minor Once the minor program is filed in the college office, any changes must be approved by the academic unit offering the minor.

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The Ohio State University  
College of Arts and Sciences

**Earth Sciences Minor (Paleontology subprogram)**

School of Earth Sciences, 275 Mendenhall Laboratory,  
125 South Oval Mall, Columbus, OH 43210-1398;  
Dr. Karen Royce; 614-292-6961; royce.6@osu.edu;  
<http://earthsciences.osu.edu/>

With this minor, students will have critical knowledge and hands-on experience to participate successfully in many public, private and international career opportunities such as government research, homeland security, environmental consulting, oil and natural gas exploration & production, international business, precious and industrial mineral exploration, mining, and processing, renewable and alternative energy resources, and education.

The subprogram in paleontology requires a minimum of 12 credit hours in upper-level Earth Sciences courses. Preparation for the minor includes 7 credit hours, for a total minimum of 19 credit hours. Some of the required courses have additional prerequisite courses that are not part of the minor.

The minor in Earth Sciences with an emphasis in paleontology offers the background necessary for a better understanding of Earth's biosphere and of the chemical and physical processes affecting life on Earth.

To declare this minor, schedule an appointment to meet with the coordinating adviser in the School of Earth Sciences (SES) and discuss the minor requirements. Many of the Earth Sciences courses are taught on a specific course offering schedule and SES wants to help you schedule our classes accordingly. Also, any variation from the program described below needs the approval of the coordinating advisor in SES. For further information about the minor program, contact the coordinating advisor (contact information above).

*\*Some courses in this minor may have pre-requisites. Please consult the course bulletin before enrolling in courses.*

**Preparation for the minor (7 credit hours)**

Earth Sciences 1100 or 1200 and 1105 or 1108 or 1121 or 1151 (4 hours)

And 3 hours in Biological Sciences

Honors versions of these courses, where they exist, may be substituted.

**Core Course (8 credit hours required)**

Earth Sciences 2122 Climate and Life over Billions of years on Earth (4 hours)

Earth Sciences 4501 Paleontology (4 hours)

**Additional courses (at least 4 additional hours are required)**

Earth Sciences 4502 Stratigraphy and Sedimentology (4 hours)

Earth Sciences 4911 Earth's climate: Past and Future (3 hours)

Earth Sciences 5615 Paleoecology (4 hours)

Earth Sciences 5621 Introduction to Geochemistry (3 hours)

Earth Sciences 5206 Advanced Oceanography (3 hours)

**Earth Sciences (Paleontology subprogram) minor program guidelines**

Credit hours required A minimum of 12 credit hrs. 1000 level courses shall not be counted in the minor.

Transfer and EM credit hours allowed A student is permitted to count up to 6 total hours of transfer credit and/or credit by examination.

Overlap with the GE A student is permitted to overlap up to 6 credit hours between the GE and the minor.

Overlap with the major and additional minor(s)

- The minor must be in a different subject than the major.
- The minor must contain a minimum of 12 hours distinct from the major and/or additional minor(s).

Grades required

- Minimum C- for a course to be listed on the minor.
- Minimum 2.00 cumulative GPA for all minor course work
- Course work graded Pass/Non-Pass cannot count on the minor.
- No more than 3 credit hours of coursework graded Satisfactory/Unsatisfactory may count toward the minor.

X193 credits No more than 3 credit hours.

Minor approval The minor program must be approved by the academic unit offering the minor.

Filing the minor program form The minor program form must be filed at least by the time the graduation application is submitted to a college/school advisor.

Changing the minor Once the minor program is filed in the college office, any changes must be approved by the academic unit offering the minor.

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The Ohio State University  
College of Arts and Sciences

**Earth Sciences Minor (Economic Geology subprogram)**

School of Earth Sciences, 275 Mendenhall Laboratory,  
125 South Oval Mall, Columbus, OH 43210-1398;  
Dr. Karen Royce; 614-292-6961; royce.6@osu.edu;  
<http://earthsciences.osu.edu/>

With this minor, students will have critical knowledge and hands-on experience to participate successfully in many public, private and international career opportunities such as government research, homeland security, environmental consulting, oil and natural gas exploration & production, international business, precious and industrial mineral exploration, mining, and processing, renewable and alternative energy resources, and education.

