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; 614-292-2721; 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 two courses (listed below), for a total minimum of 19 credit hours. Some of the core courses have additional pre-requisite courses that are not part of the minor.

If you complete the minor following the guidelines below, you need only file your Minor Program Form with your college or school counselor. Any variation from the program described below needs the approval of the coordinating adviser in the School of Earth Sciences. For further information about the minor program, contact the School of Earth Sciences.

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

Preparation for the minor (7–8 hours)
Earth Sciences 1100 or 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 Courses (12 credit hours required)
Complete a minimum of 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.

Additional courses
None required.

Arts and Sciences minor program guidelines
The following guidelines govern minors:

Required for graduation No

Credit hours required A minimum of 12 credit hrs (some minors require more). 1000 level courses shall not be counted toward the 12 credit hr minimum.

Transfer credit hours allowed No more than one half of the credit hours required on the minor.

Overlap with the GE Permitted, unless specifically disallowed by an individual minor program.

Overlap with the major Not allowed and
• The minor must be in a different subject than the major.
• The same courses cannot count on the minor and on the major.

Overlap between minors Each minor completed must contain 12 unique hours.

Grades required
• Minimum C- for a course to be listed on the minor.
• Minimum 2.00 cumulative point-hour ratio required for the minor.
• Course work graded Pass/Non-Pass cannot count on the minor.

Minor Approval The minor program description sheet indicates if the minor course work must be approved by:
• The academic unit offering the minor, or
• A college/school counselor.

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 counselor.

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, or
• A college/school counselor (depending on the minor).
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;  
614-292-2721; 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 13 credit hours in upper-level Earth Sciences courses. Preparation for the minor includes Earth Sciences 1121 and 1122, 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 geoarchaeology offers the background necessary for a better understanding of the physical nature of natural and artifactual discoveries.

If you complete the minor following the guidelines below, you need only file your Minor Program Form with your college or school counselor. Any variation from the program described below needs the approval of the coordinating adviser in the School of Earth Sciences. For further information about the minor program, contact the School of Earth Sciences.

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

**Preparation for the minor**
Earth Sciences 1121 (4 hours)
Earth Sciences 1122 (4 hours)
Honors versions of the above courses can be substituted.

**Core Courses (10 credit hours required)**
Earth Sciences 4421 (3 hours)
Earth Sciences 4423 (3 hours)
Earth Sciences 4501 (4 hours)

**Additional courses (at least 1 additional course is required)**
Earth Sciences 4502 (4 hours)
Earth Sciences 4560 (3 hours)
Earth Sciences 5550 (4 hours)
Earth Sciences 5622 (3 hours)
Earth Sciences 5650 (4 hours)

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

The following guidelines govern the Geoarcheology subprogram of the Earth Sciences minor:

**Required for graduation** No

**Credit hours required** A minimum of 13 credit hrs. 1000 level courses shall not be counted toward the 13 credit hr minimum.

**Transfer credit hours allowed** No more than one half of the credit hours required on the minor.

**Overlap with the GE** Permitted, unless specifically disallowed by an individual minor program.

**Overlap with the major** Not allowed and
- The minor must be in a different subject than the major.
- The same courses cannot count on the minor and on the major.

**Overlap between minors** Each minor completed must contain 12 unique hours.

**Grades required**
- Minimum C- for a course to be listed on the minor.
- Minimum 2.00 cumulative point-hour ratio required for the minor.
- Course work graded Pass/Non-Pass cannot count on the minor.

**Minor Approval** The minor program description sheet indicates if the minor course work must be approved by:
- The academic unit offering the minor, or
- A college/school counselor.

**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 counselor.

**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, or
- A college/school counselor (depending on the minor).
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, 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 mineralogy and petrology offers the background necessary for a better understanding of the physical and chemical nature of Earth materials and their occurrence in and on Earth.

If you complete the minor following the guidelines below, you need only file your Minor Program Form with your college or school counselor. Any variation from the program described below needs the approval of the coordinating adviser in the School of Earth Sciences. For further information about the minor program, contact the School of Earth Sciences.

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

**Preparation for the minor**

Earth Sciences 1121

The Honors version of this course can be substituted.

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

Earth Sciences 4421 (3 hours)
Earth Sciences 4423 (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 (4 hours)
Earth Sciences 5621 (3 hours)
Earth Sciences 5625 (4 hours)
Earth Sciences 5636 (3 hours)
School of Earth Sciences, 275 Mendenhall Laboratory, 125 South Oval Mall, Columbus, OH 43210-1398; 614-292-2721; 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, 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 economic geology offers the background necessary for a better understanding of the formation and exploitation of mineral and precious metal deposits.

If you complete the minor following the guidelines below, you need only file your Minor Program Form with your college or school counselor. Any variation from the program described below needs the approval of the coordinating adviser in the School of Earth Sciences. For further information about the minor program, contact the School of Earth Sciences.

