

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

Year One			
<sup>1</sup> <b>CHM 115</b> Principles of Chemistry I (GE Physical Science) Prerequisites: High school chemistry and (MTH 110 or MTH 122 or MTH 125 or MTH 201)	4 (6)	<b>BIO 120</b> General Biology I ( <i>or WRT 150</i> ) (GE Life Science) Prerequisite: High school chemistry, CHM 109 or CHM 115 strongly encouraged	4 (6)
<sup>2</sup> <b>MTH 124</b> Precalculus: Functions and Models Prerequisite: MTH 110	5	<b>OR CMB 155</b> Introduction to Cell and Molecular Biology (GE Life Science)	3
Gen Ed (GE Art) or <sup>3</sup> <b>WRT 120</b> (self-placement)	3	And <b>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)
Gen Ed (GE Philosophy & Literature)	3	<sup>1</sup> <b>CHM 116</b> Principles of Chemistry II Prerequisites: CHM 115 and (MTH 122 or MTH 124 or MTH 125 or MTH 201)	5 (7)
		<sup>3</sup> <b>WRT 130</b> or <b>WRT 150</b> Strategies in Writing (GE Writing) Gen Ed or <sup>6</sup> Elective	3-4 2-3
<i>Numbers noted within (parentheses) are contact hours</i>	<i>Total</i>	<i>Total</i>	<i>15</i>
	15		15
Year Two			
<b>CHM 221</b> Survey of Analytical Chemistry Prerequisites: CHM 116	4 (7)	<sup>4</sup> <b>CHM 247</b> Principles of Organic Chemistry II ( <i>Winter only</i> )	3/1 (6)
<sup>4</sup> <b>CHM 245</b> Principles of Organic Chemistry I ( <i>Fall only</i> )	4	<sup>4</sup> <b>CHM 248</b> Principles of Organic Chemistry II Lab ( <i>Winter only</i> ) Prerequisites: CHM 245 and CHM 246; CHM 247 and 248 <b>must</b> be taken concurrently	
<sup>4</sup> <b>CHM 246</b> Principles of Organic Chemistry I Lab ( <i>Fall only</i> ) Prerequisites: CHM 116; CHM 245 and 246 <b>must</b> be taken concurrently	1 (4)	<sup>5</sup> <b>PHY 220</b> General Physics I Prerequisites: MTH 122 and MTH 123	5 (7)
<sup>5</sup> <b>MTH 201</b> Calculus I (GE Math) Prerequisites: MTH 124; or MTH 122 and MTH 123; or proficiency through math placement	4	Gen Ed (GE Social/Behavioral)	3
<sup>6</sup> Elective	2	Gen Ed (GE Historical Analysis)	3
<i>Total</i>	<i>15*</i>	<i>Total</i>	<i>15</i>
Year Three			
<b>CHM 461</b> Biochemistry I Prerequisites: CHM 242, CHM 247, or CHM 248	4	<b>BIO 375</b> Genetics/ <b>BIO 376</b> Genetics Laboratory BIO 375 Prerequisites: BIO 120 or CMB 155 and 156 BIO 376 Prerequisites: BIO 375 or 355 (either may be taken concurrently)	3/1 (6)
<sup>5</sup> <b>PHY 221</b> General Physics II Prerequisite: PHY 220	5 (7)	<b>CHM 391</b> Chemistry Seminar I Prerequisites: 18 credits of chemistry and junior status	1
<sup>5</sup> <b>CHM 351</b> Introduction to Physical Chemistry ( <i>Fall only</i> ) Prerequisites: CHM 116, MTH 201, and PHY 220 (may be taken concurrently)	3	<b>CHM 463</b> Biochemistry II ( <i>Winter only</i> ) Prerequisites: CHM 461	3
<sup>5</sup> <b>CHM 352</b> Applied Physical Chemistry Prerequisites: CHM 116, MTH 201, CHM 351 and PHY 220 (CHM 351 or PHY 220 may be taken concurrently)	1 (3)	Issue	3
<sup>2</sup> Elective	2	Gen Ed (GE US Diversity)	3
		<sup>6</sup> Elective	1
<i>Total</i>	<i>15</i>	<i>Total</i>	<i>15</i>
Year Four			
<sup>7</sup> Major Elective (see list below)	4	<b>CHM 462</b> <i>SWS</i> Techniques in Biochemistry Prerequisites: CHM 461 or permission of instructor	3 (4)
<sup>6</sup> Elective	3	<b>CHM 491</b> Chemistry Seminar II (Capstone) Prerequisites: CHM 391 and senior standing	1
Issue-SWS	3	<sup>7</sup> Major Elective (see list below)	4
Gen Ed (GE Social/Behavioral)	3	Gen Ed (GE Global Perspectives)	3
<sup>6</sup> Elective	2	<sup>6</sup> Elective	4
<i>Total</i>	<i>15</i>	<i>Total</i>	<i>15</i>

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

<sup>1</sup>Chemistry majors who have AP/IB Credit in CHM 115 and/or CHM 116 are generally better prepared for higher level chemistry courses if they take CHM 115 and CHM 116 at GVSU.<sup>2</sup> MTH 124 is not part of the major but may be required depending on math placement. **To take the Math Proficiency Tests online, visit this link:** [gvsu.edu/s/mv](https://gvsu.edu/s/mv)<sup>3</sup>Students who self-place into WRT 120 should take course in the fall and WRT 130 in the winter of their first year. Students won't need to take WRT 150 if they've earned credit for WRT 150 through AP/Dual Enrollment. A grade of C or better is required in WRT 130/150 in order to meet GVSU's WRT requirement

<sup>4</sup>CHM 241 and CHM 242 may substitute for CHM 245/246/247/248 with advisor approval.

