**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 GS-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>Component</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major Required Courses</td>
<td>9</td>
</tr>
<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>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRSM 121S</td>
<td>Nature of Montana</td>
<td>3</td>
</tr>
<tr>
<td>or NRSM 170</td>
<td>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>
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<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>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOB 160N</td>
<td>Principles of Living Systems</td>
<td>3</td>
</tr>
<tr>
<td>BIOB 161N</td>
<td>Prncpals 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</td>
<td>3</td>
</tr>
<tr>
<td>or THTR 120A</td>
<td>Introduction to Acting I</td>
<td></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>3-4</td>
<td></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>
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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>

Total Hours: 131-133
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
Total Hours  3
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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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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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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<th>Hours</th>
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</thead>
<tbody>
<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>
</tr>
</tbody>
</table>

Total Hours: 3

Minimum Required Grade: C-

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**Natural Sciences within Major**

**Rule:** Must take all courses

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<tr>
<td>CHMY 121N</td>
<td>Introduction to General Chemistry</td>
<td>3</td>
</tr>
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</table>

Total Hours: 7

Minimum Required Grade: C-