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

**Preparation for the minor**
Earth Sciences 1121 or H1121 (4 hours)

**Core Courses (9 credit hours required)**
Earth Sciences 2210 (3 hours)  
Earth Sciences 4421 (3 hours)  
Earth Sciences 4423 (3 hours)

**Additional courses (at least 1 additional course is required) to total at least 12 semester hours in the minor**
Earth Sciences 5621 (3 hours)  
Earth Sciences 5660 (4 hours)  
Earth Sciences 5670 (2–4 hours)

**Arts and Sciences minor program guidelines**
The following guidelines govern minors:

**Required for graduation** No

**Credit hours required** A minimum of 12 credit hrs (some minors require more). 1000 level courses shall not be counted toward the 12 credit hr minimum.

**Transfer credit hours allowed** No more than one half of the credit hours required on the minor.

**Overlap with the GE** Permitted, unless specifically disallowed by an individual minor program.

**Overlap with the major** Not allowed and  
• The minor must be in a different subject than the major.  
• The same courses cannot count on the minor and on the major.

**Overlap between minors** Each minor completed must contain 12 unique hours.

**Grades required**
• Minimum C- for a course to be listed on the minor.  
• Minimum 2.00 cumulative point-hour ratio required for the minor.  
• Course work graded Pass/Non-Pass cannot count on the minor.

**Minor Approval** The minor program description sheet indicates if the minor course work must be approved by:  
• The academic unit offering the minor, or  
• A college/school counselor.

**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 counselor.

**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, or  
• A college/school counselor (depending on the minor).
School of Earth Sciences, 275 Mendenhall Laboratory, 125 South Oval Mall, Columbus, OH 43210-1398; 614-292-2721; 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 15 credit hours in upper-level Earth Sciences courses. Preparation for the minor includes Earth Sciences 1121 and 1122, for a total minimum of 23 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.

If you complete the minor following the guidelines below, you need only file your Minor Program Form with your college or school counselor. Any variation from the program described below needs the approval of the coordinating adviser in the School of Earth Sciences. For further information about the minor program, contact the School of Earth Sciences

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

Preparation for the minor
Earth Sciences 1121 (4 hours)
Earth Sciences 1122 (4 hours)
Honors version of these courses may be substituted.

Core Courses (9 credit hours required)
Complete 1 of the following courses:
Earth Sciences 2203 (3 hours)
Earth Sciences 2204 (3 hours)
Earth Sciences 2206 (3 hours)

Complete both of the following courses
Earth Sciences 4421 (3 hours)
Earth Sciences 4423 (3 hours)

Additional courses (at least 2 additional courses are required from the list below)
Earth Sciences 5621 (3 hours)
Earth Sciences 5622 (3 hours)
Earth Sciences 5627 (3 hours)
Earth Sciences 5628 (3 hours)
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;  
614-292-2721; 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  
ergy 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.

If you complete the minor following the guidelines below, you  
need only file your Minor Program Form with your college or  
school counselor. Any variation from the program described  
below needs the approval of the coordinating adviser in the  
School of Earth Sciences. For further information about the  
minor program, contact the School of Earth Sciences

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

Preparation for the minor
Earth Sciences 1100 or 1105 or 1108 or 1121 or 1151 or 2155  
(3 or 4 hours)
Earth Sciences 1122 (4 hours)
Honors versions of these courses, where they exist, may be  
substituted.

Core Course (4 credit hours required)
Earth Sciences 4501 (4 hours)

Additional courses (at least 8 additional hours are required)
Earth Sciences 4502 (4 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 (4 hours)
Earth Sciences 5621 (3 hours)
Earth Sciences 5206 (3 hours)

Arts and Sciences minor program guidelines
The following guidelines govern minors:

Required for graduation No

Credit hours required A minimum of 12 credit hrs (some  
minors require more). 1000 level courses shall not be  
counted toward the 12 credit hr minimum.

Transfer credit hours allowed No more than one half of the  
credit hours required on the minor.

Overlap with the GE Permitted, unless specifically  
disallowed by an individual minor program.

Overlap with the major Not allowed and  
• The minor must be in a different subject than the major.  
• The same courses cannot count on the minor and on the  
  major.

Overlap between minors Each minor completed must  
contain 12 unique hours.

Grades required  
• Minimum C- for a course to be listed on the minor.  
• Minimum 2.00 cumulative point-hour ratio required for  
  the minor.  
• Course work graded Pass/Non-Pass cannot count on the  
  minor.

Minor Approval The minor program description sheet  
indicates if the minor course work must be approved by:  
• The academic unit offering the minor, or  
• A college/school counselor.

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 counselor.

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, or  
• A college/school counselor (depending on the minor).

College of Arts and Sciences  
Curriculum and Assessment Services  
154 Denney Hall, 164 W. 17th Ave.  
http://artsandsciences.osu.edu

Received 5/28/12 DH
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 course chosen from 7 Earth Sciences courses (listed below), plus Earth Sciences 1122, for a total minimum of 19 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.