The subprogram in economic geology requires a minimum of 12 credit hours in upper-level Earth Sciences courses. Preparation for the minor includes Earth Sciences 1121 and 1200 and Chemistry 1210, for a total minimum of 21 credit hours. Some of the required courses have additional pre-requisite courses that are not part of the minor.

The minor in Earth Sciences with an emphasis in economic geology offers the background necessary for a better understanding of the formation and exploitation of mineral and precious metal deposits.

To declare this minor, schedule an appointment to meet with the coordinating adviser in the School of Earth Sciences (SES) and discuss the minor requirements. Many of the Earth Sciences courses are taught on a specific course offering schedule and SES wants to help you schedule our classes accordingly. Also, any variation from the program described below needs the approval of the coordinating advisor in SES. For further information about the minor program, contact the coordinating advisor (contact information above).

*\*Some courses in this minor may have pre-requisites. Please consult the course bulletin before enrolling in courses.*

**Preparation for the minor (9 credit hours)**

Earth Sciences 1121 and 1200 or 1121H (4 hours)  
Chemistry 1210 (5 hours)

**Core Courses (9 credit hours required)**

Earth Sciences 2210 Energy, Mineral Resources, and Society (3 hours) OR  
Earth Sciences 2155 Energy and Environment (3 hours) and  
Earth Sciences 4421 Earth Materials (3 hours) and  
Earth Sciences 4423 Intro Petrology (3 hours)

**Additional courses (at least 1 additional course is required) to total at least 12 semester hours in the minor**

Earth Sciences 4425 Energy Resources Sustainability (3 hours)  
Earth Sciences 5621 Introduction to Geochemistry (3 hours)  
Earth Sciences 5660 Geology of Mineral Resources (4 hours)  
Earth Sciences 5670 General and Economic Geology of Selected Areas (2–4 hours)  
Earth Sciences 5687 Borehole Geophysics (3 hours)  
Earth Sciences 5780 Reflection Seismology (4 hours)

**Earth Sciences (Economic Geology subprogram) minor program guidelines**

Credit hours required A minimum of 12 credit hrs. 1000 level courses shall not be counted in the minor.

Transfer and EM credit hours allowed A student is permitted to count up to 6 total hours of transfer credit and/or credit by examination.

Overlap with the GE A student is permitted to overlap up to 6 credit hours between the GE and the minor.

Overlap with the major and additional minor(s)

- The minor must be in a different subject than the major.
- The minor must contain a minimum of 12 hours distinct from the major and/or additional minor(s).

Grades required

- Minimum C- for a course to be listed on the minor.
- Minimum 2.00 cumulative GPA for all minor course work
- Course work graded Pass/Non-Pass cannot count on the minor.
- No more than 3 credit hours of coursework graded Satisfactory/Unsatisfactory may count toward the minor.

X193 credits No more than 3 credit hours.

Minor approval The minor program must be approved by the academic unit offering the minor.

Filing the minor program form The minor program form must be filed at least by the time the graduation application is submitted to a college/school advisor.

Changing the minor Once the minor program is filed in the college office, any changes must be approved by the academic unit offering the minor.

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The Ohio State University  
College of Arts and Sciences

**Earth Sciences Minor (Geoaerchology subprogram)**

School of Earth Sciences, 275 Mendenhall Laboratory,  
125 South Oval Mall, Columbus, OH 43210-1398;  
Dr. Karen Royce; 614-292-6961; royce.6@osu.edu;  
<http://earthsciences.osu.edu/>

With this minor, students will have critical knowledge and hands-on experience to participate successfully in many public, private and international career opportunities such as government research, homeland security, environmental consulting, oil and natural gas exploration & production, international business, precious and industrial mineral exploration, mining, and processing, renewable and alternative energy resources, and education.

The subprogram in geoaerchology requires a minimum of 12 credit hours in upper-level Earth Sciences courses. Preparation for the minor includes Earth Sciences 1121 and 1200 and 3 hours of Biological Sciences, for a total minimum of 19 credit hours. Some of the required courses have additional pre-requisite courses that are not part of the minor.

The minor in Earth sciences with an emphasis in geoaerchology offers the background necessary for a better understanding of the physical nature of natural and artifactual discoveries.

To declare this minor, schedule an appointment to meet with the coordinating adviser in the School of Earth Sciences (SES) and discuss the minor requirements. Many of the Earth Sciences courses are taught on a specific course offering schedule and SES wants to help you schedule our classes accordingly. Also, any variation from the program described below needs the approval of the coordinating adviser in SES. For further information about the minor program, contact the coordinating adviser (contact information above).

