AQUATIC ECOSYSTEM SCIENCE AND RESTORATION

The major in Ecosystem Science and Restoration prepares students to understand how ecosystems work to solve pressing environmental problems or help restore degraded ecosystems. Students can select one of two options:

- the terrestrial concentration, which focuses on the understanding and repair of terrestrial ecosystems; and
- the aquatic concentration, which focuses on aquatic ecosystem function and watershed restoration.

Students engage in field-based learning, contribute to cutting-edge restoration or ecosystem science projects, and are challenged to apply ecological theory to restoration practice. The major requires completion of a nine-credit restoration capstone, during which students gain hands-on real-world experience planning and implementing restoration projects in partnership with natural resource management agencies and organizations in western Montana.

A degree in Ecosystem Science and Restoration prepares students for careers as ecologists or restoration practitioners with non-profit, private, or governmental agencies and for graduate school in ecology or natural resource management. Students who graduate with this major may qualify for the following federal civil service jobs:

- biological technician (Series 0404),
- ecologist (Series GS-408),
- forester (Series G-460),
- hydrologist (Series GS-1315) and
- soil conservationist (Series GS-457).


Bachelor of Science - Ecosystem Science & Restoration; Aquatic Concentration

W.A Franke College of Forestry & Conservation

Degree Specific Credits: 89
Required Cumulative GPA: 2.0
Catalog Year: 2017-2018

General Education Requirements

Information regarding these requirements can be found in the General Education Section (http://catalog.umt.edu/academics/general-education-requirements) of the catalog.

Summary

<table>
<thead>
<tr>
<th>Major Required Courses</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outside Major Required Courses</td>
<td>39-40</td>
</tr>
<tr>
<td>Major Required Courses</td>
<td>21</td>
</tr>
</tbody>
</table>

Major Required Courses

**Rule:** Must take all courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRSM 121S</td>
<td>Nature of Montana or NRSM 170 International Envir. Change</td>
<td>3</td>
</tr>
<tr>
<td>NRSM 200</td>
<td>Nat. Resource Professional Wrtg</td>
<td>3</td>
</tr>
<tr>
<td>NRSM 265</td>
<td>Elements of Ecological Restora</td>
<td>3</td>
</tr>
<tr>
<td>Total Hours</td>
<td></td>
<td>9</td>
</tr>
</tbody>
</table>

Minimum Required Grade: C-

Outside Major Required Courses

**Rule:** Must take all courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>BIOB 160N</td>
<td>Principles of Living Systems</td>
<td>3</td>
</tr>
<tr>
<td>BIOB 161N</td>
<td>Prncpls of Living Systems Lab</td>
<td>1</td>
</tr>
<tr>
<td>BIOB 260</td>
<td>Cellular and Molecular Biology</td>
<td>4</td>
</tr>
<tr>
<td>BIOB 272</td>
<td>Genetics and Evolution</td>
<td>4</td>
</tr>
<tr>
<td>CHMY 121N</td>
<td>Introduction to General Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>CHMY 123</td>
<td>Introduction to Organic and Biochemistry</td>
<td>3</td>
</tr>
<tr>
<td>COMX 111A</td>
<td>Intro to Public Speaking or THTR 120A Introduction to Acting I</td>
<td>3</td>
</tr>
<tr>
<td>GEO 101N</td>
<td>Introduction to Physical Geology</td>
<td>3</td>
</tr>
<tr>
<td>GEO 102N</td>
<td>Introduction to Physical Geology Lab</td>
<td>1</td>
</tr>
<tr>
<td>M 171</td>
<td>Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>M 172</td>
<td>Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>WRIT 101</td>
<td>College Writing I</td>
<td>3</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
<td>3-4</td>
</tr>
<tr>
<td>STAT 216</td>
<td>Introduction to Statistics</td>
<td></td>
</tr>
<tr>
<td>FORS 201</td>
<td>Forest Biometrics</td>
<td></td>
</tr>
<tr>
<td>WILD 240</td>
<td>Intro to Biostatistics</td>
<td></td>
</tr>
<tr>
<td>Total Hours</td>
<td></td>
<td>39-40</td>
</tr>
</tbody>
</table>

