

**ABOUT Cell & Molecular Biology - Bioinformatics Option:**

This option provides an interdisciplinary curriculum that trains students in cell and molecular biology, computer sciences, and provides an integration of these two broader areas. Graduates from this program can pursue their next degree in a variety of biological, computational, and bioinformatics programs. There are currently over fifty graduate-level degree programs and certificate programs in Bioinformatics and Computational Biology in the United States. Our students should be competitive applicants to enter many of these graduate programs.

**Step 1: REVIEW YOUR PROGRAM REQUIREMENTS**

Cell & Molecular Biology (CMB) - BIOINFORMATICS					40 Credits Total
Concentration Courses					(18 Credits)
Course Name	Course #	Semester	Credits	Grade	
Integrative Microbiology	*CMB 211		4		
Introductory Biochemistry	CMB 311		3		
Intro. Computational Biology	CMB 320		3		
General Genetics	CMB (BIO) 352		4		
Molecular Sequence Analysis	CMB 450		3		
Seminar in Cell and Molecular Biology	CMB 495		1		
Select 1 credit CMB laboratory coursework at the 300 or 400 level					(1 Credit)
Course Name	Course #	Semester	Credits	Grade	
Computer Sciences (CSC)					(12 Credits)
Course Name	Course #	Semester	Credits	Grade	
Introduction to Computer Programming	*CSC 201 or CSC 106 or other prerequisites of CSC 211		4		
Object-Oriented Programming	CSC 211		4		
Data Structures and Abstractions	CSC 212		4		
Professional Electives: Select 9 credits from any 300 level or higher CMB course; or from the following list of approved electives					(9 Credits)
Course #	Course Name	Course #	Course Name		
CMB 341	Principles of Cell Biology	CSC 412	Operating Systems and Networks		
BPS 535	Pharmaceutical Biotechnology	CSC 415	Introduction to Parallel Computing		
PHY 430	Modern Biological Physics	CSC 436	Database Management Systems		
CSC 305	Software Engineering	CSC 440	Design and Analysis of Algorithms		
CSC 310	Programming for Data Science	CSC 491/492	Independent Research		
CSC 320	Social Issues in Computing				
Course #	Semester	Credits	Grade		

\*Course approved for general education.

Minimum 2.0 cumulative GPA required in major for graduation.

Minimum overall 2.0 cumulative GPA required for graduation.

120 earned credits required for graduation.

Major GPA = \_\_\_\_\_

**Step 1: REVIEW YOUR PROGRAM REQUIREMENTS CONTINUED:**

<b>Introduction Requirement (1 credit)</b>			
Course	Semester	Credits	Grade
URI 101		1	

<b>BIOLOGY (8 credits)</b>			
Course	Semester	Credits	Grade
*BIO 101		3	
*BIO 103		1	
*BIO 102		3	
*BIO 104		1	

<b>CHEMISTRY Requirement: (16-18 credits)</b>			
Course	Semester	Credits	Grade
*CHM 101		3	
CHM 102		1	
<b>OR</b>			
CHM 191		5	

**AND**

Course	Semester	Credits	Grade
CHM 112		3	
CHM 114		1	

**OR**

CHM 192		5	
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**AND**

Course	Semester	Credits	Grade
CHM 227		3	
CHM 228		3	
CHM 226		2	

<b>MATH Requirement: (6-8 credits)</b>			
Course	Semester	Credits	Grade
*MTH 131		3	

**OR**

*MTH 141 <i>Preferred</i>		4	
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**AND 1 OF THE FOLLOWING:** MTH \*111, 132, \*142; \*CSC 201; STA 307, 308, or 409

Course	Semester	Credits	Grade

<b>PHYSICS Requirement: (8 credits)</b>			
Course	Semester	Credits	Grade
*PHY 111		3	
*PHY 185		1	