*\*Some courses in this minor may have pre-requisites. Please consult the course bulletin before enrolling in courses.*

**Preparation for the minor (7 credit hours)**

Earth Sciences 1121 (3 hours)

Earth Sciences 1200 (1 hour)

And 3 hours in Biological Sciences

Honors versions of the above courses can be substituted.

**Core Courses (8 credit hours required)**

Earth Sciences 2122 Climate and Life over Billions of years on Earth (4 hours)

Earth Sciences 4501 Paleontology (4 hours)

**Additional courses (at least 1 additional course is required)**  
to total at least 12 semester hours in the minor

Earth Sciences 4421 Earth Materials (3 hours)

Earth Sciences 4423 Intro Petrology (3 hours)

Earth Sciences 4502 Stratigraphy and Sedimentology (4 hours)

Earth Sciences 4560 Applied Geophysics (3 hours)

Earth Sciences 5242 Natural History of The Bahamas (4 hours)

Earth Sciences 5550 Geomorphology (4 hours)

Earth Sciences 5622 Stable Isotope Biogeochemistry (3 hours)

Earth Sciences 5650 Glaciology (4 hours)

**Earth Sciences (Geoaerchology subprogram) minor program guidelines**

Credit hours required A minimum of 12 credit hrs. 1000 level courses shall not be counted in the minor.

Transfer and EM credit hours allowed

A student is permitted to count up to 6 total hours of transfer credit and/or credit by examination.

Overlap with the GE A student is permitted to overlap up to 6 credit hours between the GE and the minor.

Overlap with the major and additional minor(s)

- The minor must be in a different subject than the major.
- The minor must contain a minimum of 12 hours distinct from the major and/or additional minor(s).

Grades required

- Minimum C- for a course to be listed on the minor.
- Minimum 2.00 cumulative GPA for all minor course work
- Course work graded Pass/Non-Pass cannot count on the minor.
- No more than 3 credit hours of coursework graded Satisfactory/Unsatisfactory may count toward the minor.

X193 credits No more than 3 credit hours.

Minor approval The minor program must be approved by the academic unit offering the minor.

Filing the minor program form The minor program form must be filed at least by the time the graduation application is submitted to a college/school advisor.

Changing the minor Once the minor program is filed in the college office, any changes must be approved by the academic unit offering the minor.

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The Ohio State University  
College of Arts and Sciences

Earth Sciences Minor (Geophysics subprogram)

School of Earth Sciences, 275 Mendenhall Laboratory,  
125 South Oval Mall, Columbus, OH 43210-1398;  
Dr. Karen Royce; 614-292-6961; royce.6@osu.edu;  
<http://earthsciences.osu.edu/>

With this minor, students will have critical knowledge and hands-on experience to participate successfully in many public, private and international career opportunities such as government research, homeland security, environmental consulting, oil and natural gas exploration & production, international business, precious and industrial mineral exploration, mining, and processing, renewable and alternative energy resources, and education.

The subprogram in geophysics requires a minimum of 12 credit hours in upper-level Earth Sciences courses. Preparation for the minor includes one Earth Sciences introductory course and lab, for a total minimum of 16 credit hours. Some of the required courses have additional pre-requisite courses that are not part of the minor.

The minor in Earth Sciences with an emphasis in geophysics offers the background necessary to use of physics to understand Earth's subsurface environment.

To declare this minor, schedule an appointment to meet with the coordinating advisor in the School of Earth Sciences (SES) and discuss the minor requirements. Many of the Earth Sciences courses are taught on a specific course offering schedule and SES wants to help you schedule our classes accordingly. Also, any variation from the program described below needs the approval of the coordinating advisor in SES. For further information about the minor program, contact the coordinating advisor (contact information above).

*\*Some courses in this minor may have pre-requisites. Please consult the course bulletin before enrolling in courses.*

**Preparation for the minor (4 credit hours)**

Earth Sciences 1121 (3 hours) or  
Earth Sciences 1151 (3 hours)  
And Earth Sciences 1200 (1 hour)  
Honors versions of the above courses can be substituted.

**Core Courses (12 credit hours required)**

Complete 12 hours in Earth Sciences at the 2000-level or above, with at least 9 of the credit hours chosen from the following.

