Biology - Natural Sciences Emphasis, BS

Program Description
The B.S. Biology Natural Science emphasis is designed for students seeking a career in Organismal or Field Biology. This includes careers with the Bureau of Land Management (BLM), U.S. Forest Services, Fish and Game, National Parks Services, State Parks, Department of Natural Resources (DNR), Association of Zoos and Aquariums (AZA) and Local Governments.

Program Curriculum
120 credits

DSU General Education Requirements
All DSU General Education requirements must be fulfilled. A previously earned degree may fulfill those requirements, but courses must be equivalent to DSU’s minimum General Education standards in American Institutions, English, and Mathematics.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>General Education Core Requirements</td>
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<td>3-7</td>
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<tr>
<td>English</td>
<td></td>
<td>3-5</td>
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<tr>
<td>Mathematics</td>
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<td>3-6</td>
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<tr>
<td>American Institutions</td>
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<td>3-10</td>
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<tr>
<td>Life Sciences</td>
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<td>Physical Sciences</td>
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<td>Laboratory Science</td>
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<tr>
<td>Fine Arts</td>
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<td>3</td>
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<td>Literature/Humanities</td>
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<td>Social &amp; Behavioral Sciences</td>
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<tr>
<td>Exploration</td>
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<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>BIOL 1610 &amp; BIOL 1615</td>
<td>Principles of Biology I (LS) and Principles of Biology I Lab (LAB)</td>
</tr>
<tr>
<td>BIOL 1620 &amp; BIOL 1625</td>
<td>Principles of Biology II and Principles of Biology II Lab</td>
</tr>
<tr>
<td>BIOL 3010</td>
<td>Evolution</td>
</tr>
<tr>
<td>BIOL 3030</td>
<td>Principles of Genetics</td>
</tr>
<tr>
<td>BIOL 4910 or BIOL 4920</td>
<td>Senior Seminar I or Senior Seminar II</td>
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Mathematics & Physical Science Requirements

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<tr>
<td>CHEM 1210 &amp; CHEM 1215</td>
<td>Principles of Chemistry I (PS) and Principles of Chemistry I Lab (LAB)</td>
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<tr>
<td>CHEM 1220 &amp; CHEM 1225</td>
<td>Principles of Chemistry II and Principles of Chemistry II Lab</td>
</tr>
<tr>
<td>ENVS 1010</td>
<td>Intro to Environmental Science (PS)</td>
</tr>
<tr>
<td>GEO 1110 &amp; GEO 1115</td>
<td>Physical Geology (PS) and Physical Geology Lab (LAB)</td>
</tr>
<tr>
<td>MATH 1040 or MATH 1050</td>
<td>Introduction to Statistics (MA) or College Algebra / Pre-Calculus (MA)</td>
</tr>
<tr>
<td>PHYS 1010 &amp; PHYS 1015</td>
<td>Elementary Physics (PS) and Elementary Physics Lab (LAB)</td>
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</table>
or PHYS 2010 & PHYS 2015
College Physics I (PS)
and College Physics I Lab (LAB)

### Additional Biology Requirements

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BIOL 2400</td>
<td>Plant Kingdom (LS, ALPP)</td>
<td>4</td>
</tr>
<tr>
<td>&amp; BIOL 2405</td>
<td>and Plant Kingdom Lab (LAB, ALPP)</td>
<td></td>
</tr>
<tr>
<td>BIOL 3040</td>
<td>General Ecology</td>
<td>4</td>
</tr>
<tr>
<td>&amp; BIOL 3045</td>
<td>and General Ecology Lab</td>
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</tr>
<tr>
<td>BIOL 3110</td>
<td>Scientific Writing</td>
<td>2</td>
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Complete three (3) of the following sets of courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BIOL 3200</td>
<td>Invertebrate Zoology</td>
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<tr>
<td>&amp; BIOL 3205</td>
<td>and Invertebrate Zoology Lab</td>
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<tr>
<td>BIOL 3340</td>
<td>Plant Anatomy</td>
<td></td>
</tr>
<tr>
<td>&amp; BIOL 3345</td>
<td>and Plant Anatomy Lab</td>
<td></td>
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<tr>
<td>BIOL 4200</td>
<td>Plant Taxonomy (ALPP)</td>
<td></td>
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<tr>
<td>&amp; BIOL 4205</td>
<td>and Plant Taxonomy Lab (ALPP)</td>
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<tr>
<td>BIOL 4260</td>
<td>Herpetology</td>
<td></td>
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<tr>
<td>&amp; BIOL 4265</td>
<td>and Herpetology Lab</td>
<td></td>
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<tr>
<td>BIOL 4270</td>
<td>Ichthyology</td>
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<tr>
<td>&amp; BIOL 4275</td>
<td>and Ichthyology Lab</td>
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<tr>
<td>BIOL 4280</td>
<td>Marine Biology</td>
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<tr>
<td>BIOL 4350</td>
<td>Animal Behavior</td>
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<tr>
<td>&amp; BIOL 4355</td>
<td>and Animal Behavior Lab</td>
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</tr>
<tr>
<td>BIOL 4380</td>
<td>Ornithology</td>
<td></td>
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<tr>
<td>&amp; BIOL 4385</td>
<td>and Ornithology Lab</td>
<td></td>
</tr>
<tr>
<td>BIOL 4460</td>
<td>Plant Ecology</td>
<td></td>
</tr>
<tr>
<td>&amp; BIOL 4465</td>
<td>and Plant Ecology Lab</td>
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<tr>
<td>BIOL 4411</td>
<td>Mammalogy</td>
<td></td>
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<tr>
<td>&amp; BIOL 4415</td>
<td>and Mammalogy Lab</td>
<td></td>
</tr>
<tr>
<td>BIOL 4440</td>
<td>General Entomology</td>
<td></td>
</tr>
<tr>
<td>&amp; BIOL 4445</td>
<td>and General Entomology Lab</td>
<td></td>
</tr>
<tr>
<td>BIOL 4600</td>
<td>Plant Physiology</td>
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<tr>
<td>&amp; BIOL 4605</td>
<td>and Plant Physiology Lab</td>
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### Biology Electives

