

# 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			
BIO 120 General Biology I <i>Gen Ed</i> Prerequisites: High school chemistry, CHM 109, or CHM 115 strongly recommended (CHM 109 or 115 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 <i>Gen Ed</i> Prerequisites: High school chemistry and (MTH 110 or MTH 122 or MTH 125 or MTH 201)	5	WRT 150 Strategies in Writing	4
MTH 122 College Algebra <i>Gen Ed</i> Prerequisite: MTH 110 or assignment through Grand Valley math placement	3	MTH 123 Trigonometry Prerequisite: MTH 122 or assignment through Grand Valley math placement (MTH 122 may be taken concurrently)	3
Gen Ed	3	Gen Ed	3
<i>Total</i>	<i>15</i>	<i>Total</i>	<i>15</i>
Year Two			
<sup>2</sup> CHM 241 Organic Chemistry for Life Sciences I Prerequisite: CHM 116	4	<sup>2</sup> CHM 242 Organic Chemistry for Life Sciences II Prerequisite: CHM 241	4
<sup>1</sup> MATH/Physics Sequence (option A or B)	4-5	BIO 375 Genetics	3
STA 215 Introductory Applied Statistics Prerequisite: MTH 110 or equivalent	3	BIO 376 Genetics Laboratory Prerequisite: Concurrent enrollment in BIO 375 or successful completion of BIO 355	1
CMB 250 Introduction to Biotechnology Prerequisites: BIO 120 and CHM 116	3	<sup>1</sup> Physics Sequence	4-5
		Gen Ed	3
<i>Total</i>	<i>14-15</i>	<i>Total</i>	<i>15-16</i>
Year Three			
CHM 461 Biochemistry I Prerequisite: CHM 242, CHM 247, or CHM 248	4	CHM 462 Techniques in Biochemistry Prerequisite: CHM 461 or permission of instructor	3
BIO 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	<sup>4</sup> Microbiology course (option A or B)	4
<sup>5</sup> BIO 406 Cell and Molecular Biology Laboratory SWS	2	CMB 490 Internship Prerequisite: Permission of instructor and program director	2
<sup>1</sup> Physics Sequence	5	<b>OR</b> CMB 499 Research in Cell and Molecular Biology Prerequisite: Permission of instructor and program director	2
		<sup>1,3</sup> Physics Sequence or Elective	3-5
		Issue/Theme	3
<i>Total</i>	<i>15</i>	<i>Total</i>	<i>15-17</i>
Year Four			
CMB/BIO 426 Nucleic Acids Laboratory Prerequisite: BIO 406	3	CMB 495 Perspectives in Cell & Molecular Biology (capstone) Prerequisite: CMB 499, BIO 499, BMS 499, or CHM 499	3
CMB 490 Internship Prerequisite: Permission of instructor and program director	1	Gen Ed	3
<b>OR</b> CMB 499 Research in Cell and Molecular Biology Prerequisite: Permission of instructor and program director	1	Gen Ed	3
Issue/Theme	3	<sup>3</sup> Elective	3
Gen Ed	3	<sup>3</sup> Elective	3
Gen Ed	3		
<sup>3</sup> Elective	3		
<i>Total</i>	<i>16</i>	<i>Total</i>	<i>15</i>

<sup>1</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>2</sup>Students may choose CHM 245, 246, 247, and 248 in place of CHM 241 and 242

<sup>3</sup>Elective refers to any course to help you earn the required 120 credits to graduate; see list on reverse for suggested CMB courses to fill electives

<sup>4</sup>Select a microbiology course option A or B. **Option A:** BIO 357 Environmental Microbiology; **Option B:** BMS 212/213 Introductory Microbiology with lab

<sup>5</sup>Students must complete a total of two courses with an SWS attribute

\*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.

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

Online at: <http://www.gvsu.edu/clasadvising>

**Declaring the CMB Major:**

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 "Cell and Molecular Biology-BS"
5. Click "Submit" and then "Change to New Program"

→ If you are going into a pre-professional track besides Pre-Veterinary, you will either:

-declare "**Pre-Med**" as your SECOND MAJOR if you *have* decided on a major

**OR**

-declare "**Pre-Med**" as your FIRST MAJOR if you *have not* decided on a major

→ If you are Pre-Veterinary, and are not yet sure what to major in, we recommend that you declare **Biology with Pre-Veterinary emphasis**

### General Education Overlap

General Education Categories fulfilled by the Biomedical Sciences Major:	
Life Sciences with Lab: BIO 120	Physical Sciences with Lab: CHM 115
Mathematical Sciences: STA 215, MTH 122, MTH 123	
Additional Overlap for Pre-Professional Students	
Social and Behavioral Sciences: PSY 101	Social and Behavioral Sciences: SOC 205
U.S. Diversity: SOC 205	

### 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 pre-requisites for your professional program.**

**\*\*Needs note about PSY 101, SOC 205, etc. being required**

See [www.gvsu.edu/clasadvising/professional-programs-14.htm](http://www.gvsu.edu/clasadvising/professional-programs-14.htm) for additional details regarding professional school preparation and applications.

### Cell and Molecular Biology Elective Courses

BIO 403 Plant Structure and Function	BMS 310 Basic Pathophysiology	BMS 431 Medical Virology
BIO 411 Genetics of Development and Cancer	BMS 311 Pharmacological Aspects of Biomedical Sciences	CMB 351 Bioinformatics: Tools and Techniques for Life Sciences
BIO 416 Advanced Genetics Laboratory	BMS 312 Bacterial Genetics	CMB 452 Computational Biology
BIO 422 Embryology	BMS 313 Bacterial Genetics Laboratory	CHM 351 Introduction to Physical Chemistry
BIO 423 Plant Biotechnology	BMS 322 Bacterial Physiology	CHM 463 Biochemistry II
BIO 432 Comparative Animal Physiology	BMS 323 Bacterial Physiology Laboratory	PHY 320 Optics
BMS 208 Human Anatomy	BMS 410 Immunology	
BMS 290 Human Physiology	BMS 411 Immunology Laboratory	
BMS 291 Laboratory in Human Physiology		