Earth Sciences 2205 The Planets (3 hours)  
Earth Sciences 4421 Earth Materials (3 hours)  
Earth Sciences 4423 Intro Petrology (3 hours)  
Earth Sciences 4560 Applied Geophysics (3 hours)  
Earth Sciences 5205 Planetary Science (3 hours)  
Earth Sciences 5310 Remote Sensing in the Earth Sciences (3 hours)  
Earth Sciences 5680 Deep Earth Geophysics (3 hours)  
Earth Sciences 5687 Borehole Geophysics (3 hours)  
Earth Sciences 5780 Reflection Seismology (4 hours)

**Earth Sciences (Geophysics subprogram) minor program guidelines**

Credit hours required A minimum of 12 credit hrs. 1000 level courses shall not be counted in the minor.

Transfer and EM credit hours allowed A student is permitted to count up to 6 total hours of transfer credit and/or credit by examination.

Overlap with the GE A student is permitted to overlap up to 6 credit hours between the GE and the minor.

Overlap with the major and additional minor(s)

- The minor must be in a different subject than the major.
- The minor must contain a minimum of 12 hours distinct from the major and/or additional minor(s).

Grades required

- Minimum C- for a course to be listed on the minor.
- Minimum 2.00 cumulative GPA for all minor course work
- Course work graded Pass/Non-Pass cannot count on the minor.
- No more than 3 credit hours of coursework graded Satisfactory/Unsatisfactory may count toward the minor.

X193 credits No more than 3 credit hours.

Minor approval The minor program must be approved by the academic unit offering the minor.

Filing the minor program form The minor program form must be filed at least by the time the graduation application is submitted to a college/school advisor.

Changing the minor Once the minor program is filed in the college office, any changes must be approved by the academic unit offering the minor.

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The Ohio State University  
College of Arts and Sciences

**Earth Sciences Minor (Geochemistry subprogram)**

School of Earth Sciences, 275 Mendenhall Laboratory,  
125 South Oval Mall, Columbus, OH 43210-1398;  
Dr. Karen Royce; 614-292-6961; royce.6@osu.edu;  
<http://earthsciences.osu.edu/>

With this minor, students will have critical knowledge and hands-on experience to participate successfully in many public, private and international career opportunities such as government research, homeland security, environmental consulting, oil and natural gas exploration & production, international business, precious and industrial mineral exploration, mining, and processing, renewable and alternative energy resources, and education.

The subprogram in Geochemistry requires a minimum of 12 credit hours in upper-level Earth Sciences courses. Preparation for the minor includes Earth Sciences 1121 and 1200 and Chemistry 1210, for a total minimum of 21 credit hours. Some of the required courses have additional pre-requisite courses that are not part of the minor.

The minor in Earth Sciences with an emphasis in geochemistry offers the background necessary for a better understanding of the chemical nature of Earth's environment.

To declare this minor, schedule an appointment to meet with the coordinating adviser in the School of Earth Sciences (SES) and discuss the minor requirements. Many of the Earth Sciences courses are taught on a specific course offering schedule and SES wants to help you schedule our classes accordingly. Also, any variation from the program described below needs the approval of the coordinating advisor in SES. For further information about the minor program, contact the coordinating advisor (contact information above).

*\*Some courses in this minor may have pre-requisites. Please consult the course bulletin before enrolling in courses.*

**Preparation for the minor (9 credit hours)**

Earth Sciences 1121 (3 hours)

Earth Sciences 1200 (1 hour)

Chemistry 1210 (5 hours)

Honors version of these courses may be substituted.

**Core Courses (6-7 credit hours required)**

Complete 1 of the following courses:

Earth Sciences 2122 Climate and Life over Billions of years on Earth (4 hours)

Earth Sciences 2203 Environmental Geoscience (3 hours)

Earth Sciences 2204 Exploring Water Issues (3 hours)

Earth Sciences 2206 Oceanography (3 hours)

Complete the following course:

Earth Sciences 4421 Earth Materials (3 hours)

**Additional courses (at least 2 additional courses are required from the list below)**

Earth Sciences 4423 Intro Petrology (3 hours)

Earth Sciences 5621 Introduction to Geochemistry (3 hours)

Earth Sciences 5622 Stable Isotope Biogeochemistry (3 hours)

Earth Sciences 5627 Global Biogeochemical Cycles (3 hours)

Earth Sciences 5628 Environmental Isotope Geochemistry (3 hours)

**Earth Sciences (Geochemistry subprogram) minor program guidelines**

Credit hours required A minimum of 12 credit hrs. 1000 level courses shall not be counted in the minor.