**OR**

*PHY 203		3	
*PHY 273		1	

**AND**

Course	Semester	Credits	Grade
*PHY 112		3	
*PHY 186		1	

**OR**

*PHY 204		3	
*PHY 274		1	

**FREE ELECTIVES**

Course	Semester	Credits	Grade

Course	Semester	Credits	Grade

\*Course fulfills general education and a major requirement



**B.S. Cell & Molecular Biology - Bioinformatics Option**

**Sample 4 Year Plan - Effective Fall 2024**

**College of the Environment & Life Sciences**

**Freshman Year Fall Semester**

Course Code	Description	Cr
URI 101	Planning for Academic Success	1
*BIO 101/103	Principles of Biology I/Lab	4
*CHM 101/102	General Chemistry I/Lab	4
*MTH ____	Applied Calculus I, or Introductory Calculus	3-4
	*General Education	3-4
		<b>15-17</b>

**Freshman Year Spring Semester**

Course Code	Description	Cr
MTH/STA	2nd Required MTH/STA course	3-4
*BIO 102/104	Principles of Biology II/Lab	4
*CHM 112/114	General Chemistry II/Lab	4
*CSC 201	Introduction to Computer Programming	4
	*General Education	3-4
		<b>15-17</b>

**Year 1 Milestones:** Complete **BIO** 101, 103, 102, 104, **CHM** 101, 102, 112, 114, **MTH** 131 or 141. Earn 30 credits with a cumulative GPA of 2.0 or higher.

**Sophomore Year Fall Semester**

Course Code	Description	Cr
*CMB 211	Integrative Microbiology	4
CSC 211	Object-Oriented Programming	4
*PHY ____	General Physics I/Lab	4
	*General Education	3-4
		<b>15-17</b>

**Sophomore Year Spring Semester**

Course Code	Description	Cr
CHM 227	Organic Chemistry I	3
CSC 212	Data Structures and Abstractions	4
*PHY ____	General Physics II/Lab	4
	*General Education	3-4
		<b>15-17</b>

**Year 2 Milestones:** Complete **CMB** 211 and **CSC** 201. Begin Organic Chemistry sequence. Begin computer science core courses. Meet with a CMB Faculty advisor to discuss research opportunities and plan year 3 and 4 courses. Earn 60 total credits with a cumulative GPA of 2.0 or higher.

**Junior Year Fall Semester**

Course Code	Description	Cr
CMB 352	General Genetics	4
CMB 311	Intro Biochemistry Lecture	3
CHM 226	Organic Chemistry Lab	2
CHM 228	Organic Chemistry II	3
	*General Education	3-4
		<b>15-17</b>

**Junior Year Spring Semester**

Course Code	Description	Cr
<i>CMB 320</i>	<i>Intro Computational Biology</i>	3
CMB ____	CMB Required Lab Course	1
	Professional Elective	3-4
	Professional Elective	3-4
	*General Education/Free Elective	3-4
		<b>15-17</b>

**Year 3 Milestones:** Complete **CMB** 311, 352, 320 (*320 is only taught in the Spring semester*), **CSC** 211. Complete Organic Chemistry sequence. Meet with a CMB and CSC Faculty advisors to plan year 3 and 4 courses. Earn 90 total credits with a cumulative GPA of 2.0 or higher. Prepare intent to graduate with faculty advisor for Fall submission.

**Senior Year Fall Semester**

Course Code	Description	Cr
CMB 495	Seminar in Cell & Molecular Biology	1
<i>CMB 450</i>	<i>Practical Tools for Molecular Sequence and Analysis</i>	3
	Professional Elective	3-4
	*General Education/Free Elective	3-4
		<b>15-17</b>

**Senior Year Spring Semester**

Course Code	Description	Cr
	Professional Elective	3-4
	Professional Elective	3-4
	Free Elective	3-4
	*General Education/Free Elective	3-4
	*General Education/Free Elective	3-4
		<b>15-17</b>

**Year 4 Milestones:** Complete **CMB** 450, 495 (*450 is only taught in the Fall semester*), **CSC** 212. Earn total 120 credits with a cumulative GPA of 2.0 or higher. Minimum 2.0 cumulative gpa in CMB concentration courses.