COLLEGE OF LIBERAL ARTS AND SCIENCES (CLAS) ACADEMIC ADVISING CENTER 2021-2022

BIOLOGY-BA OR BS-SECONDARY EDUCATION (WITH EDUCATION MAJOR AND TEACHABLE MINOR)

THIS IS A **GENERAL** CURRICULUM GUIDE AND IS NOT APPLICABLE TO EVERY STUDENT. IT IS IMPORTANT TO MEET WITH YOUR ADVISOR.

A 2.7 cumulative GPA in the Biology major is required for admission to the College of Education

Year One			
BIO 120 General Biology I **or** BIO 121 General Biology II Prerequisites: BIO 120: High school chemistry, CHM 109, or CHM 115 strongly recommended (CHM 109 or 115 may be taken concurrently) BIO 121: MTH 110 or higher (may be taken concurrently)	4	CHM 116 Principles of Chemistry II Prerequisites: CHM 115 and (MTH 122 or MTH 125 or MTH 201)	5
CHM 115 Principles of Chemistry I Prerequisites: High school chemistry and (MTH 110 or MTH 122 or MTH 125 or MTH 201)	4	[1]WRT 150 Strategies in Writing or WRT 130 Strategies in Writing Stretch II	4/3
MTH 122 College Algebra Prerequisite: MTH 110 or assignment through Grand Valley math placement	3	BIO 120 General Biology I **or** BIO 121 General Biology II Prerequisites: BIO 120: High school chemistry, CHM 109, or CHM 115 strongly recommended (CHM 109 or 115 may be taken concurrently) BIO 121: MTH 110 or higher (may be taken concurrently)	4
Gen Ed or WRT 120 Strategies in Writing Stretch I[1]	3	Gen Ed	3
Total	*14/15*	*Total*	*16**
Year Two			
BIO 215 Ecology Prerequisites: BIO 120 and BIO 121 (BIO 120 may be taken concurrently)	4	BIO 210 Evolutionary Biology Prerequisites: BIO 120 and BIO 121	3
[2]CHM 231 Introductory Organic Chemistry Prerequisite: CHM 109 or CHM 116	4	[2]CHM 232 Biological Chemistry Prerequisite: CHM 231	4
OR CHM 241 Organic Chemistry for Life Sciences I Prerequisite: CHM 116	5	***OR*** CHM 242 Organic Chemistry for Life Sciences II Prerequisite: CHM 241	4
PSY 101 Introductory Psychology	3	EDF 315 Diverse Perspectives on Education	3
Gen Ed	3	Gen Ed	3
		Gen Ed or Minor Course	3
Total	*14-15*	*Total*	*16**
Spring/Summer			
[3]Minor Course	3	[3]Minor Course	3
Year Three			
BIO 375 Genetics and BIO 376 Genetics Laboratory Prerequisites: BIO 120. Concurrent enrollment in BIO 376 is required	4	[5]PHY 220 General Physics I Prerequisites: MTH 122 and MTH 123	5
[5]MTH 123 Trigonometry Prerequisite: MTH 122 or assignment through Grand Valley math placement (MTH 122 may be taken concurrently)	3	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
EDI 339 Assessment in Secondary Schools	3	[4]CMB 406 SWS Cell and Molecular Biology Laboratory Prerequisites: CMB 405 (may be taken concurrently)	4
PSY 301 Child Development Prerequisite: PSY 101	3	[3]Minor Course	2
Issue	3		3
Total	*16**	*Total*	*13-14*
Spring/Summer			
[5]PHY 221 – General Physics II Prerequisite: PHY 220	5	[3]Minor Course	3-6
Year Four			
[3]Minor Course	3	BIO 495 Perspectives in Biology (Capstone) Prerequisites: Senior Standing and CMB 405 (may be taken concurrently)	3
[3]Minor Course (if room)	3		
[6]BIO Elective Course - Plant Organismal Biology (Category I)	3-4	[6]BIO Elective Course - Biomolecular Processes (Category V)	3-4
[6]BIO Elective Course - Animal Organismal Biology (Category II)	3-4	[6]BIO Elective Course - Principles of Ecology and Evolutionary Biology (Category III) **OR** Applied Ecology and Evolution (Category IV)—***SCI 450 recommended to fulfill category III or IV***	2-4
[7]MTH Cognate Course	3-4	Issue	3
		[8]EDS 379 Universal Design for Learning: Secondary Sophomore Standing, EDF 315, and EDI 339. B- or better required.	3
Total	*15*	*Total*	*15*
Year Five			
Teacher Assisting		**Student Teaching**	
EDI 331 Methods and Strategies of Secondary Teaching	5	EDI 431 Student Teaching: Secondary	8
EDI 310 Organizing and Managing Classroom Environments	3	EDI 432 Student Teaching: Secondary Content	2
EDR 321 Content Area Literacy	3	EDF 485 The Context of Educational Issues Must be taken with or after EDI 431	3
EDT 370 Technology in Education Must be taken with or after EDI 331 but before EDI 431	3		
Total	*14*	*Total*	*13*

