

# BIOCHEMISTRY - 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>4</sup>CHM 115</b> Principles of Chemistry I 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 (or WRT 150) Prerequisite: High school chemistry, CHM 109 or CHM 115 strongly encouraged	4 (6)	
<b><sup>6</sup>MTH 124</b> Precalculus: Functions and Models Prerequisite: MTH 110	5	<b>OR CMB 155</b> Introduction to Cell and Molecular Biology Prerequisites: CHM 115 (may be taken concurrently)	3	
<b>WRT 150</b> Strategies in Writing (or BIO 120) Elective	4 2	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)	
		<b><sup>4</sup>CHM 116</b> Principles of Chemistry II Prerequisites: CHM 115 and (MTH 122 or MTH 124 or MTH 125 or MTH 201)	5 (7)	
		Gen Ed	3	
		Gen Ed	3	
<i>Numbers noted within (parentheses) are contact hours</i>	<b>Total</b> 15			<b>Total</b> 15
<b>Year Two</b>				
<b>BIO 375</b> Genetics/ <b>BIO 376</b> Genetics Laboratory Prerequisites: BIO 120 or CMB 155 and 156. Must take BIO 376 concurrently	3/1 (6)	<b>CHM 221</b> Survey of Analytical Chemistry Prerequisites: CHM 116	4 (7)	
<b><sup>1</sup>CHM 245</b> Principles of Organic Chemistry I	4	<b><sup>1</sup>CHM 247</b> Principles of Organic Chemistry II	3	
<b><sup>1</sup>CHM 246</b> Principles of Organic Chemistry I Lab Prerequisites: CHM 116; CHM 245 and 246 <b>must</b> be taken concurrently	1 (4)	<b><sup>1</sup>CHM 248</b> Principles of Organic Chemistry II Lab Prerequisites: CHM 245 and CHM 246; CHM 247 and 248 <b>must</b> be taken concurrently	1 (4)	
<b><sup>3</sup>MTH 201</b> Calculus I Prerequisites: MTH 124; or MTH 122 and MTH 123; or proficiency through math placement	4 3	Gen Ed	3	
Gen Ed		Gen Ed	3	
		<sup>2</sup> Elective	1	
	<b>Total</b> 16*			<b>Total</b> 15
<b>Year Three</b>				
<b>CHM 461</b> Biochemistry I Prerequisites: CHM 242, CHM 247, or CHM 248	4	<b><sup>3</sup>PHY 221</b> General Physics II Prerequisite: PHY 220	5 (7)	
<b><sup>3</sup>PHY 220</b> General Physics I Prerequisites: MTH 122 and MTH 123	5 (7)	<b>CHM 391</b> Chemistry Seminar I Prerequisites: 18 credits of chemistry and junior status	1	
<b><sup>2</sup>Elective</b>	3	<b>CHM 463</b> Biochemistry II Prerequisites: CHM 461	3	
Gen Ed		Issue	3	
		Gen Ed	3	
	<b>Total</b> 15			<b>Total</b> 15
<b>Year Four</b>				
<b><sup>3</sup>CHM 351</b> Introduction to Physical Chemistry Prerequisites: CHM 116, MTH 201, and PHY 220 (may be taken concurrently)	3	<b>CHM 462</b> SWS Techniques in Biochemistry Prerequisites: CHM 461 or permission of instructor	3 (4)	
<b><sup>3</sup>CHM 352</b> SWS Applied Physical Chemistry Prerequisites: CHM 116, MTH 201, CHM 351 and PHY 220 (CHM 351 or PHY 220 may be taken concurrently)	1 (3)	<b>CHM 491</b> Chemistry Seminar II (Capstone) Prerequisites: CHM 391 and senior standing	1	
<b><sup>5</sup>Cognate Elective</b>	4	<sup>5</sup> Cognate Elective	4	
<b><sup>2</sup>Elective</b>	3	Gen Ed	3	
Issue	3	Gen Ed	3	
		<sup>2</sup> Elective	1	
	<b>Total</b> 14			<b>Total</b> 15

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

<sup>1</sup>CHM 241 and CHM 242 may substitute for CHM 245/246/247/248 with advisor approval.

<sup>2</sup> Elective refers to any course to help you earn the required 120 credits for graduation.

<sup>3</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>4</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>5</sup> See below for cognate electives. Students are encouraged to work with their faculty in selecting elective courses.

6 MTH 124 is not part of the major but may be required depending on math placement. **To take the Math Proficiency Tests online:** [gvsu.edu/s/mv](http://gvsu.edu/s/mv)

### **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"
4. Declare "**Pre-Professional**" as your SECOND MAJOR if you are planning on medical, dental, pharmacy, or optometry school.  
→ If you are Pre-Veterinary, the **Biology with Pre-Veterinary emphasis** is recommended

<b>General Education Categories fulfilled by the Biochemistry Major:</b>	
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	Social and Behavioral Sciences: SOC 101

### **<sup>5</sup>Choose an additional 8 credits in cognate 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 Biology (3) Prerequisites: BIO 120, CHM 115, CHM 116, (CMB 250 or CHM 461), (MTH 122, MTH 123, MTH 125) or (MTH 201, MTH 202), (PHY 220, PHY 221) or (PHY 230, PHY 231) or permission of instructor
*BMS 212 Introductory Microbiology (3) and BMS 213 Laboratory in Microbiology (1) Prerequisites: BIO 120 and (CHM 230 or 232 or 241)	CHM 421 - Green Chemistry for Sustainable Environment (3) Prerequisite: One of CHM 231, CHM 242, or CHM 247
*BMS 290 Human Physiology (3) and BMS 291 Laboratory in Human Physiology (1) Prerequisites: BMS 208 and two semesters of chemistry	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) and BMS 313 Bacterial Genetics Laboratory (1) Prerequisites: BMS 212 or BIO 357, and BIO 355 or BIO 375	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 (may be taken concurrently)	CHM 447 - Organic Synthesis and Characterization (3) Prerequisites: CHM 242; or CHM 247 and CHM 248
BMS 422 Bacterial Physiology (3) and BMS 423 Bacterial Physiology Laboratory (2) Prerequisite: BMS 212 or BIO 357	CHM 457 - Advanced Physical and Instrumental Chemistry Lab (3) Prerequisites: CHM 221 and CHM 352 (CHM 352 may be taken 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 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 475 - Electrochemistry (3) Prerequisites: CHM 115 and one of PHY 221, PHY 231, or PHY 234; or permission of instructor
CMB 406 Cell and Molecular Biology Laboratory (2) Prerequisite: CMB 405 (may be taken concurrently)	CHM 477 - Synthetic Inorganic Chemistry (3) Prerequisites: CHM 273 or CHM 471; CHM 242 or CHM 248.

*\*Recommended for Pre-Professional Students*

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-1-140 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 Biochemistry and/or 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)