COLLEGE OF LIBERAL ARTS AND SCIENCES (CLAS) ACADEMIC ADVISING CENTER 2017-2018

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			
BIO 120 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)*	**BIO 121** General Biology II w/lab Prerequisite: MTH 110 (may be taken concurrently)	4 *(6)*
***OR* BIO 121** General Biology II w/lab Prerequisite: MTH 110 (may be taken concurrently)	4 *(6)*	***OR* BIO 120** 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	[4]**MTH 123** Trigonometry Prerequisite: MTH 122 or assignment through Grand Valley math placement (MTH 122 may be taken concurrently)	3
Gen Ed	3	**WRT 150** Strategies in Writing	4
Numbers noted within (parentheses) are contact hours Total	*14*	*Total*	*16**
Year Two			
BIO 215 Ecology w/lab *(summer and fall only)* Prerequisites: BIO 120 and BIO 121 (BIO 120 may be taken concurrently)	4 *(6)*	**BIO 210** Evolutionary Biology Prerequisites: BIO 120 and BIO 121	3
[1]**CHM 231** Introductory Organic Chemistry w/lab Prerequisite: CHM 109 or CHM 116	4 *(7)*	[1]**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)*
[2]Category I BIO Elective Course	3-4	[3]MTH Cognate Course	3
Gen Ed	3	Gen Ed	3
		[5]Elective	3
Total	*14-15*	*Total*	*16**
Year Three			
BIO 375 Genetics and **BIO 376** Genetics Laboratory Prerequisites: BIO 120. Concurrent enrollment in BIO 376 is required	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
[1,4]**PHY 220** General Physics I w/lab Prerequisites: MTH 122 and MTH 123	5 *(7)*	[6]**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)*	[1,4]**PHY 221** General Physics II w/lab Prerequisite: PHY 220	5 *(7)*
[2]Category II BIO Elective Course	3-4	Issue	3
Gen Ed	3	[5]Elective	1
Total	*14-15*	*Total*	*15*
Year Four			
[2]Category V BIO Elective Course (in addition to CMB 406)	2-4	**BIO 495** Perspectives in Biology (Capstone) Prerequisites: Senior Standing and CMB 405 (may be taken concurrently)	3
[2]Category V BIO Elective Course (in addition to CMB 406)	2-4		
Issue	3		
Gen Ed	3	[2]Any Category BIO Elective Course (if needed)	1-3
[5]Elective	3	[5]Elective	3
		Gen Ed	3
		Gen Ed	3
Total	*15*	*Total*	*15*

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

[1] 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.

[2] 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.

[3] 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.

[4] 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 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***

[5] Elective refers to any course that will help you earn the required 120 credits to graduate.

[6] 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 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:
Life Science and Physical Science: BIO 120 and CHM 115 (both fulfill lab requirement)
Mathematical Sciences: STA 215, MTH 122, MTH 123, MTH 124, MTH 201

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.

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

Numbers in parentheses indicate # of credits
[1]Offered in Fall semesters only
[2]Offered in Winter semesters only

Category II: Animal Organismal Biology
[1]BIO 222 Natural History of Vertebrates (3) w/lab
[2]BIO 232 Natural History of Invertebrates (3) w/lab
[1]BIO 272 Insect Biology & Diversity (3) w/lab
[2]BIO 302 Comparative Vertebrate Anatomy (4) w/lab
[2]BIO 342 Ornithology (3) w/lab
[1]BIO 362 Fisheries Biology (4) w/lab
[2]BIO 402 Aquatic Insects (3) w/lab
[1]BIO 412 Mammalogy (4) w/lab
[1]BIO 422 Embryology (3) w/lab
[1]BIO 432 Comparative Animal Physiology (4) w/lab
BIO 444 Herpetology (4) w/lab
BMS 208+309 Human Anatomy and Lab (4)
BMS 290+291 Human Physiology and Lab (4)

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

Category IV: Applied Ecology & Evolution
[2]BIO 308/NRM 308 - Wildlife Ecology (4) w/lab
[1]BIO 357 - Environmental Microbiology* (4) w/lab
[1]BIO 362 - Fisheries Biology (3) w/lab
[1]BIO 370 - Marine Biology (3)
[1]BIO 386/NRM 386 - Ecological Restoration & Management (4) w/lab
[2]BIO 402 - Aquatic Insects (3) w/lab
[1]BIO 408/NRM 408 - Wildlife Management (4) w/lab
[1]BIO 440 - Limnology (4) w/lab
[1]BIO 450 - Stream Ecology (4) w/lab
[1]BIO 470 - Conservation Biology (3)
[2]BIO 473 - Ecology and Evolution of Plant-Animal Interactions (3)
[2]BIO 486/NRM 486 - Advanced Restoration Ecology (3)
BIO 407 - Biology and Society: Study Abroad (with advisor's permission)
BIO 417 - International Field Biology (with advisor's permission)
BIO 418 - Regional Field Biology (with advisor's permission)

Category V: Biomolecular Processes
[2]BIO 317 - Animal Nutrition (3)
[1]BIO 357* - Environmental Microbiology (4) w/lab
[2]BIO 403 - Plant Structure and Function (4) w/lab
[2]BIO 416 - Advanced Genetics Laboratory (2)
[1]BIO 422 - Embryology (3) w/lab
[2]BIO 423 - Plant Biotechnology (3) w/lab
[2]BIO 485 - Molecular Ecology (3) w/lab
BMS 212 *and* BMS 213* Introductory Microbiology and Lab (4)
[1]CMB 351 - Bioinformatics: Tools and Techniques for Life Scientists (3)
CMB 406 - Cellular and Molecular Biology laboratory (2) (elective for EEB emphasis *only*)
[2]CMB 411 - Genetics of Development and Cancer (3)
[1]CMB 414 - Molecular Biology of the Gene (3)
CMB 426 - Nucleic Acids Laboratory (3)

*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.
The following course may only count towards the Biology major with advisor's permission.
BIO 355 - Human Genetics (3)
*Note: students may count BIO 357 *or* BMS 212/213 towards the Biology degree, but not both

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-1-140 MAK, 616-331-8585 http://www.gvsu.edu/clasadvising

Academic Advisors: Jo Ann Litton, littonj@gvsu.edu, Julie Amon-Mattox, amonju@gvsu.edu, and Jason Prowant, prowanja@gvsu.edu

See http://gvsu.edu/s/zY for additional details regarding professional school information, and follow the Pre-Professional Blog:
https://preprofessionallakers.wordpress.com

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