Transfer and EM credit hours allowed A student is permitted to count up to 6 total hours of transfer credit and/or credit by examination.

Overlap with the GE A student is permitted to overlap up to 6 credit hours between the GE and the minor.

Overlap with the major and additional minor(s)

• The minor must be in a different subject than the major.

• The minor must contain a minimum of 12 hours distinct from the major and/or additional minor(s).

Grades required

• Minimum C- for a course to be listed on the minor.

• Minimum 2.00 cumulative GPA for all minor course work

• Course work graded Pass/Non-Pass cannot count on the minor.

• No more than 3 credit hours of coursework graded Satisfactory/Unsatisfactory may count toward the minor.

X193 credits No more than 3 credit hours.

Minor approval The minor program must be approved by the academic unit offering the minor.

Filing the minor program form The minor program form must be filed at least by the time the graduation application is submitted to a college/school advisor.

Changing the minor Once the minor program is filed in the college office, any changes must be approved by the academic unit offering the minor.

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The Ohio State University  
College of Arts and Sciences

**Earth Sciences Minor (Mineralogy and Petrology subprogram)**

School of Earth Sciences, 275 Mendenhall Laboratory,  
125 South Oval Mall, Columbus, OH 43210-1398;  
Dr. Karen Royce; 614-292-6961; royce.6@osu.edu;  
<http://earthsciences.osu.edu/>

With this minor, students will have critical knowledge and hands-on experience to participate successfully in many public, private and international career opportunities such as government research, homeland security, environmental consulting, oil and natural gas exploration & production, international business, precious and industrial mineral exploration, mining, and processing, renewable and alternative energy resources, and education.

The subprogram in mineralogy and petrology requires a minimum of 12 credit hours in upper-level Earth Sciences courses. Preparation for the minor includes Earth Sciences 1121 and 1200 and Chemistry 1210, for a total minimum of 21 credit hours. Some of the required courses have additional pre-requisite courses that are not part of the minor.

To declare this minor, schedule an appointment to meet with the coordinating adviser in the School of Earth Sciences (SES) and discuss the minor requirements. Many of the Earth Sciences courses are taught on a specific course offering schedule and SES wants to help you schedule our classes accordingly. Also, any variation from the program described below needs the approval of the coordinating advisor in SES. For further information about the minor program, contact the coordinating advisor (contact information above).

*\*Some courses in this minor may have pre-requisites. Please consult the course bulletin before enrolling in courses.*

**Preparation for the minor (9 credit hours)**

Earth Sciences 1121 (3 hours)

Earth Sciences 1200 (1 hour)

Chemistry 1210 (5 hours)

The Honors version of this course can be substituted.

**Core Courses (6 credit hours required)**

Earth Sciences 4421 Earth Materials (3 hours)

Earth Sciences 4423 Intro Petrology (3 hours)

**Additional courses (at least 6 additional hours are required, chosen from among these courses)**

Earth Sciences 5617 Petrology of Earth and Planets (4 hours)

Earth Sciences 5621 Introduction to Geochemistry (3 hours)

Earth Sciences 5625 Igneous Petrology (4 hours)

Earth Sciences 5636 Advanced Topics in Mineralogy and Crystallography (3 hours)

**Earth Sciences (Mineralogy and Petrology subprogram) minor program guidelines**

**Credit hours required** A minimum of 12 credit hrs. 1000 level courses shall not be counted in the minor.

**Transfer and EM credit hours allowed** A student is permitted to count up to 6 total hours of transfer credit and/or credit by examination.

**Overlap with the GE** A student is permitted to overlap up to 6 credit hours between the GE and the minor.

**Overlap with the major and additional minor(s)**

- The minor must be in a different subject than the major.

- The minor must contain a minimum of 12 hours distinct from the major and/or additional minor(s).

**Grades required**

- Minimum C- for a course to be listed on the minor.
- Minimum 2.00 cumulative GPA for all minor course work
- Course work graded Pass/Non-Pass cannot count on the minor.
- No more than 3 credit hours of coursework graded Satisfactory/Unsatisfactory may count toward the minor.

**X193 credits** No more than 3 credit hours.

**Minor approval** The minor program must be approved by the academic unit offering the minor.

**Filing the minor program form** The minor program form must be filed at least by the time the graduation application is submitted to a college/school advisor.

