### Biology-Ba or Bs-General

**The BA degree requires 3rd semester proficiency in a foreign language (201 level). This is a GENERAL CURRICULUM GUIDE and is NOT APPLICABLE TO EVERY STUDENT. IT IS IMPORTANT TO MEET WITH YOUR ADVISOR.**

<table>
<thead>
<tr>
<th>Year One</th>
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<th>Year Two</th>
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<th>Year Three</th>
<th></th>
<th>Year Four</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>BIO 121</strong></td>
<td>General Biology II w/lab</td>
<td><strong>BIO 120</strong></td>
<td>General Biology I w/lab (GE Life Science)</td>
<td><strong>BIO 210</strong></td>
<td>Evolutionary Biology</td>
<td><strong>CMB 405</strong></td>
<td>Cell and Molecular Biology</td>
</tr>
<tr>
<td>Prerequisite: MTH 110 (may be taken concurrently)</td>
<td>Prerequisites: High school chemistry, CHM 109, or CHM 115 strongly recommended (CHM 109 or 115 may be taken concurrently)</td>
<td>Prerequisites: MTH 122 and MTH 201</td>
<td>4 (6)</td>
<td>3</td>
<td>4 (6)</td>
<td>4</td>
<td>4 (6)</td>
</tr>
<tr>
<td><strong>CHM 115</strong></td>
<td>Principles of Chemistry I w/lab (GE Physical Science)</td>
<td><strong>CHM 116</strong></td>
<td>Principles of Chemistry II w/lab</td>
<td><strong>3CHM 232</strong></td>
<td>Biological Chemistry w/lab</td>
<td><strong>CMB 406</strong></td>
<td>SWS Cell and Molecular Biology Laboratory</td>
</tr>
<tr>
<td>Prerequisites: High school chemistry and (MTH 110 or MTH 122 or MTH 125 or MTH 201)</td>
<td>Prerequisites: CHM 115 and (MTH 122 or MTH 125 or MTH 201)</td>
<td>Prerequisites: CHM 231</td>
<td>4 (7)</td>
<td>4 (7)</td>
<td>2 (4)</td>
<td>5 (7)</td>
<td>3-4</td>
</tr>
<tr>
<td><strong>1MTH 122</strong></td>
<td>College Algebra</td>
<td>1, 3<strong>MTH 123</strong></td>
<td>Trigonometry</td>
<td></td>
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<tr>
<td>Prerequisite: MTH 110 or assignment through Grand Valley math placement</td>
<td>Prerequisite: MTH 122 or assignment through Grand Valley math placement (MTH 122 may be taken concurrently)</td>
<td>3</td>
<td></td>
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<tr>
<td>Gen Ed (GE Art) or 3WRT 120 (self-placement)</td>
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<tr>
<td>4It is strongly recommended that BIO majors take BIO 121 before BIO 120.</td>
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<td><strong>Numbers noted within (parentheses) are contact hours</strong></td>
<td><strong>Total</strong></td>
<td><strong>15</strong></td>
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<tr>
<td><strong>BIO 215</strong></td>
<td>Ecology w/lab (summer and fall only)</td>
<td><strong>BIO 210</strong></td>
<td>Evolutionary Biology</td>
<td><strong>2WRT 130 or WRT 150</strong></td>
<td>Strategies in Writing (GE Writing)</td>
<td><strong>3</strong></td>
<td><strong>Elective</strong></td>
</tr>
<tr>
<td>Prerequisites: BIO 121</td>
<td>Prerequisites: MTH 120 and BIO 121</td>
<td>3</td>
<td>4</td>
<td>3-4</td>
<td>1-2</td>
<td>3</td>
<td>3</td>
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<tr>
<td><strong>3CHM 231</strong></td>
<td>Introductory Organic Chemistry w/lab</td>
<td><strong>4</strong></td>
<td><strong>Elective</strong></td>
<td><strong>4</strong></td>
<td><strong>Elective</strong></td>
<td><strong>3</strong></td>
<td><strong>Elective</strong></td>
</tr>
<tr>
<td>Prerequisite: CHM 109 or CHM 116</td>
<td>4 (7)</td>
<td>4 (7)</td>
<td>4 (6)</td>
<td>4 (6)</td>
<td>4 (6)</td>
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<tr>
<td><strong>OR CHM 241</strong></td>
<td>Organic Chemistry for Life Sciences I w/lab</td>
<td><strong>OR CHM 242</strong></td>
<td>Organic Chemistry for Life Sciences II w/lab</td>
<td><strong>3</strong></td>
<td><strong>Category I BIO Elective Course</strong></td>
<td><strong>6</strong></td>
<td><strong>Issue</strong></td>
</tr>
<tr>
<td>Prerequisite: CHM 116</td>
<td>Prerequisite: CHM 241</td>
<td>5 (7)</td>
<td>4 (7)</td>
<td>3-4</td>
<td>3</td>
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<td>3</td>
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<tr>
<td><strong>5MTH Cognate Course (GE Math)</strong></td>
<td>3-4</td>
<td>4</td>
<td>8</td>
<td>3-4</td>
<td>3</td>
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<tr>
<td>Gen Ed (GE Historical Analysis)</td>
<td>3</td>
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<td>4</td>
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<td><strong>Total</strong></td>
<td><strong>14-16</strong></td>
<td><strong>Total</strong></td>
<td><strong>15</strong></td>
<td><strong>Total</strong></td>
<td><strong>15</strong></td>
<td><strong>Total</strong></td>
<td><strong>15</strong></td>
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</tbody>
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*The block tuition rate is for 12-15 credits. You will pay additional tuition for any credits over 15

