

**BIOLOGY-BA OR BS-ECOLOGY AND EVOLUTIONARY BIOLOGY***The BA degree requires 3<sup>rd</sup> 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.

Year One			
<b>BIO 121*</b> General Biology II w/lab Prerequisite: MTH 110 (may be taken concurrently) <sup>4</sup> Elective (if needed) Gen Ed (GE Art) or <sup>1</sup> WRT 120 (self-placement) Gen Ed (GE Philosophy & Literature) <sup>3</sup> MTH 122 College Algebra or Elective <sup>4</sup> Prerequisite: MTH 110 or math placement <b>BIO 130</b> Careers in Biology or <sup>4</sup> Elective (if needed)  <i>*It is recommended that BIO majors take BIO 121 before BIO 120.</i>	4 (6) 1 3 3 3 1	<b>BIO 120*</b> General Biology I w/lab (GE Life Science) <i>Prerequisites: High school chemistry, CHM 109, or CHM 115 strongly recommended (CHM 109 or 115 may be taken concurrently)</i> <sup>2,6</sup> CHM 109 Introductory Chemistry (GE Phys. Science) <b>OR</b> <sup>2,6</sup> CHM 125+126 Principles of Chemistry I w/lab (GE Physical Science) Prerequisites: High school chemistry and (MTH 110 or MTH 122 or MTH 125 or MTH 201) <sup>1</sup> WRT 130 or WRT 150 Strategies in Writing (GE Writing) Gen Ed (GE Social/Behavioral) <b>BIO 130</b> Careers in Biology or <sup>4</sup> Elective (if needed)	4 (6) 4 (6) 4 (6) 3-4 3 1
<i>Numbers noted within (parentheses) are contact hours</i>	<i>Total</i>	<i>Total</i>	<i>Total</i>
	15		15-16
Year Two			
<b>BIO 215</b> Ecology w/lab ( <i>CLAS Voyage – Experiential Learning</i> ) Prerequisites: BIO 121 <sup>2</sup> CHM 234 Introductory Biochemistry w/lab Prerequisite: CHM 109 or both CHM 125+126 or equivalent <b>OR</b> <sup>2</sup> CHM 127+128 Principles of Chemistry II w/lab Prerequisites: CHM 125+126 and (MTH 122 or 124 or 125) <sup>5</sup> MTH/STA Requirement (GE Math) Gen Ed (GE Social/Behavioral) <sup>4</sup> Elective (if needed)	4 (6) 4 (6) 5 (7) 3-4 3 1	<b>BIO 210</b> Evolutionary Biology Prerequisites: BIO 120 and BIO 121 <b>Advanced Ecology Biology Elective</b> (see list below) <sup>6</sup> Supplementary Skills Elective(see list below) Gen Ed (GE Art) or <sup>4</sup> Elective <sup>4</sup> Elective (if needed)	3 3-4 3-5 3 1-3
<i>Total</i>	<i>15-16*</i>	<i>Total</i>	<i>15</i>
Year Three			
<b>BIO 375</b> Genetics and <b>BIO 376</b> Genetics Laboratory BIO 375 Prerequisite: BIO 120 or CMB 155 and 156 BIO 376 Prerequisite: BIO 375 or 355 (may be taken concurrently) ( <i>CLAS Voyage – Experiential Learning</i> ) <sup>6</sup> Supplementary Skills Elective(see list below) Gen Ed (GE US Diversity) <sup>4</sup> Elective <sup>4</sup> Elective (if needed)	3/1 (6) 3-5 3 3 1-2	<b>BIO/CMB 485</b> Molecular Ecology (winter only) Prerequisites: BIO 375 Issues <b>Organismal Biology Elective</b> (see list below) Gen Ed (GE Historical Analysis) <sup>6</sup> Supplementary Skills Elective(see list below) (if needed) <b>OR</b> <sup>4</sup> Elective (if needed)	3 3 3-4 3 2-3
<i>Total</i>	<i>15</i>	<i>Total</i>	<i>15</i>
Year Four			
<b>Organismal Biology Elective</b> (see list below) <b>Advanced Ecology Biology Elective</b> (see list below) <sup>7</sup> Issues+SWS Gen Ed (GE Global Perspectives) <sup>4</sup> Elective	3-4 3-4 3 3 1-3	<sup>7, 8</sup> <b>BIO 495 SWS</b> Perspectives in Biology ( <i>CLAS Voyage - Capstone</i> ) Prerequisites: Senior Standing, and either STA 215, MTH 125 or MTH 201 <b>Biology Elective</b> (see list below) <sup>4</sup> Elective or (Gen Ed, if needed) <sup>4</sup> Elective <sup>4</sup> Elective	3 3-4 3 3 2-3
<i>Total</i>	<i>15</i>	<i>Total</i>	<i>15</i>

\*The block tuition rate is for 12-15 credits. You will pay additional tuition for any credits over 15

<sup>1</sup> WRT 150 earned through AP/Dual Enrollment will fulfill the WRT 150 requirement. A grade of C or better is required in WRT 130 or 150.<sup>2</sup> Must complete one of the following CHM sequences: 1) CHM 109 + CHM 234; 2) CHM 125/126 + CHM 127/128. Those who need CHM 109 + CHM 234 + CHM 231 for graduate/professional school can take CHM 231 in place of CHM 234, but will still need an additional option of Supplemental Skill electives<sup>3</sup> MTH 122 is not a required course in the Biology major. Students who plan to take CHM 127/128 must complete MTH 122. MTH 124 and MTH 201 will substitute for MTH 122. **Take the Math Proficiency Tests for MTH 122 and/or 123 online: [www.gvsu.edu/s/mv](http://www.gvsu.edu/s/mv)**<sup>4</sup> 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.<sup>5</sup> Choose one of the following for the math/statistics requirement 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.