See reverse for footnotes

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

It is imperative to meet with your faculty advisor and an advisor in the CLAS Academic Advising Center regularly.
Your advisor in the CLAS Advising Center is Emily Davis, davisem1@gvsu.edu.
The CLAS Academic Advising Center is located in C-1-140 MAK, 616-331-8585. Online at: http://www.gvsu.edu/clasadvising

[1] Students who self-place into WRT 120 should take this course in the fall semester and then take WRT 130 in the winter semester of their first year. Students who self-place into WRT 150 should normally take this course in the winter semester of their first year.
Students will not need to take WRT 150 (or 120 & 130)if they have earned credit for the course through AP/Dual Enrollment. A grade of C or better is required.
[2] If you plan to attend graduate or professional school you will want to complete the CHM 241/242 sequence.
[3] A teachable minor is required for students pursuing secondary teacher certification. See below for minor options.
[4] Students must complete a total of two courses with an SWS attribute.
[5] MTH 122/123 are prerequisites for PHY 220 and are not part of the Biology major. 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. For students with the Advanced Waiver/Override for Mathematics based on ACT scores, it is **STRONGLY RECOMMENDED** that proficiency in MTH 123 – Trigonometry – be demonstrated by either taking the MTH 123 course or by achieving a passing score on the GVSU math placement test **PRIOR** to taking PHY 220 and 221. To take the math placement test, go to gvsu.edu/s/mv
[6] Choose one course from category I, II, and V. Also choose one course from either category III **or** IV **SCI 450 recommended to fulfill category III or IV
[7] Choose one of the following to complete the math cognate for the major: MTH 125: Survey of Calculus, MTH 201: Calculus I, 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.
[8] EDS 379 may be taken prior to the Teacher Assisting Semester but must be completed prior to Student Teaching. Permit required (COE – 616-331-6650).

Biology students can pursue a Bachelor of Arts or Bachelor of Science degree. Students who wish to obtain a BA must fulfill 3rd semester proficiency in a foreign language (201 level). The BS degree requirements are incorporated into the major requirements and include BIO 120, BIO 375 and 376, and STA 215.

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 and the requirements for their chosen emphasis, 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 Education Major with a teachable Minor:

1. Log into myBanner from the GVSU homepage
2. Once logged in select "Student," "Student Records," and then "Change Major"
3. Click on the "Change Major 1/Program" box
4. Click on the down arrow in the box next to "New Major 1/Program," from here scroll down and choose "Biology Teaching – **BA (or) BS** Secondary Education"
5. Click "Submit." The system will automatically declare your 2nd major in "Education" and give you the option to declare a minor. Choose an appropriate minor from the list and then click "Change to New Program"

General Education Overlap

General Education Categories fulfilled by the Biology Major:	
Life Sciences with Lab: BIO 120	Physical Sciences with Lab: CHM 115
Mathematical Sciences: MTH 122 or MTH 123	Issues: BIO Issue courses may count towards the Biology major *after* elective-category requirements are satisfied for the student's selected emphasis
Additional Overlap for Education Majors:	
Social and Behavioral Sciences: PSY 101	U.S. Diversity: EDF 315

Teachable Majors and Minors for Secondary Education

Teachable Majors		**Teachable Minors**	
Biology	Latin	Applied Linguistics - ESL	German-Teaching
Chemistry	Mathematics	Biology-Teaching	History-Teaching
Earth/Space Science	Music (K-12)	Chemistry-Teaching	Mathematics-Secondary Education
English	Physical Education (K-12)	Earth/Space Science-Teaching	Physics-Teaching
French	Physics	Economics-Teaching	Political Science-Teaching
German	Social Studies	English-Teaching	Psychology-Teaching
History	Spanish	French-Teaching	Spanish-Secondary Teaching
Integrated Science	Visual Arts (K-12)	Geography-Teaching	

Second Major in Education

Education Major Prerequisites (9 credits)
A 2.7 cumulative GPA in the Education Major Prerequisites is required with no grade lower than a C