1MTH 122/123 are prerequisites for other courses and are not part of the Biology major. If a student chooses to take PHY 200, MTH 123 does not need to be completed. PHY 221 is not required but students planning to attend graduate school, professional school, or to pursue secondary teacher certification should complete the PHY 220/221 sequence. MTH 124 and MTH 201 will substitute for MTH 122 and MTH 123. **Take the Math Proficiency Tests for MTH 122 and/or 123 online:** [www.gvsu.edu/s/mv](http://www.gvsu.edu/s/mv)

2Students will not need to take WRT 150 if they have earned credit for the course through AP/Dual Enrollment. A grade of C or better is required in WRT 130 or 150 in order to satisfy the WRT requirement at GVSU.

3Students planning on professional or graduate school should complete CHM 241, CHM 242, CHM 461, and PHY 220 and PHY 221. See the Preprofessional Advisors in the CLAS Academic Advising Center for more information.

4Students must complete a minimum of 41 credits of Biology coursework. If students still do not have 41 credits of Biology coursework after completing both the Biology core requirements (above) and the requirements for their chosen emphasis (reverse), they should select additional Biology courses from the elective categories, BIO Issues courses, credits in research (BIO 499), or internship credit (BIO 490). Students should consult with a Biology advisor prior to selecting elective courses.
Choose one of the following to complete the math cognate for the major: MTH 125: Survey of Calculus, MTH 201: Calculus, or STA 215: Introductory Applied Statistics. Students who don’t place into MTH 201 should take MTH 124 as a prerequisite instead of MTH 122+123.

Students must have a minimum of 120 credits to graduate with 58 of the 120 credits being from a senior level institution and the final 30 of the 120 credits completed at GVSU. Elective refers to any course that will help meet these requirements.

Students must complete a total of two courses with an SWS attribute.

### Declaring the Biology-General Major:
1. In myBanner, select “Student” > “Student Records” > “Change Major” > “Change Major 1/Program”
2. Choose “Biology-BA or BS-General Biology” from the drop-down box.
3. Click “Submit” and then “Change to New Program”
4. Declare “Preprofessional Preparation” as your SECOND MAJOR if you are planning on medical, dental, pharmacy, or optometry school.

   → If you are Preveterinary, the Biology with Pre-Veterinary emphasis is recommended

<table>
<thead>
<tr>
<th>General Education Categories fulfilled by the Biology major:</th>
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</thead>
<tbody>
<tr>
<td>Life Science and Physical Science: BIO 120 and CHM 115 (both fulfill lab requirement)</td>
</tr>
<tr>
<td>Mathematical Sciences: STA 215, MTH 122, MTH 123, MTH 124, MTH 201</td>
</tr>
</tbody>
</table>

### Students must complete one course from Categories I, II, and V, and one course from either Category III or IV.

The BIO-General major requires a total of 41 credits of BIO classes, including certain CMB and BMS courses. An additional course may be needed and can be taken from any category to reach 41 credits. Elective courses may only count in one category.

#### Category I: Plant Organismal Biology
- BIO 243 Plant Identification & Natural History (3) w/lab
- BIO 303 Plant Morphology (4) w/lab
- BIO 313 Plants and Islands (4) w/lab
- BIO 323 Aquatic and Wetland Plants (3) w/lab
- BIO 333 Systematic Botany (4) w/lab
- BIO 383 Plant-Fungal Interactions (4) w/lab
- BIO 403 Plant Structure and Function (4) w/lab
- BIO 413 Freshwater Algae (3) w/lab
- BIO 423 Plant Biotechnology (3) w/lab
- BIO 433 Plant Ecology (4) w/lab

#### Category II: Animal Organismal Biology
- BIO 222 Natural History of Vertebrates (3) w/lab
- BIO 232 Natural History of Invertebrates (3) w/lab
- BIO 272 Insect Biology and Diversity (3) w/lab
- BIO 302 Comparative Vertebrate Anatomy (4) w/lab
- BIO 342 Ornithology (3) w/lab
- BIO 362 Biology & Diversity of Fishes (4) w/lab
- BIO 402 Aquatic Insects (3) w/lab
- BIO 412 Mammalogy (4) w/lab
- BIO 422 Animal Development Biology (3) w/lab
- BIO 432 Comparative Animal Physiology (4) w/lab
- BIO 444 Herpetology (4) w/lab
- BMS 208+309 Human Anatomy and Lab (4)
- BMS 290+391 Human Physiology and Lab (5)