**Changing the minor** Once the minor program is filed in the college office, any changes must be approved by the academic unit offering the minor.

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College of Arts and Sciences

**Earth Sciences Minor (Environmental Studies subprogram)**

School of Earth Sciences, 275 Mendenhall Laboratory,  
125 South Oval Mall, Columbus, OH 43210-1398;  
Dr. Karen Royce; 614-292-6961; royce.6@osu.edu;  
<http://earthsciences.osu.edu/>

With this minor, students will have critical knowledge and hands-on experience to participate successfully in many public, private and international career opportunities such as government research, homeland security, environmental consulting, oil and natural gas exploration & production, international business, precious and industrial mineral exploration, mining, and processing, renewable and alternative energy resources, and education.

The subprogram in environmental studies requires a minimum of 12 credit hours in upper-level Earth Sciences courses. Preparation for the minor includes one introductory Earth Sciences course with a lab, for a total minimum of 16 credit hours for the minor. Some of the required courses have additional pre-requisite courses that are not part of the minor.

The subprogram in environmental studies offers an introduction to the increasingly complex issues and problems affecting Earth's environment.

To declare this minor, schedule an appointment to meet with the coordinating adviser in the School of Earth Sciences (SES) and discuss the minor requirements. Many of the Earth Sciences courses are taught on a specific course offering schedule and SES wants to help you schedule our classes accordingly. Also, any variation from the program described below needs the approval of the coordinating advisor in SES. For further information about the minor program, contact the coordinating advisor (contact information above).

*\*Some courses in this minor may have pre-requisites. Please consult the course bulletin before enrolling in courses.*

**Preparation for the minor (4 hours)**

Earth Sciences 1100 or 1200 and 1105 or 1108 or 1110 or 1121 or 1151 or 2155 (4 hours)

Where available, an Honors course can substitute for an equivalent non-Honors course listed above

**Core Course (3 credit hours)**

**Complete one of these courses**

Earth Sciences 2203 Environmental Geoscience (3 hours)

Earth Sciences 2204 Exploring Water Issues (3 hours)

**Additional courses (at least 9 additional hours are required). At least 3 credit hours must be at or above the 3000-level**

Earth Sciences 2122 Climate and Life over Billions of years on Earth (4 hours)

Earth Sciences 2203 or 2204 (if not used as "Core Course")

Earth Sciences 2205 The Planets (3 hours)

Earth Sciences 2206 Oceanography (3 hours)

Earth Sciences 2210 Energy, Mineral Resources, and Society (3 hours)

Earth Sciences 4450 Water, Ice, and Energy in the Earth System (3 hours)

Earth Sciences 5206 Advanced Oceanography (3 hours)

Earth Sciences 5242 Natural History of The Bahamas (4 hours)

Earth Sciences 5550 Geomorphology (4 hours)

Earth Sciences 5189.05, 5189.06 (2 hours)

Earth Sciences 5621 Introduction to Geochemistry (3 hours)

Earth Sciences 5622 Stable Isotope Biogeochemistry (3 hours)

Earth Sciences 5627 Global Biogeochemical Cycles (3 hours)

Earth Sciences 5628 Environmental Isotope Geochemistry (3 hours)

Earth Sciences 5650 Glaciology (4 hours)

Earth Sciences 5651 Hydrogeology (4 hours)

Earth Sciences 5663 Global Change and Sustainability in the Earth System (4 hours)

Earth Sciences 5717 Critical Issues in World Freshwater Resources (4 hours)

Earth Sciences 5751 Quantitative Ground-Water Flow Modeling (4 hours)

Earth Sciences 5752 Contaminants in Aqueous Systems (4 hours)

**Earth Sciences (Environmental Studies subprogram) minor program guidelines**

Credit hours required A minimum of 12 credit hrs. 1000 level courses shall not be counted in the minor. At least 3 credit hours must be at or above the 3000-level.

Transfer and EM credit hours allowed A student is permitted to count up to 6 total hours of transfer credit and/or credit by examination.

Overlap with the GE A student is permitted to overlap up to 6 credit hours between the GE and the minor.

Overlap with the major and additional minor(s)

- The minor must be in a different subject than the major.
- The minor must contain a minimum of 12 hours distinct from the major and/or additional minor(s).

Grades required

- Minimum C- for a course to be listed on the minor.
- Minimum 2.00 cumulative GPA for all minor course work
- Course work graded Pass/Non-Pass cannot count on the minor.
- No more than 3 credit hours of coursework graded Satisfactory/Unsatisfactory may count toward the minor.

