

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			
CHM 125 (Lecture) + 126 (Lab) Principles of Chemistry I Prerequisites: High school chemistry and (MTH 110 or equivalent by placement or exam) ¹ CMB 155 Intro to Cell & Molecular Biology ¹ CMB 156 Discoveries in Cell and Molecular Biology: A Research-Based Laboratory Course Prerequisites: BIO 120 or CMB 155 (may be taken concurrently) ² MTH 122 College Algebra Prerequisite: MTH 110 or math placement Gen Ed (GE Art) or ³ WRT 120 (self-placement) Elective	4 (6) 3 1 (3) 3 3 1	CHM 127 (Lecture) + 128 (Lab) Principles of Chemistry II Prerequisites: CHM 125 + 126 and (MTH 122 or MTH 124 or MTH 125, or equivalent by placement or exam) ² MTH 123 Trigonometry Prerequisite: MTH 122 or assignment through math placement (MTH 122 may be taken concurrently) ³ WRT 130 or WRT 150 Strategies in Writing (GE Writing) Gen Ed (GE Philosophy & Literature) OR * CMB 155 + 156 ⁴ Elective (if needed for 15 cr.) *CMB 155+156 can be taken in Fall or Winter.	5 (7) 3 3-4 3 1
<i>Numbers noted within (parentheses) are contact hours</i> Total	15	Total	15
Year Two			
– begin looking for a research mentor for ⁵ CMB 499 (or internship CMB 490)			
⁶ CHM 235 (Lecture) + 236 (Lab) Organic Chemistry for Life Sciences I Prerequisites: CHM 127 + 128 CMB 250 Introduction to Biotechnology Prerequisites: CMB 155 and 156 (or BIO 120) and CHM 127+128 ⁷ MTH 125 Survey of Calculus (option A) Prerequisite: MTH 110; or proficiency via math placement OR ⁷ MTH 201 Calculus I (option A or B) Prerequisites: MTH 124; or MTH 122 and MTH 123; or proficiency through math placement STA 215 Introductory Applied Statistics (GE Math) Prerequisite: MTH 110 or equivalent	5 (7) 4 3 Or 4 3	BIO 375 Genetics Prerequisites: BIO 120 or CMB 155 and 156 BIO 376 Genetics Laboratory Prerequisites: BIO 375 or 355 (either may be taken concurrently) CMB 409 Responsible Conduct of Research ⁶ CHM 237 (Lecture) + 238 (Lab) Organic Chemistry for Life Sciences II Prerequisites: CHM 235 + 236 ⁷ MTH 202 Calculus II (option B) – OR Elective if option A Prerequisites: MTH 201 Gen Ed (GE Social/Behavioral)	3 1 (3) 1 4 (6) 3-4 3
Total	15-16*	Total	15-16*
Year Three			
CHM 461 Biochemistry I Prerequisite: CHM 237+238, CHM 247, or CHM 248 CMB 490 Internship OR ⁵ CMB 499 Research in Cell and Molecular Biology (<i>CLAS Voyage, Experiential Learning</i>) Prerequisite: Permission of instructor and program director ⁷ PHY 220 General Physics I (option A) Prerequisites: MTH 122 and MTH 123 OR ⁷ PHY 230 Principles of Physics II (option B) Prerequisite: MTH 201 Gen Ed (GE Social/Behavioral) Gen Ed (GE Historical Analysis)	4 1 5 (7) Or 5 (7) 3 3	CMB 405 Cell and Molecular Biology Prerequisites: (BIO 375 or BIO 355) and BIO 376, and (CHM 234 or 242 or 247—may be taken concurrently) CMB 406 Cell and Molecular Biology Laboratory SWS Prerequisites: CMB 405 (may be taken concurrently) CMB 490 Internship OR CMB 499 Research in Cell and Molecular Biology (<i>CLAS Voyage, Experiential Learning</i>) Prerequisite: Permission of instructor and program director ⁷ PHY 221 General Physics I (option A) Prerequisites: PHY 220 OR ⁷ PHY 231 Principles of Physics II (option B) Prerequisite: PHY 230 and MTH 202 Gen Ed (Issue)	4 2 (4) 1 5 (7) Or 5 (7) 3
Total	16*	Total	15
Year Four			
CMB 426 Research Applications in Molecular Genetics (Fall only) (<i>CLAS Voyage, Experiential Learning</i>) Prerequisite: CMB 406 CMB 451 Bioinformatics: Tools & Techniques for Life Scientists Prerequisites: Junior standing, CMB 155 and 156 (or BIO 120) and CMB 250 or BIO 375, or permission of instructor CMB 490 Internship OR ⁵ CMB 499 Research in Cell and Molecular Biology (<i>Experiential Learning</i>) Prerequisite: Permission of instructor and program director Gen Ed (GE US Diversity) Gen Ed (Issue)	4 (6) 3 1 3 3	CMB 495 Perspectives in CMB (<i>CLAS Voyage, Capstone</i>) (Winter Only) Prerequisite: CMB 499, BIO 499, BMS 499, or CHM 499 CHM 462 Techniques in Biochemistry SWS Prerequisite: CHM 461 or permission of instructor Gen Ed (GE Global Perspectives) Gen Ed (if any remaining) or ⁴ Elective ⁴ Elective	3 3 (4) 3 3 3
Total	15	Total	15

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

¹Transfer and incoming students with BIO 120 credit may substitute BIO 120 for CMB 155 but will still need to take CMB 156.

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](https://www.gvsu.edu/s/mv)**

³Students 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.

⁴Students 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.

⁵CMB 499 is an independent, mentored research project and not a class. Ideally, students will do a continuous research project spanning more than one semester. For more information, visit <https://www.gvsu.edu/cmb/cmb-499-research-experience-4>, or contact Dr. Szarecka, szarecka@gvsu.edu

⁶Students may choose CHM 245, 246, 247, and 248 in place of CHM 235, 236, 237, and 238

⁷Students 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 (or MTH 201), 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

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 125+126
Mathematical Sciences: STA 215, MTH 125, MTH 201	
Additional Overlap for Preprofessional Students	
Social and Behavioral Sciences: PSY 101	Social and Behavioral Sciences: SOC 101

The CMB department offers a [Combined Degree BS/MS in CMB program](#), as well as a certificate in [Bioinformatics & Genomics](#) and badges in [Homebrewing Beer](#) and [Advanced Craft Brewing](#).

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

It is imperative to meet with your faculty advisor and an advisor in the CLAS Academic Advising Center regularly.

CLAS Voyage Courses	
What is the CLAS Voyage? https://www.gvsu.edu/clas/voyage or search "GVSU CLAS Voyage"	
Experiential Learning	CMB 426; CMB 490 internship or CMB 499 Research
Capstone	CMB 495

The CLAS Academic Advising Center is located in C-1-140 & 120 MAK, 616-331-8585

Preprofessional Students – visit www.gvsu.edu/clasadvising/preprofessional

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

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