### College of Liberal Arts and Sciences (CLAS) Academic Advising Center

**Biology-BA or BS-Biomolecular Processes**

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.**

| Year One | BIOL121* | General Biology II w/lab  
Prerequisite: MTH 110 (may be taken concurrently) | 4 (6) | BIOL120* | General Biology I w/lab  
Prerequisites: High school chemistry, CHM 109, or CHM 115 strongly recommended (CHM 109 or 115 may be taken concurrently) | 4 (6) |
| --- | --- | --- | --- | --- | --- |
| | CHM 115 Principles of Chemistry I w/lab  
Prerequisites: High school chemistry and (MTH 110 or MTH 122 or MTH 125 or MTH 201) | 4 (6) | | CHM 116 Principles of Chemistry II w/lab  
Prerequisites: CHM 115 and (MTH 122 or MTH 125 or MTH 201) | 5 (7) |
| | MTH 122 College Algebra  
Prerequisite: MTH 110 or assignment through Grand Valley math placement | 3 | | MTH 123 Trigonometry  
Prerequisite: MTH 122 or assignment through Grand Valley math placement (MTH 122 may be taken concurrently) | 3 |
| | Gen Ed or WRT 120 (self-placement)  
*It is strongly recommended that BIO majors take BIO 121 before BIO 120. | 3-4 | | WRT 130 or WRT 150 Strategies in Writing | 3-4 |
| | Numbers noted within (parentheses) are contact hours | Total 14 | Total 15-16* |

| Year Two | BIOL215 Ecology w/lab (summer and fall only)  
Prerequisites: BIO 120 and BIO 121 (BIO 120 may be taken concurrently) | 4 (6) | BIOL210 Evolutionary Biology  
Prerequisites: BIO 120 and BIO 121 | 3 |
| --- | --- | --- | --- |
| | CHM 231 Introductory Organic Chemistry w/lab  
Prerequisite: CHM 109 or CHM 116 | 4 (7) | CHM 232 Biological Chemistry w/lab  
Prerequisite: CHM 231 | 4 (7) |
| | *OR CHM 241 Organic Chemistry for Life Sciences I w/lab  
Prerequisite: CHM 116 | 5 (7) | OR CHM 242 Organic Chemistry for Life Sciences II w/lab  
Prerequisite: CHM 241 | 4 (6) |
| | **Category I BIO Elective Course**  
Gen Ed | 3-4 | **MTH Cognate Course**  
Gen Ed | 3 |
| | **Category II BIO Elective Course**  
Gen Ed | 3 | **Elective**  
Gen Ed | 3 |
| | Numbers noted within (parentheses) are contact hours | Total 14-16 | Total 16* |

| Year Three | BIOL375 Genetics and BIOL 376 Genetics Laboratory  
BIO 375 Prerequisites: BIO 120 or CMB 155 and 156  
BIO 376 Prerequisites: BIO 375 or 355 (either may be taken concurrently) | 4 (6) | CMB 405 Cell and Molecular Biology  
Prerequisites: BIO 375 or 355, BIO 376, and (CHM 232 or CHM 242 or CHM 247) may be taken concurrently | 4 |
| --- | --- | --- | --- |
| | *PHY 220 General Physics I w/lab  
Prerequisites: MTH 122 and MTH 123 | 5 (7) | *CMB 406 SWS Cell and Molecular Biology Laboratory  
Prerequisites: CMB 405 (may be taken concurrently) | 2 (4) |
| | **OR PHY 200 Physics for the Life Sciences w/lab**  
Prerequisite: MTH 110 or MTH 122 or MTH 201 | 4 (6) | **PHY 221 General Physics II w/lab**  
Prerequisite: PHY 220 | 5 (7) |
| | **Category II BIO Elective Course**  
Gen Ed | 3-4 | **Issue**  
Gen Ed or **Elective**  
Gen Ed | 3 |
| | Numbers noted within (parentheses) are contact hours | Total 14-16 | Total 15 |

| Year Four | **Category V BIO Elective Course** (in addition to CMB 406)  
**Category V BIO Elective Course** (in addition to CMB 406)  
Issue  
Gen Ed  
**Elective** | 2-4 | BIOL 495 Perspectives in Biology (Capstone)  
Prerequisites: Senior Standing | 3 |
| --- | --- | --- | --- |
| | **Category VI BIO Elective Course** (in addition to CMB 406)  
Issue  
Gen Ed  
**Elective** | 3 | Any Category BIO Elective Course (if needed)  
Gen Ed or **Elective**  
Gen Ed | 1-3 |
| | Numbers noted within (parentheses) are contact hours | Total 15 | Total 15 |

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

1. MTH 122/123 are prerequisites for PHY 220 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/or 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)**