X193 credits No more than 3 credit hours.

Minor approval The minor program must be approved by the academic unit offering the minor.

Filing the minor program form The minor program form must be filed at least by the time the graduation application is submitted to a college/school advisor.

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**From:** [Lower, Steven](#)  
**To:** [Reed, Katie](#); [Leite, Fabio](#)  
**Cc:** [Lower, Steven](#)  
**Subject:** Re: 11/1 CAA Meeting - ASC Proposal  
**Date:** Wednesday, November 1, 2023 6:59:58 AM  
**Attachments:** [image002.png](#)  
[image003.png](#)  
[image001.png](#)

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Dear Kate and Fábio –

I was able to get answers to your three questions (see below in **red**) thanks to Associate Professor Liz Griffith.

Unfortunately, the School of Earth Sciences won't have a representative at today's meeting. Hopefully, the information provided below will be enough to allow you to make a decision. I appreciate your consideration of the changes to our minor.

Best wishes,  
--Steven



**Steven K. Lower, Ph.D.**

Director & Professor, School of Earth Sciences  
Professor, School of Environmental & Natural Resources  
Professor, Department of Microbial Infection & Immunity  
**Ohio State University**  
275 Mendenhall Lab, 125 S. Oval Mall, Columbus, OH 43210  
614-292-1571 Office  
[Lower.9@osu.edu](mailto:Lower.9@osu.edu)  
Pronouns: he / him / his

**What has been the impact of ES2122 on students with declared minor since its inception in 2020?**

Since ES2122 became the course required for our new majors in 2020 (and 1122 was no longer being taught), students with a declared minor had to complete this course new course 2122 in place of 1122 only where it was required as a prereq or if they chose it as an option for a prereq. Note this course (ES 1122) was not included as a prereq or required course in all of our minor subprograms. This changed replaced a foundational level course with a more advanced 2000-level course. Because the course is now taught at the higher level, it can be included as a 4-credit course in the minor where appropriate (i.e., it is being proposed to be removed as one of the options for a 1000-level

foundational (prereq) course for Geophysics subprogram; removed as a required 1000-level foundational (prereq) course for Geochemistry subprogram and added to the list of optional 2000-level courses for this Geochemistry minor; removed as an option for a 1000-level foundational (prereq) course for Environmental Sciences subprogram and included as an elective for this minor). These changes are outlined in the documents shared.

· **What will the impact of the revision be on current students in any of the 8 minor subprograms?**

Current students in the 8 minor subprograms can opt to follow the new requirements/options.

· **Have there been assessment changes (other than assessing ES2122 as a new course) on the major that might carry on to the minor since 2020? Any assessment changes to the minor specifically with this revision?**

There are not any assessment changes in the major that need to be carried over to the minor given this specific change. These changes do not require any assessments to be changed because where the course was required before (as a prereq) it is now part of the minor subprogram except in the case of the Geochemistry subprogram where it is now an option (one of several 2000-level courses) thereby increasing the flexibility of this minor for our students interested in the field of geochemistry.

These proposed changes with ES 2122 add flexibility for students seeking our minors, where ES 2122 is a choice or required course in the minor, it allows more students with varied majors (particularly non-science) across all colleges at the university to have more access to the minor. Many of the subprograms had 8 hours of ES prerequisites and 12 hours for the minor, for a total of 20 hours in ES. Now, there is a reduction of about 4 hours in ES for prerequisites for most subprograms with 12 hours in ES for the minor, so the total is a more manageable 16 hours (often with students discovering the minor through taking one of our 1000-level foundational courses which also serve as a prereq for the minor).

---

**From:** Reed, Katie <reed.901@osu.edu>  
**Date:** Tuesday, October 31, 2023 at 9:55 AM  
**To:** Lower, Steven <lower.9@osu.edu>  
**Subject:** RE: 11/1 CAA Meeting - ASC Proposal

Dear Dr. Lower:

Were you able to identify anyone to attend tomorrow's CAA meeting? If not, are you OK with us presenting the proposal without a representative, or would you like us to move the proposal to the next CAA meeting?