#### Category III: Principles of Ecology and Evolutionary Biology
- BIO 303 - Plant Morphology (4) w/lab
- BIO 313 - Plants and Islands (4) w/lab
- BIO 333 - Systematic Botany (4) w/lab
- BIO 349 - The Darwinian Revolution (3)
- BIO 352 - Animal Behavior (3) w/lab
- BIO 370 - Marine Biology (3)
- BIO 433 - Plant Ecology (4) w/lab
- BIO 440 - Limnology (4) w/lab
- BIO 450 - Stream Ecology (4) w/lab
- BIO 452 - Human Evolution (3)
- BIO 460 - Terrestrial Ecosystem Ecology (4) w/lab
- BIO 473 - Ecology and Evolution of Plant-Animal Interactions (3)
- BIO 475 - Population Genetics (3)

#### Category IV: Applied Ecology & Evolution
- BIO/NRM 308 - Wildlife Ecology (4) w/lab
- BIO 357 - Environmental Microbiology* (4) w/lab
- BIO 362 - Fishes Biology (3) w/lab
- BIO 370 - Marine Biology (3)
- BIO/NRM 386 - Ecological Restoration & Management (4) w/lab
- BIO 402 - Aquatic Insects (3) w/lab
- BIO 407 - Biology and Society: Study Abroad (with advisor’s permission)
- BIO/NRM 408 - Wildlife Management (4) w/lab
- BIO 415 - Fire Ecology & Management (3)
- BIO 417 - International Field Biology (w/ advisor’s permission)
- BIO 418 - Regional Field Biology (w/ advisor’s permission)
- BIO 440 - Limnology (4) w/lab
- BIO 451 - Stream Ecology (4) w/lab
- BIO 470 - Conservation Biology (3)
- BIO 473 - Ecology and Evolution of Plant-Animal Interactions (3)
- BIO 475 - Population Genetics (3)
- BIO/NRM 486 - Adv. Restoration Ecology (3)

#### Category V: Biomolecular Processes
- BIO 357* - Environmental Microbiology (4) w/lab
- BIO 396 - Laboratory Assistant in Genetics (1)
- BIO 403 - Plant Structure and Function (4) w/lab
- BIO 416 - Advanced Genetics Laboratory (2)
- BIO 422 - Animal Development Biology (3) w/lab
- BIO 423 - Plant Biotechnology (3) w/lab
- BIO 485 - Molecular Ecology (3) w/lab
- BMS 212 and BMS 213* Introductory Microbiology and Lab (4)
- CMB 451 - Bioinformatics: Tools and Techniques for Life Scientists (3)
- CMB 411 - Genetics of Development and Cancer (3)
- CMB 414 - Molecular Biology of the Gene (3)
- CMB 426/626 - Nucleic Acids Laboratory (4)

*Note: students may count BIO 357 or BMS 212/213 towards the Biology degree, but not both

#### Excluded and Restricted Courses:
The following courses may not count towards the Biology major:
- BIO 104 - Biology for the 21st Century (4)
- BIO 105 - Environmental Science (3)
- BIO 107 - Great Lakes & Other Water Resources (4)
- BIO 109 - Plants in the World (4)
- BIO 205 - Genetics for K-8 Pre-Service Teachers (2)

Any other biology course whose description prevents it from being used in the major.

BIO 355 (Human Genetics) may only count towards the Biology major with advisor’s permission.

The following courses can satisfy part of Gen Ed Issues requirement and may count towards the Biology major after elective-category requirements are satisfied:
- BIO 309 - Plants and Human Health (3)
- BIO 311 - Who’s Running Your Life: Genes, Evolution and Behavior (3)
- BIO 319 - Global Agricultural Sustainability (3)
- BIO 328 - Biomedical Ethics (3)
- BIO 329 - Evolution of Social Behavior (3)
- BIO 338 - Environmental Ethics (3)

It is imperative to meet with your faculty advisor and an advisor in the CLAS Academic Advising Center regularly.

The CLAS Academic Advising Center is located in C-1-120 MAK, 616-331-8585. To schedule an appointment with a Biology and/or Preprofessional Advisor in the CLAS Academic Advising Center, visit [www.gvsu.edu/clasadvising](http://www.gvsu.edu/clasadvising) and click on “Schedule Appointment.” To find more information on Preprofessional programs, visit [www.gvsu.edu/clasadvising/preprofessional](http://www.gvsu.edu/clasadvising/preprofessional).