2. Students 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.

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

4. Students 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.
Declaring the Biology-General Major:

1. In myBanner, select “Student” > “Student Records” > “Change Major” > “Change Major 1/Program”
2. Choose “Biology-BA or BS Biomolecular Processes” from the drop-down box.
3. Click “Submit” and then “Change to New Program”
4. Declare “Pre-Professional” as your SECOND MAJOR if you are planning on medical, dental, pharmacy, or optometry school.
   - If you are Pre-Veterinary, the Biology with Pre-Veterinary emphasis is recommended

General Education Categories fulfilled by the Biology-Biomolecular Processes major:

<table>
<thead>
<tr>
<th>Category I: Plant Organismal Biology</th>
<th>Category II: Animal Organismal Biology</th>
<th>Category V: Biomolecular Processes</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIO 243 Plant Identification &amp; Natural History (3) w/lab</td>
<td>BIO 222 Natural History of Vertebrates (3) w/lab</td>
<td>BIO 357* - Environmental Microbiology (4) w/lab</td>
</tr>
<tr>
<td>BIO 303 Plant Morphology (4) w/lab</td>
<td>BIO 232 Natural History of Invertebrates (3) w/lab</td>
<td>BIO 403 - Plant Structure and Function (4) w/lab</td>
</tr>
<tr>
<td>BIO 313 Plants and Islands (4) w/lab</td>
<td>BIO 272 Insect Biology &amp; Diversity (3) w/lab</td>
<td>BIO 416 - Advanced Genetics Laboratory (2)</td>
</tr>
<tr>
<td>BIO 323 Aquatic and Wetland Plants (3) w/lab</td>
<td>BIO 302 Comparative Vertebrate Anatomy (4) w/lab</td>
<td>BIO 422 - Embryology (3) w/lab</td>
</tr>
<tr>
<td>BIO 333 Systematic Botany (4) w/lab</td>
<td>BIO 342 Ornithology (3) w/lab</td>
<td>BIO 423 - Plant Biotechnology (3) w/lab</td>
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<tr>
<td>BIO 383 Plant-Fungal Interactions (4) w/lab</td>
<td>BIO 362 Fisheries Biology (4) w/lab</td>
<td>BIO 485 - Molecular Ecology (3) w/lab</td>
</tr>
<tr>
<td>BIO 403 Plant Structure and Function (4) w/lab</td>
<td>BIO 402 Aquatic Insects (3) w/lab</td>
<td>BMS 212 and BMS 213* Introductory Microbiology and Lab (4)</td>
</tr>
<tr>
<td>BIO 413 Freshwater Algae (3) w/lab</td>
<td>BIO 412 Mammalogy (4) w/lab</td>
<td>CMB 351 - Bioinformatics: Tools and Techniques for Life Scientists (3)</td>
</tr>
<tr>
<td>BIO 423 Plant Biotechnology (3) w/lab</td>
<td>BIO 422 Embryology (3) w/lab</td>
<td>CMB 406 - Cellular and Molecular Biology laboratory (2) (elective for Ecology/Evolutionary BIO emphasis only)</td>
</tr>
<tr>
<td>BIO 433 Plant Ecology (4) w/lab</td>
<td>BIO 432 Comparative Animal Physiology (4) w/lab</td>
<td>CMB 411 - Genetics of Development and Cancer (3)</td>
</tr>
<tr>
<td>Numbers in parentheses indicate # of credits</td>
<td>BIO 444 Herpetology (4) w/lab</td>
<td>CMB 414 - Molecular Biology of the Gene (3)</td>
</tr>
<tr>
<td>*Offered in Fall semesters only</td>
<td>BMS 208+309 Human Anatomy and Lab (4)</td>
<td>CMB 426/626 - Nucleic Acids Laboratory (4)</td>
</tr>
<tr>
<td>*Offered in Winter semesters only</td>
<td>BMS 290+391 Human Physiology and Lab (5)</td>
<td></td>
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<tr>
<td>*Offered in Even years only</td>
<td>Category IV: Popular Course Electives</td>
<td></td>
</tr>
<tr>
<td>*Offered in Odd years only</td>
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</tbody>
</table>

Excluded and Restricted Courses:

- The following courses are excluded from 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)

Students must complete ONE course from Categories I and II, and TWO courses from Category V in addition to CMB 406.

The BIO-Biomolecular Processes major requires a total of 41 credits of BIO classes, including certain CMB and BMS courses. Additional course(s) may be needed and can be taken from any category to reach 41 credits. Elective courses may only count in one category.

To find more information on Pre-Professional programs, visit [www.gvsu.edu/clasadvising/preprofessional](http://www.gvsu.edu/clasadvising/preprofessional)

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