



**Biology Major**  
**Bachelor of Arts Degree**  
**2010-2011**

Biology is one of the traditional liberal arts; it informs us about ourselves, the dynamics of the natural world, and how we interact with our environment. In so doing, biology complements the other liberal arts programs as a context for human endeavors.

Biology provides the basis of knowledge in the areas of medicine, agriculture, biotechnology, and ecology. Studies of nature have long been the inspiration for works of art, literature, and music. At the same time, rapid advancements in biotechnology affect nearly every facet of our lives from the foods we eat and the drugs we take, to the fibers that are used to make our clothes. With our increasing ability to manipulate the genetic structure of organisms, as well as the structure and composition of entire ecosystems, comes an increased responsibility for all citizens to act in an informed manner.

Within that context, the major objectives of the B.A. in Biology at UMM are to:

- (1) provide a broad and substantive training in scientific inquiry appropriate for students seeking careers in the biological sciences or in secondary education immediately following graduation;
- (2) provide rigorous training for students planning to further their education in professional studies or graduate school; and
- (3) allow sufficient flexibility to encourage students to pursue a concentration, a minor, or a second major.

Students will study biological systems at the level of the cell, the organism, and the ecosystem. Courses in mathematics, physics, and chemistry will enhance students' understanding of the physical laws that govern the activities of living organisms. All coursework is enhanced by extensive study in the laboratory and in the field with emphasis on hypothesis formulation and testing, and experimental design.

All students in the biology major are required to complete 57 credits of program requirements. A highlight of these requirements is the opportunity to participate in a Senior Thesis that allows students to do an in-depth study of an area of particular interest. Alternatively, students may enroll in a Senior Seminar that explores advanced topics in biology based on a student's previous training. Students may elect additional coursework to complete a Pre-Professional, Wildlife Biology, or Fisheries Biology concentration. Biology courses required in either concentration will fulfill biology electives in the program requirements.

## General Requirements

All University Core requirements must be met in addition to the Biology program requirements. Note that completion of some courses within the major, such as in mathematics, will also fulfill Core requirements. Students must earn a minimum of 120 credits and achieve a cumulative GPA of at least 2.00.

A minimum cumulative GPA of 2.00 in the degree program requirements is necessary for graduation. This GPA must be achieved by the completion of a total of 60 credits. If the student fails to maintain this average in subsequent semesters, a warning may be issued. A student may lose matriculated status if the average remains below 2.0 after the completion of another 12 credits. Students may petition to be readmitted to the program.

<b>Program requirements</b>	<b>33 cr</b>
BIO 111 General Zoology	4
BIO 112 General Botany	4
BIO 222 Cell Biology	4
BIO 245 General Ecology	4
BIO 265 Genetics	4
BIO 340 Evolution	3

*Select one pair from the following:*

BIO 401-403 Senior Thesis and BIO electives at 200 level or higher	3  7
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OR

BIO 404-406 Senior Thesis in Research and BIO electives at 200 level or higher	6  4
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OR

BIO 410 Senior Seminar in Biology and BIO electives at 200 level or higher	3  7
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<b>Cognate course requirements</b>	<b>24 cr</b>
CHY 101 General Chemistry I	4
CHY 102 General Chemistry II	4
CHY 221 Organic Chemistry I	4
MAT 126 Calculus I	4
PHY 111 Physics I	4

*Select one from:* 4  
*MAT 127 Calculus II*

*PHY 112 Physics II*

A student may select one of the concentrations below. A concentration is not required to complete the Biology degree.

**Pre-Professional Concentration** **28 cr**

The pre-professional concentration is designed for students planning to pursue careers in medicine, veterinary medicine, dentistry, optometry, pharmacy, or other professions requiring a rigorous background in the life and physical sciences. Courses within this concentration will prepare students to successfully complete entrance exams required by professional schools. Students are encouraged to meet early and often with their advisor to prepare other aspects of their education such as internships, workshops, and volunteer activities in their desired field.

BIO 221	General Microbiology	4
BIO 323	Comparative Vertebrate Anatomy and Physiology	5
BIO 350	Developmental Biology	3
CHY 222	Organic Chemistry II	4
CHY 322	Biochemistry	4
MAT 127	Calculus II	4
PHY 112	Physics II	4

Since some of the above courses will also meet program requirements, the pre-professional concentration requires only an additional 17 to 20 credits.

**Wildlife Biology Concentration** **32-34 cr**

BIO 309	Topics: Fish and Wildlife Management	2
BIO 355	Conservation Biology	4
BIO 229	Plant Taxonomy	4
GIS 230	GIS Applications I	4
MAT 215	Applied Statistics	4

*Choose 1 from:* 2 - 4

- ENV 105 Intro to Trees and Wildflowers of Maine
- BIO 333 Plant Ecology

*Choose 2 from:* 8

- BIO 212 Ornithology
- BIO 216 Mammalogy
- BIO 218 Herpetology
- BIO 224 General Entomology

*Choose 1 from:* 4

- MAT 127 Calculus II
- BIO 315 Experimental Design and Analysis for Biologists

Since some of the above courses will also meet program requirements, the wildlife biology concentration requires only an additional 21 to 30 credits.

<b>Fisheries Biology Concentration</b>	<b>32-34 cr</b>
BIO 309 Topics: Fish and Wildlife Management	2
BIO 313 Ichthyology	4
BIO 355 Conservation Biology	4
GIS 230 Geographic Information Systems Applications I	4
MAT 215 Applied Statistics	4
<i>Choose 1 from:</i>	<i>3-4</i>
ENV 103 Oceanography	
BIO 324 Limnology	
<i>Choose 2 from:</i>	<i>7-8</i>
BIO 221 Microbiology	
BIO 227 Invertebrate Zoology	
BIO 224 General Entomology	
<i>Choose 1 from:</i>	<i>4</i>
BIO 315 Experimental Design and Analysis for Biologists	
MAT 127 Calculus II	
GIS 330 GIS Applications II	

Since some of the above courses will also meet program requirements, the wildlife biology concentration requires only an additional 22 to 30 credits.

### **General Electives**

Students are encouraged to consult with their advisors in selecting elective courses in and out of biology with future career plans and personal interests in mind.