If you complete the minor following the guidelines below, you need only file your Minor Program Form with your college or school counselor. Any variation from the program described below needs the approval of the coordinating adviser in the School of Earth Sciences. For further information about the minor program, contact the School of Earth Sciences.

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

Preparation for the minor (7–8 hours)

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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>Earth Sciences 1100 or 1105 or 1108 or 1110 or 1121 or 1151 or 2155</td>
<td>3 or 4 hours</td>
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<tr>
<td>Earth Sciences 1122</td>
<td>4 hours</td>
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Where available, an Honors course can substitute for an equivalent non-Honors course listed above.

Core Course (3 credit hours)

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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>Earth Sciences 2203</td>
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</tr>
<tr>
<td>Earth Sciences 2204</td>
<td>3 hours</td>
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</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>Earth Sciences 2203 or 2204</td>
<td>3 hours</td>
<td></td>
</tr>
<tr>
<td>Earth Sciences 2206</td>
<td>3 hours</td>
<td></td>
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<tr>
<td>Earth Sciences 2210</td>
<td>3 hours</td>
<td></td>
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<tr>
<td>Earth Sciences 2212</td>
<td>4 hours</td>
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<tr>
<td>Earth Sciences 4450</td>
<td>3 hours</td>
<td></td>
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<tr>
<td>Earth Sciences 5206</td>
<td>3 hours</td>
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<tr>
<td>Earth Sciences 5550</td>
<td>4 hours</td>
<td></td>
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<tr>
<td>Earth Sciences 5189.03, 5189.04, 5189.05, 5189.06</td>
<td>2 hours</td>
<td></td>
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<tr>
<td>Earth Sciences 5621</td>
<td>3 hours</td>
<td></td>
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<tr>
<td>Earth Sciences 5622</td>
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<td>Earth Sciences 5627</td>
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<td>Earth Sciences 5651</td>
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<td>Earth Sciences 5663</td>
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<td>Earth Sciences 5717</td>
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</tbody>
</table>

Arts and Sciences minor program guidelines

The following guidelines govern minors:

Required for graduation No

Credit hours required A minimum of 12 credit hrs (some minors require more). 1000 level courses shall not be counted toward the 12 credit hr minimum.

Transfer credit hours allowed No more than one half of the credit hours required on the minor.

Overlap with the GE Permitted, unless specifically disallowed by an individual minor program.

Overlap with the major Not allowed and
- The minor must be in a different subject than the major.
- The same courses cannot count on the minor and on the major.

Overlap between minors Each minor completed must contain 12 unique hours.

Grades required
- Minimum C- for a course to be listed on the minor.
- Minimum 2.00 cumulative point-hour ratio required for the minor.
- Course work graded Pass/Non-Pass cannot count on the minor.

Minor Approval The minor program description sheet indicates if the minor course work must be approved by:
- The academic unit offering the minor, or
- A college/school counselor.

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 counselor.

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, or
- A college/school counselor (depending on the minor).
Earth Sciences Minor (Geophysics subprogram)

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 Earth Sciences introductory courses, for a total minimum of 18 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.

If you complete the minor following the guidelines below, you need only file your Minor Program Form with your college or school counselor. Any variation from the program described below needs the approval of the coordinating adviser in the School of Earth Sciences. For further information about the minor program, contact the School of Earth Sciences.

*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)
- Earth Sciences 1121 (4 hours)
- Earth Sciences 1122 (4 hours)
- Earth Sciences 1151 (3 hours)
- Earth Sciences 2155 (3 hours)
- Honors versions can substitute for 1121 and 1122.

### 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 4310 (3 hours)
- Earth Sciences 4421 (3 hours)
- Earth Sciences 4423 (3 hours)
- Earth Sciences 4560 (3 hours)
- Earth Sciences 5680 (3 hours)
- Earth Sciences 5687 (3 hours)
- Earth Sciences 5780 (4 hours)

### Arts and Sciences minor program guidelines
The following guidelines govern minors:

- **Required for graduation**: No
- **Credit hours required**: A minimum of 12 credit hrs (some minors require more). 1000 level courses shall not be counted toward the 12 credit hr minimum.
- **Transfer credit hours allowed**: No more than one half of the credit hours required on the minor.
- **Overlap with the GE**: Permitted, unless specifically disallowed by an individual minor program.
- **Overlap with the major**: Not allowed and
  - The minor must be in a different subject than the major.
  - The same courses cannot count on the minor and on the major.
- **Overlap between minors**: Each minor completed must contain 12 unique hours.
- **Grades required**:
  - Minimum C- for a course to be listed on the minor.
  - Minimum 2.00 cumulative point-hour ratio required for the minor.
  - Course work graded Pass/Non-Pass cannot count on the minor.
- **Minor Approval**: The minor program description sheet indicates if the minor course work must be approved by:
  - The academic unit offering the minor, or
  - A college/school counselor.
- **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 counselor.
- **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, or
  - A college/school counselor (depending on the minor).