<sup>6</sup>Students planning on professional or graduate school should complete CHM 235/236, CHM 237/238, CHM 461, and PHY 220 and PHY 221. The Pre-Professional emphasis is recommended. See the Preprofessional Advisors in the CLAS Academic Advising Center for more information.

<sup>7</sup> Students must complete a total of two courses with an SWS attribute.

<sup>8</sup> May substitute a 3-credit BIO 490 or BIO 499 with mentor approval. Must occur in final year and include a public presentation. Doesn't satisfy SWS.

**Declaring the Biology Major:**

1. In myBanner, select "Student" > "Student Records" > "Change Major" > "Change Major 1/Program"
2. Choose "Biology-(BA or BS)-Ecology & Evolutionary Biology" from the drop-down box.
3. Click "Submit" and then "Change to New Program"

General Education Categories fulfilled by the Biology major:
Life Science and Physical Science: BIO 120 and CHM 109 or CHM 125+126 (both fulfill lab requirement)
Mathematical Sciences: STA 215, MTH 125, or MTH 201

**Students in the Ecology & Evolutionary Emphasis must complete one of the following Supplemental Skill options below.**

<p><b>Option 1: Statistics (6 credits)</b></p> <ul style="list-style-type: none"> <li>• STA 216 Intermediate Applied Statistics (3)</li> <li>• STA 310 Intro to Biostatistics (3)</li> <li>• <b>OR</b> STA 312 Probability &amp; Statistics (3)</li> </ul>	<p><b>Option 5: Chemistry (8-9 credits)</b></p> <ul style="list-style-type: none"> <li>• CHM 235+236 <u>AND</u> CHM 237+238 Organic Chem. for Life Sciences I &amp; II (9)</li> <li>• <b>OR</b> CHM 231 <u>AND</u> CHM 234 Intro Organic Chemistry/Introductory Biochemistry (8)</li> </ul>
<p><b>Option 2: Physics (10 credits)</b></p> <ul style="list-style-type: none"> <li>• PHY 220 <u>AND</u> PHY 221 General Physics I &amp; II (10)</li> <li>• <b>OR</b> PHY 230 <u>AND</u> PHY 231 Principles of Physics I &amp; II (10)</li> </ul>	<p><b>Option 6: Fire Management (7 credits)</b></p> <ul style="list-style-type: none"> <li>• BIO/NRM 415 Fire Ecology &amp; Management (3)</li> <li>• <b>OR</b> NRM 250 Resource Measurement and Maps (3)</li> <li>• BIO/NRM 230 Introduction to Wildland Fire Management (2)</li> <li>• BIO/NRM 430 Advanced Wildland Fire Management (2)</li> </ul>
<p><b>Option 3: Computer Science – Choose 2 courses (6 credits)</b></p> <ul style="list-style-type: none"> <li>• CIS 160 Learn to Code in Python (3)</li> <li>• <b>OR</b> CIS 161 Computational Science (3)</li> <li>• CIS 231 Problem Solving with Spreadsheets (3)</li> <li>• CIS 335 Data Mining (3)</li> </ul>	<p><b>Option 7: Mathematics (7-8 credits)</b></p> <ul style="list-style-type: none"> <li>• MTH 201 Calculus I (4)</li> <li>• MTH 202 Calculus II (4) <b>OR</b> MTH 204 – Linear Algebra (3)</li> </ul> <p><i>MTH 201 may fulfill both the Stat/Math requirement OR here, but not both</i></p>
<p><b>Option 4: GIS (6 Credits)</b></p> <ul style="list-style-type: none"> <li>• NRM 250 Resource Measurement and Maps (3)</li> <li>• <b>OR</b> GPY 307 Intro to Geographic Information Systems (3)</li> <li>• NRM 405 GIS Applications in Natural Resources (3)</li> </ul>	<p><b>Option 8: Geology (8 credits)</b></p> <ul style="list-style-type: none"> <li>• GEO 111 Exploring the Earth (4)</li> <li>• GEO 112 Earth History (4)</li> </ul>

**Students in the Ecology & Evolutionary Emphasis must select a total of five (5) Biology elective courses, including at least 2 from the Organismal Biology category and 2 from the Advanced Ecology & Evolution category. The courses will be applied to either the Organismal Biology or the Advanced Ecology & Evolution Category, but not both.**

