

# 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.

<b>Year One</b>				
<b><sup>1</sup>CHM 115</b> Principles of Chemistry Prerequisites: High school chemistry and (MTH 110 or MTH 122 or MTH 125 or MTH 201)	4 (6)	<b><sup>1</sup>CHM 116</b> Principles of Chemistry II Prerequisites: CHM 115 and (MTH 122 or MTH 125 or MTH 201)	5 (7)	
<b><sup>1</sup>CMB 155</b> Introduction to Cell and Molecular Biology Prerequisites: CHM 115 (may be taken concurrently)	3	<b><sup>2</sup>MTH 123</b> Trigonometry Prerequisite: MTH 122 or assignment through Grand Valley math placement (MTH 122 may be taken concurrently)	3	
<b><sup>1</sup>CMB 156</b> Discoveries in Cell and Molecular Biology: A Research-Based Laboratory Course Prerequisites: BIO 120 or CMB 155 (may be taken concurrently)	1 (3)	<b>WRT 150</b> Strategies in Writing Gen Ed	4 3	
<b><sup>2</sup>MTH 122</b> College Algebra Prerequisite: MTH 110 or assignment through Grand Valley math placement	3			
Gen Ed	3			
<b><sup>5</sup>Elective</b>	1			
<i>Numbers noted within (parentheses) are contact hours</i>	<i>Total</i>	15	<i>Total</i>	15
<b>Year Two</b>				
<b><sup>3</sup>CHM 241</b> Organic Chemistry for Life Sciences I Prerequisite: CHM 116	5 (7)	<b>BIO 375</b> Genetics Prerequisites: BIO 120 or CMB 155 and 156; concurrent enrollment in BIO 376	3	
<b>CMB 250</b> Introduction to Biotechnology Prerequisites: (BIO 120 or CMB 155 and 156) and CHM 116	4	<b>BIO 376</b> Genetics Laboratory Prerequisite: Concurrent enrollment in BIO 375 or successful completion of BIO 355	1 (3)	
<b><sup>4</sup>MTH 125</b> Survey of Calculus (option A) Prerequisite: MTH 110; or assignment through math placement	3	<b>CMB 409</b> Responsible Conduct of Research	1	
<b>OR <sup>4</sup>MTH 201</b> Calculus I (option B) Prerequisites: MTH 124; or MTH 122 and MTH 123; or proficiency through math placement	4	<b><sup>3</sup>CHM 242</b> Organic Chemistry for Life Sciences II Prerequisite: CHM 241	4 (6)	
<b>STA 215</b> Introductory Applied Statistics Prerequisite: MTH 110 or equivalent	3	<b><sup>4</sup>MTH 202</b> Calculus II (option B) – <b>OR</b> Elective if option A Prerequisites: MTH 201	3-4	
	<i>Total</i>	15-16*	<i>Total</i>	15-16*
<b>Year Three</b>				
<b>CMB 351</b> Bioinformatics: Tools & Techniques for Life Scientists Prerequisites: Junior standing, BIO 120 and either CMB 250 or BIO 375, or permission of instructor	3	<b>CMB 405</b> 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	
<b>CHM 461</b> Biochemistry I Prerequisite: CHM 242, CHM 247, or CHM 248	4	<b><sup>6</sup>CMB 406</b> Cell and Molecular Biology Laboratory SWS Prerequisites: CMB 405 (may be taken concurrently)	2 (4)	
<b><sup>4</sup>PHY 220</b> General Physics I (option A) Prerequisites: MTH 122 and MTH 123	5 (7)	<b><sup>4</sup>PHY 221</b> General Physics I (option A) Prerequisites: PHY 220	5 (7)	
<b>OR <sup>4</sup>PHY 230</b> Principles of Physics II (option B) Prerequisite: MTH 201	5 (7)	<b><sup>4</sup>PHY 231</b> Principles of Physics II (option B) Prerequisite: PHY 230 and MTH 202	5 (7)	
Gen Ed	3	Issue	3	
	<i>Total</i>	15	<i>Total</i>	14
<b>Year Four</b>				
<b>CMB 426</b> Research Applications in Nucleic Acids Prerequisite: CMB 406	4 (6)	<b>CMB 495</b> Perspectives in Cell & Molecular Biology (capstone) Prerequisite: CMB 499, BIO 499, BMS 499, or CHM 499	3	
<b>CMB 490</b> Internship Prerequisite: Permission of instructor and program director	1	<b>CMB 490</b> Internship Prerequisite: Permission of instructor and program director	2	
<b>OR CMB 499</b> Research in Cell and Molecular Biology Prerequisite: Permission of instructor and program director	1	<b><sup>4</sup>CMB 499</b> Research in Cell and Molecular Biology Prerequisite: Permission of instructor and program director	2	
<b><sup>6</sup>CHM 462</b> Techniques in Biochemistry SWS Prerequisite: CHM 461 or permission of instructor	3 (4)	Gen Ed	3	
Issue	3	Gen Ed	3	
Gen Ed	3	<b><sup>5</sup>Elective</b>	3	
<b><sup>5</sup>Elective</b>	1-2	<b><sup>5</sup>Elective</b>	1	
	<i>Total</i>	15-16*	<i>Total</i>	15