Complete 12 credits from the following or from any upper-division BIOL course listed above not already used to fulfill a requirement.

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
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<tbody>
<tr>
<td>BIOL 3100</td>
<td>Bioethics</td>
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<tr>
<td>BIOL 3150</td>
<td>Biostatistics and the Scientific Method</td>
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<tr>
<td>&amp; BIOL 3155</td>
<td>and Biostatistics and the Scientific Method Lab</td>
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<tr>
<td>BIOL 3140</td>
<td>Comparative Vertebrate Anatomy</td>
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<tr>
<td>&amp; BIOL 3145</td>
<td>and Comparative Vertebrate Anatomy Lab</td>
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<tr>
<td>BIOL 3250</td>
<td>Cancer Biology</td>
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<tr>
<td>BIOL 3340</td>
<td>Plant Anatomy</td>
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<tr>
<td>&amp; BIOL 3345</td>
<td>and Plant Anatomy Lab</td>
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<tr>
<td>BIOL 3360</td>
<td>Developmental Biology</td>
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<tr>
<td>BIOL 3450</td>
<td>General Microbiology</td>
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<tr>
<td>&amp; BIOL 3455</td>
<td>and General Microbiology Lab</td>
</tr>
<tr>
<td>BIOL 3550</td>
<td>Eukaryotic Cell Biology</td>
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<tr>
<td>&amp; BIOL 3555</td>
<td>and Eukaryotic Cell Biology Lab</td>
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<tr>
<td>BIOL 4190</td>
<td>Mammalian Histology</td>
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<tr>
<td>&amp; BIOL 4195</td>
<td>and Mammalian Histology Lab</td>
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<tr>
<td>BIOL 4240</td>
<td>Virology</td>
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<tr>
<td>&amp; BIOL 4245</td>
<td>and Virology Lab</td>
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<tr>
<td>BIOL 4300</td>
<td>Molecular Biology</td>
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<tr>
<td>&amp; BIOL 4305</td>
<td>and Molecular Biology Laboratory</td>
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<tr>
<td>BIOL 4500</td>
<td>Comparative Vertebrate Physiology</td>
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<tr>
<td>&amp; BIOL 4505</td>
<td>and Comparative Vertebrate Physiology Lab</td>
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<tr>
<td>BIOL 4810R</td>
<td>Independent Research I</td>
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or BIOL 4820R Independent Research II
or BIOL 4830R Independent Research III
BIOL 4930R Senior Thesis
GEOG 3600 Introduction to Geographic Information Systems
& GEOG 3605 and Introduction to Geographic Information Systems Laboratory

Graduation Requirements

1. Complete a minimum of 120 college-level credits (1000 and above).
2. Complete at least 40 upper-division credits (3000 and above).
3. Complete at least 30 upper-division credits at DSU for institutional residency.
4. Cumulative GPA 2.0 or higher.
5. Grade C or higher required (not C-) in each Program Requirement, Core Discipline Requirement, and Biology Elective Requirement course.
6. Maximum 6 total credits of BIOL 4810R, BIOL 4820R, BIOL 4830R, and/or BIOL 4930R may be used toward Biology requirements.

