**MAJOR REQUIREMENTS FOR A BS DEGREE IN BIOLOGY: MARINE BIOLOGY**

**Total credit hours required:** 120.0 minimum

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### REQUIREMENTS AND POLICIES FOR THE BS BIOLOGY MAJOR

#### A. Policies for Admission to the Major
1. New students (freshmen and transfers) must be admitted to the Biology major by the Office of Admissions upon admission to the University.
2. Admission of Millersville University students to the Biology major (from other departments or undeclared status) requires that the student is in satisfactory academic standing as described in the Undergraduate Catalog. Students who were dropped from a Biology major also must satisfy the Biology Retention in the Major criteria before being readmitted to a Biology major.
3. Non-degree and continuing education students must be admitted to the Biology major by the Office of Admissions.

#### B. Policies for Retention in the Major
1. University requirements for retention must be met.
2. All Biology majors must earn grades of C- (C minus) or higher in all core courses (BIOL 101, 211, 221, 343, 362, 364) required for their option.
3. The requirements stated above must be satisfied before completion of 90 Millersville University credit hours.
4. Millersville University students changing majors, or Biology majors changing options within the Biology major, must satisfy the above requirements prior to completion of 45 additional Millersville University credit hours. Note: Students who desire to change their major to Biology must refer to the Biology department's Admission to the Major Policy. Those transferring into the major may substitute BIOL 100 for BIOL 101 if they earn a grade of B- (B minus) or higher in this course.
5. Transfer students with 60 credit hours or more must satisfy the above requirements prior to completion of 45 Millersville University credit hours. Transfer students with fewer than 60 credits should refer to the policy for all other majors (part #3 above).
6. Any student failing to meet the above requirements will be dropped from the Biology major. Students who wish to re-enter the major, must follow the requirements stipulated in part 4 above.

#### C. Policies for Completion of the Major
1. Completion of all University curricular requirements.
2. ENGL 312, Technical Writing, is the recommended course for the Upper Level Writing Requirement under the General Education Curriculum Requirements.

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**Note to the student:** This form is provided as a guide. It is your responsibility to consult regularly with your advisor to be aware of changes and curriculum details which are not incorporated on this form.
### MAJOR SEQUENCE AND DEGREE REQUIREMENTS

**Major:** BS BIOLOGY  
**Option:** MARINE BIOLOGY  
**Major Field Requirements:** 47.0 credits  
**Other Requirements:** 31.0 - 35.0 credits

When applicable, up to six of the REQUIRED RELATED courses may be credited toward the Liberal Arts Core subject to normal distribution rules.

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Short Title</th>
<th>C.H.</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>REQUIRED BIOLOGY COURSES (24.0 credits)</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>BIOL 101</td>
<td>Foundations of Biology</td>
<td>4.0</td>
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<tr>
<td>BIOL 211</td>
<td>Concepts of Zoology</td>
<td>4.0</td>
<td></td>
</tr>
<tr>
<td>BIOL 221</td>
<td>Concepts of Botany</td>
<td>4.0</td>
<td></td>
</tr>
<tr>
<td>BIOL 343</td>
<td>Ecology and Evolution</td>
<td>4.0</td>
<td></td>
</tr>
<tr>
<td>BIOL 362</td>
<td>Cell &amp; Development</td>
<td>4.0</td>
<td></td>
</tr>
<tr>
<td>BIOL 364</td>
<td>Genetics &amp; Mol Biology</td>
<td>4.0</td>
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</tbody>
</table>

**REQUIRED MARINE BIOLOGY COURSES (8.0-9.0 credits)**

- BIOL 291 Marine Biology 4.0
- **--OR--**
- BIOL 290 Coastal Marine Biology 3.0
- **--and--**
- BIOL 292 Problem Solving Marine Biol 1.0

- BIOL 375 Biometry 3.0
- BIOL 472 Marine Biology Seminar 1.0-2.0

* These courses do not count as directed electives taken at a field station.

**DIRECTED ELECTIVES (9.0 credits)**

In consultation with your advisor, select marine biology courses at a marine field station that add up to 9.0 credits. Independent research, a co-op, or a senior thesis on a marine topic can count for a maximum of 3.0 of these credits.

- BIOL 293 Coastal Ornithology 3.0
- BIOL 294 Coral Reef Ecology 3.0
- BIOL 295 Marine Invertebrates 3.0
- BIOL 296 Marine Ecology 3.0
- BIOL 392 Marine Mammals 3.0
- BIOL 396 Marine Ichthyology 3.0
- BIOL 397 Marine Botany 3.0
- BIOL 471 Topics: _______________ *
- BIOL 495 Biological Oceanography 3.0
- BIOL 498 Independent Marine Research 3.0
- BIOL 499 Thesis Marine Research 3.0

* Topics: Advanced Methods Coastal Ecology, Biology Mollusks, Ecology of Marine Plankton

**BIOLOGY ELECTIVES (5.0-6.0 credits)**

In consultation with your advisor, choose additional courses at the 300-level or higher and approved for BIOL majors to bring total BIOL credits to 47.

- BIOL 4 ___
- BIOL ___

**REQUIRED RELATED (31.0 - 35.0 credits)**

**Chemistry & Earth Sciences (19.0-20.0 credits)**

<table>
<thead>
<tr>
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<th>C.H.</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESCI 261/</td>
<td>Intro to Oceanography</td>
<td>4.0</td>
<td></td>
</tr>
<tr>
<td>MS 110</td>
<td></td>
<td>4.0</td>
<td></td>
</tr>
<tr>
<td>CHEM 111*</td>
<td>Introductory Chemistry I</td>
<td>4.0</td>
<td></td>
</tr>
<tr>
<td>CHEM 112*</td>
<td>Introductory Chemistry II</td>
<td>4.0</td>
<td></td>
</tr>
<tr>
<td>CHEM 235</td>
<td>Short Course Organic Chemistry</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**--AND--**

- CHEM 326 Biochemistry I 4.0
- **--or--**
- CHEM 375 Environmental Chemistry 4.0
- **--or--**
- ESCI 363/ Chemical Oceanography 3.0
- MS 331

Note: CHEM 231* and CHEM 232 (total of 8.0 credits) may substitute for CHEM 235.

*Must earn a C- or better in these courses before completing CHEM 235 or 232.

**Mathematics (4.0 - 5.0 credits)**

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Short Title</th>
<th>C.H.</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 151</td>
<td>Calculus for Mgmt, Life &amp; SS</td>
<td>4.0</td>
<td></td>
</tr>
</tbody>
</table>
- **--OR--**
| MATH 161   | Calculus I                      | 4.0  |       |
- **--OR--**
| MATH 163   | Honors Calculus                 | 5.0  |       |

**Physics (8.0-10.0 credits)**

<table>
<thead>
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<th>C.H.</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 131</td>
<td>Physics I with Algebra</td>
<td>4.0</td>
<td></td>
</tr>
<tr>
<td>PHYS 132</td>
<td>Physics II with Algebra</td>
<td>4.0</td>
<td></td>
</tr>
</tbody>
</table>
- **--OR--**
| PHYS 231   | Physics I with Calculus         | 5.0  |       |
| PHYS 232   | Physics II with Calculus        | 5.0  |       |

Note: Students are encouraged to consider completing a minor in Oceanography.

**General Electives (as necessary)**

- ____________
- ____________
- ____________
- ____________
- ____________
- ____________

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BIOL-527 SUMMER 2015