Minimum Required Grade: C-

Major Required Courses

**Rule:** Must take all courses

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<tr>
<th>Course Code</th>
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<tr>
<td>NRSM 344</td>
<td>Ecosystem Science and Restoration Capstone</td>
<td>5</td>
</tr>
<tr>
<td>NRSM 385</td>
<td>Watershed Hydrology</td>
<td>3</td>
</tr>
<tr>
<td>NRSM 422</td>
<td>Nat Res Policy/Administration</td>
<td>3</td>
</tr>
</tbody>
</table>
NRSM 465 Foundations of Restoration Ecology 3
or BIOE 447 Terrestrial Ecosystem Ecology
NRSM 389E Ethics Forestry & Conservation 3
NRSM 494 Ecosystem Science and Restoration Seminar 1
NRSM 495 Ecosystem Science and Restoration Practicum 3

Total Hours 21
Minimum Required Grade: C-

Outside Major Required Courses
Rule: Must take all courses
BIOE 370 General Ecology 3
BIOE 428 Freshwater Ecology 5

Total Hours 8
Minimum Required Grade: C-

Restoration Aquatic Electives
Select at least 9 credits from the following:
BIOE 342 Field Ecology
BIOE 439 Stream Ecology
BIOE 451 Landscape Ecology
BIOE 447 Terrestrial Ecosystem Ecology
BIOE 453 Ecology of Small & Large Lakes
BIOO 340 Biology and Mgmt of Fishes
FORS 250 Intro to GIS for Forest Mgt
GEO 318 Climate System Dynamics
GEO 420 Hydrogeology
GEO 421 Hydrology
GEO 460 Process Geomorphology
NRSM 210N Soils, Water and Climate
NRSM 408 Global Cycles and Climate
NRSM 418 Ecosystem Climatology
NRSM 455 Riparian Ecology & Management
NRSM 465 Foundations of Restoration Ecology
WILD 485 Aquatic Invertebrate Ecology

Total Hours 9
Minimum Required Grade: C-

Social Science Elective Courses
Rule: must take at least 3 credits
Select at least one of the following:
ECNS 433 Economics of the Environment
FORS 320 Forest Environmental Economics
GPHY 335 Water Policy
NRSM 379 Collab in Nat Res Decisions
NRSM 426 Climate and Society

NRSM 475 Environment & Development 3

Total Hours
Minimum Required Grade: C-

Writing Requirements
Rule: Must complete the following subcategories

Lower Division Writing
Rule: Complete all courses
NRSM 200 Nat.Resource Professional Wrtg 3

Total Hours 3
Minimum Required Grade: C-

Upper Division Writing
Rule: Must take at least three courses
Select at least 9 credits from the following:
BIOE 428 Freshwater Ecology
FORS 330 Forest Ecology
NRSM 344 Ecosystem Science and Restoration Capstone
NRSM 379 Collab in Nat Res Decisions
NRSM 495 Ecosystem Science and Restoration Practicum
NRSM 499 Senior Thesis

Total Hours 9
Minimum Required Grade: C-

Math Requirements for Major
Rule: Must take all courses
M 171 Calculus I 4
M 172 Calculus II 4

Total Hours 8
Minimum Required Grade: C-

Exception to the Modern/Classical Languages Requirement
Rule: The Ecosystem Science and Restoration major has been granted an exception to the Modern/Classical Language Requirement. Must take one of the following courses to satisfy this requirement.
Select one of the following:
FORS 201 Forest Biometrics
STAT 216 Introduction to Statistics
WILD 240 Intro to Biostatistics

Total Hours 3-4
Minimum Required Grade: C-
**Expressive Arts Requirement for Major**

*Rule:* must take one of the following courses

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<td>Intro to Public Speaking</td>
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<td>or THTR 120A</td>
<td>Introduction to Acting I</td>
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Total Hours: 3

Minimum Required Grade: C-

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**Social Science**

*Rule:* May take the following course

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<tr>
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<tr>
<td>NRSM 121S</td>
<td>Nature of Montana</td>
<td>3</td>
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Total Hours: 3

Minimum Required Grade: C-

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**Ethical & Human Values Elective within Major**

*Rule:* must take one of the following courses

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<tr>
<td>NRSM 449E</td>
<td>Climate Change Ethics/Policy</td>
<td>3</td>
</tr>
<tr>
<td>or NRSM 389E</td>
<td>Ethics Forestry &amp; Conservation</td>
<td></td>
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</tbody>
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Total Hours: 3

Minimum Required Grade: C-

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**Natural Sciences within Major**

*Rule:* Must take all courses

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<td>Introduction to General Chemistry</td>
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Total Hours: 7

Minimum Required Grade: C-