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

<sup>1</sup>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 recommended prior to CHM 115 if the ACT science subscore is below 23. CHM 100 does not count toward the CMB major. CHM 100 has a corequisite of MTH 110.

<sup>2</sup> Math proficiency exams are available for MTH 122 and MTH 123. **To take the Math Proficiency Tests online, visit this link: [gvsu.edu/s/jk](http://gvsu.edu/s/jk)**

<sup>3</sup>Students may choose CHM 245, 246, 247, and 248 in place of CHM 241 and 242

<sup>4</sup>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

<sup>5</sup>Elective refers to any course that will help you earn the required 120 credits to graduate; see list below for suggested elective courses

<sup>6</sup>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**

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

<b>Cell and Molecular Biology Suggested Elective Courses</b>		
BIO 403 Plant Structure and Function	BMS 310 Basic Pathophysiology	CMB 411 Genetics of Development and Cancer
BIO 416 Advanced Genetics Laboratory	BMS 311 Pharmacological Aspects of Biomedical Sciences	CMB 321 Designing our Future: Babies, Food, Medicine and Biotechnology
BIO 422 Embryology	BMS 312 Bacterial Genetics	CMB 351 Bioinformatics: Tools and Techniques for Life Sciences
BIO 423 Plant Biotechnology	BMS 313 Bacterial Genetics Laboratory	CMB 440 Drosophila Genomics Research
BIO 432 Comparative Animal Physiology	BMS 422 Bacterial Physiology	CMB 460 Genomics and Molecular Diagnostics
BMS 208 Human Anatomy	BMS 423 Bacterial Physiology Laboratory	CMB 452 Computer Modeling of Biomolecules
BMS 212 Introductory Microbiology	BMS 410 Immunology	CHM 351 Introduction to Physical Chemistry
BMS 213 Laboratory in Microbiology	BMS 411 Immunology Laboratory	CHM 463 Biochemistry II
BMS 290 Human Physiology	BMS 431 Medical Virology	PHY 320 Optics
BMS 291 Laboratory in Human Physiology		

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> (Also find us on Facebook and Twitter!)

#### **Pre-Professional Students**

(Pre-Chiropractic, Pre-Dental, Pre-Medical, Pre-Optometry, Pre-Pharmacy, Pre-Podiatry, & Pre-Veterinary)

**Keep in mind that you may major in anything so long as you complete the prerequisites for your professional program.**

To schedule an appointment with a Pre-Professional Advisor in the CLAS Academic Advising Center, visit [www.gvsu.edu/clasadvising](http://www.gvsu.edu/clasadvising) and click on "Schedule Appointment"

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