<p><b>Organismal Biology (Select 2 courses)</b></p> <p><sup>1</sup>BIO 222 Natural History of Vertebrates (3) w/lab</p> <p><sup>20</sup>BIO 232 Natural History of Invertebrates (3) w/lab</p> <p><sup>55</sup>BIO 243 Plant Identification &amp; Natural History (3) w/lab</p> <p><sup>1</sup>BIO 272 Insect Biology and Diversity (3) w/lab</p> <p><sup>2</sup>BIO 302 Comparative Vertebrate Anatomy (4) w/lab</p> <p><sup>2</sup>BIO 303 Plant Morphology (4) w/lab</p> <p><sup>2E</sup>BIO 313 Plants and Islands (4) w/lab</p> <p><sup>1</sup>BIO 323 Aquatic and Wetland Plants (3) w/lab</p> <p><sup>1</sup>BIO 333 Systematic Botany (4) w/lab</p> <p><sup>2</sup>BIO 342 Ornithology (3) w/lab</p> <p><sup>1</sup>BIO 357* Environmental Microbiology (4) w/lab</p> <p><sup>1</sup>BIO 362 Biology &amp; Diversity of Fishes (4) w/lab</p> <p><sup>1E</sup>BIO 383 Plant-Fungal Interactions (4) w/lab</p> <p><sup>2E</sup>BIO 402 Aquatic Insects (3) w/lab</p> <p><sup>2</sup>BIO 403 Plant Structure and Function (4) w/lab</p> <p><sup>1</sup>BIO 412 Mammalogy (4) w/lab</p> <p><sup>20</sup> BIO 413 Freshwater Algae (3) w/lab</p> <p><sup>2E</sup>BIO 422 Animal Development Biology (3) w/lab</p> <p><sup>1</sup>BIO 433 Plant Ecology (4) w/lab</p> <p><sup>1</sup>BIO 444 Herpetology (4) w/lab</p> <p><sup>1</sup>NRM 263 – Forest Vegetation (2) w/ lab</p>	<p><b>Advanced Ecology &amp; Evolution (Select 2 courses)</b></p> <p><sup>2</sup>BIO 303 Plant Morphology (4) w/lab</p> <p><sup>2E</sup>BIO 313 Plants and Islands (4) w/lab</p> <p><sup>1E</sup>BIO 333 Systematic Botany (4) w/lab</p> <p><sup>1E</sup>BIO 383 Plant-Fungal Interactions (4) w/lab</p> <p><sup>1</sup>BIO 433 Plant Ecology (4) w/lab</p> <p><sup>1</sup>BIO 362 Biology &amp; Diversity of Fishes (4) w/lab</p> <p><sup>2E</sup>BIO 402 Aquatic Insects (3) w/lab</p> <p><sup>2</sup>BIO/NRM 308 Wildlife Ecology (4) w/lab</p> <p>BIO 352 Animal Behavior (3) w/lab</p> <p><sup>1</sup>BIO 370 Marine Biology (3)</p> <p><sup>1</sup>BIO/NRM 386 - Ecological Restoration &amp; Mgmt (4) w/lab</p> <p><sup>1</sup>BIO/NRM 408 Wildlife Management (4) w/lab</p> <p>BIO 417 International Field Biology (w/ mentor permission)</p> <p><sup>10</sup>BIO 440 Limnology (4) w/lab</p> <p><sup>1E</sup>BIO 451 Stream Ecology (4) w/lab</p> <p><sup>1</sup>BIO 460 - Terrestrial Ecosystem Ecology (4) w/lab</p> <p><sup>2</sup>BIO 470 Conservation Biology (3)</p> <p><sup>2</sup>BIO 473 Ecology and Evolution of Plant-Animal Interactions (3)</p> <p><sup>1E</sup>BIO 475 Population Genetics (3)</p> <p><sup>2</sup>BIO/NRM 486 Adv. Restoration Ecology (3)</p>	<p><b>Additional Elective Course (Select 1 course)</b></p> <p>Selected from Biology (numbered 222 or higher), Biomedical Sciences (BMS 208 or higher), Behavioral Neuroscience (PSY 300, 330, 350, or 435), Cell and Molecular Biology (CMB 250 or higher), or Natural Resources Management (NRM 150 or higher). Internship and Research credit are encouraged (BIO490/BIO499).</p> <p><b>Notes</b></p> <ul style="list-style-type: none"> <li>•For those interested in microbiology, it is recommended to take one of BIO 357 or BMS 212/213, but not both</li> <li>It is not recommended to take BIO 355 and BIO 375. Please consult with your mentor if you have already taken BIO 355.</li> </ul> <p><sup>1</sup><i>Offered in Fall semesters</i></p> <p><sup>2</sup><i>Offered in Winter semesters</i></p> <p><sup>55</sup><i>Offered in spring/summer</i></p> <p><sup>E</sup><i>Offered in Even years</i></p> <p><sup>O</sup><i>Offered in Odd years</i></p> <p><i>Numbers in parentheses indicate # of credits</i></p>
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**It is imperative to meet with your faculty mentor 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).