COLLEGE OF LIBERAL ARTS AND SCIENCES (CLAS) ACADEMIC ADVISING CENTER 2024-2025

CELL AND MOLECULAR BIOLOGY-BS

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

Year One			
[1]**CHM 115** Principles of Chemistry (GE Physical Science) Prerequisites: High school chemistry and (MTH 110 or MTH 122 or MTH 125 or MTH 201)	4 *(6)*	[1]**CHM 116** Principles of Chemistry II Prerequisites: CHM 115 and (MTH 122 or MTH 125 or MTH 201)	5 *(7)*
[2]**MTH 122** College Algebra Prerequisite: MTH 110 or assignment through Grand Valley math placement	3	[2]**MTH 123** Trigonometry Prerequisite: MTH 122 or assignment through Grand Valley math placement (MTH 122 may be taken concurrently)	3
Gen Ed (GE Art) or [3]**WRT 120** (self-placement)	3	[3]**WRT 130** or **WRT 150** Strategies in Writing (GE Writing)	3-4
[1]**CMB 155** Intro to Cell & Molecular Biology (GE Life Science)	3	Gen Ed (GE Philosophy & Literature) **OR *CMB 155 + 156**	3
[1]**CMB 156** Discoveries in Cell and Molecular Biology: A Research-Based Laboratory Course Prerequisites: BIO 120 or CMB 155 (may be taken concurrently)	1 *(3)*	[4]Elective (if needed)	1
[4]Elective	1	***CMB 155+156 can be taken in Fall or Winter.**	
Numbers noted within (parentheses) are contact hours Total	*15*	*Total*	*15*
Year Two			
[5]**CHM 241** Organic Chemistry for Life Sciences I Prerequisite: CHM 116	5 *(7)*	**BIO 375** Genetics Prerequisites: BIO 120 or CMB 155 and 156	3
CMB 250 Introduction to Biotechnology Prerequisites: CMB 155 and 156 (or BIO 120) and CHM 116	4	**BIO 376** Genetics Laboratory Prerequisites: BIO 375 or 355 (either may be taken concurrently	1 *(3)*
[6]**MTH 125** Survey of Calculus (option A) Prerequisite: MTH 110; or assignment through math placement	3	**CMB 409** Responsible Conduct of Research	1
		[5]**CHM 242** Organic Chemistry for Life Sciences II Prerequisite: CHM 241	4 *(6)*
OR [6]**MTH 201** Calculus I (option B) Prerequisites: MTH 124; or MTH 122 and MTH 123; or proficiency through math placement	4	[6]**MTH 202** Calculus II (option B) – ***OR*** Elective if option A Prerequisites: MTH 201	3-4
STA 215 Introductory Applied Statistics (GE Math) Prerequisite: MTH 110 or equivalent	3	Gen Ed (GE Social/Behavioral)	3
Total	*15-16**	*Total*	*15-16**
Year Three			
CMB 451 Bioinformatics: Tools & Techniques for Life Scientists (formerly CMB 351) Prerequisites: Junior standing, CMB 155 and 156 (or BIO 120) and CMB 250 or BIO 375, or permission of instructor	3	**CMB 405** Cell and Molecular Biology Prerequisites: (BIO 375 or BIO 355) and BIO 376, and (CHM 232 or 242 or 247—may be taken concurrently)	4
		[7]**CMB 406** Cell and Molecular Biology Laboratory *SWS* Prerequisites: CMB 405 (may be taken concurrently)	2 *(4)*
CHM 461 Biochemistry I Prerequisite: CHM 242, CHM 247, or CHM 248	4	[6]**PHY 221** General Physics I (option A) Prerequisites: PHY 220	5 *(7)*
[6]**PHY 220** General Physics I (option A) Prerequisites: MTH 122 and MTH 123	5 *(7)*	***OR*** [6]**PHY 231** Principles of Physics II (option B) Prerequisite: PHY 230 and MTH 202	5 *(7)*
OR [6]**PHY 230** Principles of Physics II (option B) Prerequisite: MTH 201	5 *(7)*	Issue	3
Gen Ed (GE Social/Behavioral)	3		
Total	*15*	*Total*	*14*
Year Four			
CMB 426 Research Applications in Nucleic Acids Prerequisite: CMB 406	4 *(6)*	**CMB 495** Perspectives in Cell & Molecular Biology (capstone) (Winter Only) Prerequisite: CMB 499, BIO 499, BMS 499, or CHM 499	3
CMB 490 Internship Prerequisite: Permission of instructor and program director	1	**CMB 490** Internship Prerequisite: Permission of instructor and program director	2
***OR* CMB 499** Research in Cell and Molecular Biology Prerequisite: Permission of instructor and program director	1	***OR* CMB 499** Research in Cell and Molecular Biology Prerequisite: Permission of instructor and program director	2
[7]**CHM 462** Techniques in Biochemistry *SWS* Prerequisite: CHM 461 or permission of instructor	3 *(4)*	Gen Ed (GE US Diversity)	3
Issue	3	Gen Ed (GE Global Perspectives)	3
Gen Ed (GE Historical Analysis)	3	Gen Ed (if any remaining) or [4]Elective	3
[4]Elective	1-2	[4]Elective	1
Total	*15-16**	*Total*	*15*