<sup>5</sup> If planning to attend graduate school, students are advised to consult with their advisor about selecting the following: PHY 230/231 instead of PHY 220/221; CHM 356 and CHM 358 instead of CHM 351; MTH 202 in addition to MTH 201.

<sup>6</sup> 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.

<sup>7</sup> See below for major electives. Students are encouraged to work with their faculty in selecting elective courses.

### Declaring the Biochemistry Major:

1. In myBanner, select "Student" > "Student Records" > "Change Major" > "Change Major 1/Program"
2. Choose "Biochemistry-BS" from the drop-down box.
3. Click "Submit" and then "Change to New Program" Declare "**Preprofessional**" as your SECOND MAJOR if you are planning on medical/podiatry, dental, pharmacy, or optometry school.  
→ If you are Preveterinary, the **Biology with Pre-Veterinary emphasis** is recommended

General Education Categories fulfilled by the Biochemistry Major:	
Life Sciences with Lab: BIO 120 or CMB 155 (w/o lab)	Physical Sciences with Lab: CHM 115
Mathematical Sciences: MTH 124, or MTH 201	
Social and Behavioral Sciences: PSY 101 and SOC 101 (for Preprofessional Students)	

### <sup>5</sup>Choose an additional 8 credits in major electives from the following courses:

BIO 357 Environmental Microbiology (4) Prerequisite: BIO 120 or permission of instructor	CMB 411 Genetics of Development and Cancer (3) Prerequisite: (BIO 375 and 376) or (BIO 355 and CHM 232)
BIO 416 Advanced Genetics Laboratory (2) Prerequisite: BIO 376; BIO 411 or 414 recommended (may be taken concurrently)	CMB 414 Molecular Biology of the Gene (3) Prerequisites: BIO 375 and BIO 376
BIO 423 Plant Biotechnology (3) Prerequisite: BIO 376	CMB 426 Nucleic Acids Laboratory (3) Prerequisite: CMB 406
BIO 432 Comparative Animal Physiology (4) Prerequisites: BIO 121 (or BMS 208), BIO 120, CHM 232 or CHM 242	CMB 452 Computational Modeling and Drug Design (3) Prerequisites: BIO 120; CHM 241 or 245 (or CHM 231 and 232); (PHY 220 or PHY 230) or permission of instructor
*BMS 212 Introductory Microbiology (3) and BMS 213 Laboratory in Microbiology (1) Prerequisites: BIO 120 or CMB 155+156 and (CHM 116, 230 or 231)	CHM 421 - Green Chemistry for Sustainable Environment (3) Prerequisite: One of CHM 231, CHM 242, or CHM 247
*BMS 290 Human Physiology (3) & BMS 391 Lab in Human Phys. (2) Prerequisites: for 290, BMS 208 and 2 semesters of chemistry; for 391, 290 or 251	CHM 427 - Green and Environmental Chemistry Laboratory (3) Prerequisites: CHM 221; CHM 241, or CHM 245 and CHM 246
BMS 306 Advanced Human Nutrition Prerequisites: BMS 290 or MOV 304, and CHM 232 or CHM 461	CHM 441 - Advanced Topics in Organic Chemistry (3) Prerequisite: CHM 242 or CHM 247
BMS 312 Bacterial Genetics (3) & BMS 313 Bacterial Genetics Lab(1) Prerequisites: BMS 212 or BIO 357	CHM 442 - Synthetic Polymers: Life Cycle and Emerging Sustainable Technologies (3) Prerequisite: CHM 242 or CHM 247
BMS 410 Immunology (3) Prerequisite: BMS 212; and CHM 232 or CHM 461 (take concurrently)	CHM 447 - Organic Synthesis and Characterization (3) Prerequisites: CHM 242; or CHM 247 and CHM 248
BMS 422 Bacterial Physiology (3) & BMS 423 Bacterial Phys. Lab (2) Prerequisite: BMS 212 or BIO 357	CHM 457 - Advanced Physical and Instrumental Chemistry Lab (3) Prerequisites: CHM 221 and CHM 352 (CHM 352 take concurrently)
BMS 431 Medical Virology (3) Prerequisite: BMS 212 and CHM 241	CHM 471 - Advanced Inorganic Chemistry (3) Prerequisites: CHM 242 or CHM 248; CHM 273; CHM 351 or CHM 356 (CHM 351 or CHM 356 may be taken concurrently).
CMB 451 Bioinformatics: Tools & Techniques for Life Scientists (3) Prerequisite: Junior Standing, CMB 250 or BIO 375	CHM 475 - Electrochemistry (3) Prerequisites: CHM 115 and one of PHY 221, PHY 231, or PHY 234; or permission of instructor
CMB 405 Cell and Molecular Biology (4) Prerequisites: (BIO 375 or BIO 355) and BIO 376 and (CHM 232 or CHM 242 or CHM 247 may be taken concurrently)	CHM 477 - Synthetic Inorganic Chemistry (3) Prerequisites: CHM 273 or CHM 471; CHM 242 or CHM 248.
CMB 406-SWS Cell and Molecular Biology Laboratory (2) Prerequisite: CMB 405 (may be taken concurrently)	<i>*Recommended for Preprofessional Students</i>

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

Please Friend the GVSU Chemistry Facebook page: <https://www.facebook.com/gvsu.chemistrystockroom>

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

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

### Preprofessional Students

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

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

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