Thanks,  
Katie

---

**From:** Lower, Steven <lower.9@osu.edu>  
**Sent:** Monday, October 30, 2023 6:53 AM  
**To:** Leite, Fabio <leite.11@osu.edu>  
**Cc:** Reed, Katie <reed.901@osu.edu>; Griffith, Elizabeth M. <griffith.906@osu.edu>; Lower, Steven <lower.9@osu.edu>  
**Subject:** Re: 11/1 CAA Meeting - ASC Proposal

Dear Fábio –

I will connect with Liz Griffith about the questions that are posed your email below.

I am trying to find a representative to attend the meeting on Nov 1 at 3:15pm. Unfortunately, neither Liz or I can make it, and our lead instructor on ES2122 (Prof Matt Saltzman) is on FPL this semester. We should at least be able to provide answers to the three questions even if no one from SES is able to attend to represent the proposal.

Thank you for considering our proposal to revise the minor.

--Steven



**Steven K. Lower, Ph.D.**

Director & Professor, School of Earth Sciences  
Professor, School of Environmental & Natural Resources  
Professor, Department of Microbial Infection & Immunity

**Ohio State University**

275 Mendenhall Lab, 125 S. Oval Mall, Columbus, OH 43210  
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[Lower.9@osu.edu](mailto:Lower.9@osu.edu)

Pronouns: he / him / his

---

**From:** Leite, Fabio <leite.11@osu.edu>  
**Date:** Thursday, October 26, 2023 at 3:17 PM

**To:** Griffith, Elizabeth M. <[griffith.906@osu.edu](mailto:griffith.906@osu.edu)>, Lower, Steven <[lower.9@osu.edu](mailto:lower.9@osu.edu)>

**Cc:** Reed, Katie <[reed.901@osu.edu](mailto:reed.901@osu.edu)>

**Subject:** Re: 11/1 CAA Meeting - ASC Proposal

Dear Professor Lower and Professor Griffith,

Following up on Katie's invitation, I look forward to having the proposal reviewed by the Council next week. Given my review of the proposal, I would like to ask for clarification on the following:

- What has been the impact of ES2122 on students with declared minor since its inception in 2020?
- What will the impact of the revision be on current students in any of the 8 minor subprograms?
- Have there been assessment changes (other than assessing ES2122 as a new course) on the major that might carry on to the minor since 2020? Any assessment changes to the minor specifically with this revision?

You are welcome to have answers to these questions ready to share with the Council during our meeting or to share them in advance with us.

Thanks in advance,  
Fábio

---

Fábio P. Leite, MBA, Ph.D.

[Pronounced lay-chee] | (he/him)

Associate Professor of Psychology | College of Arts and Sciences & Lima Campus |

<https://psychology.osu.edu>

Academic Director, Brazil Gateway | Office of International Affairs | <https://oia.osu.edu/units/global-gateways/brazil-gateway>

Chair, Council on Academic Affairs | University Senate | <https://oaa.osu.edu/council-academic-affairs>

The Ohio State University

---

**From:** Reed, Katie <[reed.901@osu.edu](mailto:reed.901@osu.edu)>

**Date:** Thursday, October 26, 2023 at 10:53 AM

**To:** Griffith, Elizabeth M. <[griffith.906@osu.edu](mailto:griffith.906@osu.edu)>, Lower, Steven <[lower.9@osu.edu](mailto:lower.9@osu.edu)>

**Cc:** Leite, Fabio <[leite.11@osu.edu](mailto:leite.11@osu.edu)>, Smith, Randy <[smith.70@osu.edu](mailto:smith.70@osu.edu)>, Vankeerbergen, Bernadette <[vankeerbergen.1@osu.edu](mailto:vankeerbergen.1@osu.edu)>, Martin, Andrew <[martin.1026@osu.edu](mailto:martin.1026@osu.edu)>

**Subject:** 11/1 CAA Meeting - ASC Proposal

Dear Drs. Griffith and Lower:

The Council on Academic Affairs will discuss the following proposal at its meeting on **Wednesday, November 1**, from 3-5 p.m. at the Ohio Union:

- **Proposal to revise the Earth Sciences minor – College of Arts and Sciences**

The meeting's draft agenda is attached. We anticipate that proposal discussions will begin at 3:15 p.m.

Please let me know if you and/or a designee(s) will attend to represent the proposal.

Thanks,  
Katie



**Katie Reed**

Executive Assistant to the Vice President for Resource and Budget Management

Executive Assistant to the Vice Provost for Academic Programs

Executive Assistant to the Vice Provost for Urban Research and Community Engagement

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