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

[1]Transfer and incoming students with BIO 120 credit may substitute BIO 120 for CMB 155 but will still need to take CMB 156. CMB majors who have AP/IB Credit in BIO 120, CHM 115 and/or CHM 116 are generally better prepared for higher level courses if they take CMB 155+156, CHM 115 and CHM 116 at GVSU. CHM 100 is designed for students who did not have a full year of high school chemistry or whose standardized test scores indicate they may struggle with CHM 115.

[2] Math proficiency exams are available for MTH 122 and MTH 123. ***To take the Math Proficiency Tests online, visit this link: gvsu.edu/s/mv***

[3]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 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.

[4] 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. See list below for suggested elective courses.

[5]Students may choose CHM 245, 246, 247, and 248 in place of CHM 241 and 242

[6] Students must select a math/physics option A or B. MTH 122 and 123 must be completed or waived prior to beginning either option.

Option A: MTH 125 Survey of Calculus, PHY 220 General Physics I, and PHY 221 General Physics II

Option B: MTH 201 Calculus I, MTH 202 Calculus II, PHY 230 Principles of Physics I, and PHY 231 Principles of Physics II

[7]Students must complete a total of two courses with an SWS attribute

Declaring the Cell and Molecular Biology Major:

1. In myBanner, select "Student" > "Student Records" > "Change Major" > "Change Major 1/Program"
2. Choose "Cell and Molecular Biology-BS" 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 chiropractic, medical, dental, podiatry, pharmacy, or optometry school.

General Education Overlap

General Education Categories fulfilled by the Cell and Molecular Biology Major:	
Life Sciences: CMB 155	Physical Sciences with Lab: CHM 115
Mathematical Sciences: STA 215, MTH 122, MTH 123	
Additional Overlap for Preprofessional Students	
Social and Behavioral Sciences: PSY 101	Social and Behavioral Sciences: SOC 101

Cell and Molecular Biology Suggested Elective Courses

The department offers a certificate in Bioinformatics & Genomics and badges in Advanced Craft Brewing and Homebrewing Beer. For a full list of certificates and badges, visit www.gvsu.edu/acad-index.htm.

BIO 403 Plant Structure and Function	BMS 311 Pharmacological Aspects of Biomedical Sciences	CMB 321 Designing our Future: Babies, Food, Medicine and Biotechnology
BIO 416 Advanced Genetics Laboratory	BMS 312 Bacterial Genetics	CMB 440 Drosophila Genomics Research
BIO 422 Animal Developmental Biology	BMS 313 Bacterial Genetics Laboratory	CMB 460 Genomics and Molecular Diagnostics
BIO 423 Plant Biotechnology	BMS 422 Bacterial Physiology	CMB 452/552 Computer Modeling and Drug Design (Computer Modeling of Biomolecules)
BMS 208 Human Anatomy	BMS 423 Bacterial Physiology Laboratory	CHM 351 Introduction to Physical Chemistry
BMS 212 Introductory Microbiology	BMS 410 Immunology	CHM 463 Biochemistry II
BMS 213 Laboratory in Microbiology	BMS 411 Immunology Lab (not regularly offered)	PHY 320 Optics (not regularly offered)
BMS 290 Human Physiology	BMS 431 Medical Virology	
BMS 391 Laboratory in Human Physiology	CMB 411 Genetics of Development and Cancer	
BMS 310 Basic Pathophysiology		

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

Preprofessional Students

(Prechiropractic, Predental, Premedical, Preoptometry, Prepharmacy, Prepodiatry, & Preveterinary)

You may major in anything so long as you complete the prerequisites for your professional program.

To schedule an appointment with a Preprofessional Advisor in the CLAS Academic Advising Center, visit www.gvsu.edu/clasadvising and click on "Schedule Appointment"

To find more information on preprofessional programs, visit www.gvsu.edu/clasadvising/preprofessional