Graduation Plan

1st Year

Fall Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>BIOL 1610</td>
<td>Principles of Biology I (LS)</td>
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<td>&amp; BIOL 1615</td>
<td>and Principles of Biology I Lab (LAB)</td>
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<tr>
<td>CHEM 1110</td>
<td>Elementary General/Organic Chemistry (PS)</td>
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<tr>
<td>&amp; CHEM 1115</td>
<td>or Principles of Chemistry II and</td>
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<tr>
<td>or CHEM 1220</td>
<td>Principles of Chemistry II Lab</td>
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</tr>
<tr>
<td>ENGL 1010</td>
<td>Introduction to Writing (EN)</td>
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<tr>
<td>SSC 1010</td>
<td>Trailblazer Connections</td>
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Spring Semester

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<th>Hours</th>
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<tbody>
<tr>
<td>BIOL 1620</td>
<td>Principles of Biology II</td>
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<tr>
<td>&amp; BIOL 1625</td>
<td>and Principles of Biology II Lab</td>
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<tr>
<td>CHEM 1120</td>
<td>Elem Organic / Bio Chemistry</td>
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<td>and Elem Organic/Bio Chemistry Lab</td>
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<tr>
<td>MATH 1050</td>
<td>College Algebra / Pre-Calculus (MA)</td>
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2nd Year

Fall Semester

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<th>Course</th>
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<tbody>
<tr>
<td>BIOL 2400</td>
<td>Plant Kingdom (LS, ALPP)</td>
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<tr>
<td>&amp; BIOL 2405</td>
<td>and Plant Kingdom Lab (LAB, ALPP) (meets GE Exploration requirement)</td>
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<tr>
<td>BIOL 3030</td>
<td>Principles of Genetics</td>
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<td>ENGL 2010</td>
<td>Interm Writing Selected Topics: (EN)</td>
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<tr>
<td>General Elective</td>
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Spring Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>BIOL 3010</td>
<td>Evolution</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 3110</td>
<td>Scientific Writing</td>
<td>2</td>
</tr>
<tr>
<td>ENVS 1010</td>
<td>Intro to Environmental Science (PS)</td>
<td>3</td>
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<tr>
<td>PHYS 1010</td>
<td>Elementary Physics (PS)</td>
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<tr>
<td>&amp; PHYS 1015</td>
<td>and Elementary Physics Lab (LAB)</td>
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<tr>
<td>General Education (Social &amp; Behavioral Sciences) (catalog.dixie.edu/programs/generaleducation/#gerequirementstext)</td>
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### 3rd Year

#### Fall Semester

<table>
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<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BIOL 3040 General Ecology</td>
<td>4</td>
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<tr>
<td>&amp; BIOL 3045 and General Ecology Lab</td>
<td>4</td>
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<tr>
<td>Biology organismal course #1</td>
<td>4</td>
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<tr>
<td>Biology organismal course #2</td>
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#### Spring Semester

<table>
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<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BIOL electives</td>
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</tr>
<tr>
<td>BIOL organismal course #3</td>
<td>4</td>
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<tr>
<td>Additional Physical Sciences course</td>
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<tr>
<td>General Elective(s)</td>
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<td><strong>Total Hours</strong></td>
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### 4th Year

#### Fall Semester

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<th>Course</th>
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<tbody>
<tr>
<td>GEO 1110 Physical Geology (PS)</td>
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<td>&amp; GEO 1115 and Physical Geology Lab (LAB)</td>
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<tr>
<td>BIOL electives</td>
<td>4</td>
</tr>
<tr>
<td>General Education (American Institutions)</td>
<td>3</td>
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<tr>
<td>Upper Division Electives</td>
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</tr>
<tr>
<td><strong>Total Hours</strong></td>
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#### Spring Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BIOL 4920 Senior Seminar II</td>
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<tr>
<td>BIOL electives</td>
<td>5</td>
</tr>
<tr>
<td>General Education (Literature / Humanities)</td>
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</tr>
<tr>
<td>Upper Division Electives</td>
<td>6</td>
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<td><strong>Total Hours</strong></td>
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**Total Hours**: **120**

### Natural Sciences Program Learning Outcomes

At the successful conclusion of this program, students will be able to:

1. Outline the foundational concepts of biology including cellular, organismic, ecological, and evolutionary biology.
2. Evaluate hypotheses, design research, test hypotheses, conduct data analysis, and draw conclusions on biology related problems.
3. Integrate knowledge of scientific literacy in oral and written assignments when communicating biological topics.
4. Evaluate information to discriminate between science and non-science.
5. Develop an understanding of why science is an integral activity for addressing social and environmental problems.