— **EDF 315 Diverse Perspectives on Education** (3)	— **PSY 301 Child Development** (3)
— **EDI 339 Assessment in Secondary Schools** (3)	Prerequisite: PSY 101
Teacher Assisting (14 - 17 credits)	**Student Teaching (13 credits)**
— **EDI 331 Teacher Assisting-Secondary** (5)	— **EDI 431 Student Teaching, Secondary** (8)
— **EDI 310 Organizing and Managing Classroom Environments** (3)	— **EDI 432 Student Teaching, Secondary Content** (2)
— **EDR 321Content Area Literacy** (3)	— **EDF 485 The Context of Educational Issues** (3)
— **EDT 370 Technology in Education** (3)	Must be taken with or after EDI 431
Must be taken with or after EDI 331 but before EDI 431	
— **EDS 379 Universal Design for Learning: Secondary** (3)	

See attached sheet for Biology Elective Categories

Biology Elective Categories		
Category I - Plant Organismal Biology BIO 243 - Plant Identification and Natural History (3) BIO 303 - Plant Morphology (4) BIO 313 - Plants and Islands (4) BIO 323 - Aquatic and Wetland Plants (3) BIO 333 - Systematic Botany (4) BIO 383- Plant Fungal Interactions (4) BIO 403 - Plant Structure and Function (4) BIO 413 - Freshwater Algae (3) BIO 423 - Plant Biotechnology (3) BIO 433 - Plant Ecology (4)	**Category II – Animal Organismal Biology** BIO 222 - Natural History of Vertebrates (3) BIO 232 - Natural History of Invertebrates (3) BIO 272 - Insect Biology and Diversity (3) BIO 302 - Comparative Vertebrate Anatomy (4) BIO 342 - Ornithology (3) BIO 362 - Fisheries Biology (3) BIO 402 - Aquatic Insects (3) BIO 412 - Mammalogy (4) BIO 422 - Embryology (3) BIO 432 - Comparative Animal Physiology (4) BIO 444- Herpetology (4) BMS 208 *and* BMS 309 - Human Anatomy and Laboratory in Human Anatomy (total of 4) BMS 290 *and* BMS 291 - Human Physiology and Laboratory in Human Physiology (total of 4)	**Category III – Principles of Ecology and Evolutionary Biology** BIO 303 - Plant Morphology (4) BIO 313 - Plants and Islands (4) BIO 333 - Systematic Botany (4) BIO 349 - The Darwinian Revolution (3) BIO 352 - Animal Behavior (3) BIO 370 - Marine Biology (3) BIO 433 - Plant Ecology (4) BIO 440 - Limnology (4) BIO 450 - Stream Ecology (4) BIO 452 - Human Evolution (3) BIO 460 - Terrestrial Ecosystem Ecology (4) BIO 473 - Ecology and Evolution of Plant-Animal Interactions (3)
Category IV – Applied Ecology and Evolution BIO 308/NRM 308 - Wildlife Ecology (4) BIO 357 - Environmental Microbiology* (4) BIO 362 - Fisheries Biology (3) BIO 370 - Marine Biology (3) BIO 386/NRM 386 - Ecological Restoration & Management (4) BIO 402 - Aquatic Insects (3) BIO 408/NRM 408 - Wildlife Management (4) BIO 440 - Limnology (4) BIO 450 - Stream Ecology (4) BIO 470 - Conservation Biology (3) BIO 473 - Ecology and Evolution of Plant-Animal Interactions (3) 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) *Note: students may count BIO 357 *or* BMS 212/213 towards the Biology degree, but not both	**Category V – Biomolecular Processes** BIO 317 - Animal Nutrition (3) BIO 357* - Environmental Microbiology (4) BIO 403 - Plant Structure and Function (4) BIO 416 - Advanced Genetics Laboratory (2) BIO 422 - Embryology (3) BIO 423 - Plant Biotechnology (3) BIO 485 - Molecular Ecology (3) BMS 212 *and* BMS 213* Introductory Microbiology and Laboratory in Microbiology (4) CMB 351 - Bioinformatics: Tools and Techniques for Life Scientists (3) CMB 406 - Cellular and Molecular Biology laboratory (2) (elective for EEB emphasis *only*) CMB 411 - Genetics of Development and Cancer (3) 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 BIO 105 - Environmental Science Credits: BIO 107 - Great Lakes & Other Water Resources BIO 109 - Plants in the World BIO 205 - Genetics for K-8 Pre-Service Teachers Credits: 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) Students may count BIO 357 *or* BMS 212/213 towards the Biology degree, but not both.