

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

Biochemistry is a fundamental science focusing on the understanding of living systems from a physical and chemical perspective. The biochemistry option emphasizes the study of cells and multicellular organisms through the lens of the molecular-level characterization of all biological macromolecules in order to define their structures and functions. The requirements for this option include focused biochemistry specialty courses in proteins, enzymes and physical chemistry, plus laboratory courses that emphasize modern methods used to purify and physically and/or functionally characterize biological macromolecules; such as DNA, RNA, proteins, lipids, and carbohydrates.

**Step 1: REVIEW YOUR PROGRAM REQUIREMENTS**

<b>Cell &amp; Molecular Biology (CMB) - BIOCHEMISTRY</b>					<b>36-42 Credits</b>
<b>Concentration Courses</b>					<b>(30-36 Credits)</b>
Course Name	Course #	Semester	Credits	Grade	
Integrative Microbiology	CMB 211		4		
Introductory Biochemistry	CMB 311		3		
Immunology and Serology	CMB 333	Fall _____	3		
General Genetics	CMB (BIO) 352		4		
Introductory Biochemistry Lab or <i>Advanced Biochemistry Lab I (preferred)</i>	CMB 312 or 412		3		
Physical Biochemistry or Structural Biochemistry	CMB 421 or CMB 426		3		
Fundamentals of Molecular Biology	CMB (BIO) 437	Spring _____	3		
Proteins and Enzymes	CMB 482	Spring _____	3		
Research in Cell and Molecular Biology	CMB 491		1-6		
Seminar in Cell and Molecular Biology	CMB 495	Fall _____	1		
<b>Biological Sciences (BIO)</b>					<b>(3 Credits)</b>
Course Name	Course #	Semester	Credits	Grade	
Principles of Cell Biology	BIO 341		3		
<b>Professional Electives:</b>					<b>(3 Credits)</b>
<i>Select an additional 3 credits from one other 300 level or above CMB course, determined in consultation with your advisor.</i>					
Course Name	Course #	Semester	Credits	Grade	

Minimum 2.0 cumulative GPA required in major and overall for graduation.

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

Overall GPA = \_\_\_\_\_

\*Course fulfills general education and a major requirement

**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	
<b>AND</b>			
Course	Semester	Credits	Grade
CHM 112		3	
CHM 114		1	
<b>OR</b>			
CHM 192		5	
<b>AND</b>			
Course	Semester	Credits	Grade
CHM 227		3	
CHM 228		3	
CHM 226		2	

<b>FREE ELECTIVES</b>			
Course	Semester	Credits	Grade

<b>MATH Requirement: (6-8 credits)</b>			
Course	Semester	Credits	Grade
*MTH 131		3	
<b>OR</b>			
*MTH 141 <i>Preferred</i>		4	

**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	
<b>OR</b>			
*PHY 203 <i>Preferred</i>		3	
*PHY 273 <i>Preferred</i>		1	
<b>AND</b>			
Course	Semester	Credits	Grade
*PHY 112		3	
*PHY 186		1	
<b>OR</b>			
*PHY 204 <i>Preferred</i>		3	
*PHY 274 <i>Preferred</i>		1	

\*Course fulfills general education and a major requirement

**General Education Guidelines:**

General education is 40 credits. Each of the twelve outcomes (A1-D1) must be met by at least 3 credits. A single course may meet more than one outcome, but cannot be double counted towards the 40 credit total. At least one course must be a Grand Challenge (G). No more than twelve credits can have the same course code. General education courses may also be used to meet requirements of the major or minor when appropriate.

**LIST COURSES THAT MEET GENERAL EDUCATION:**

General Education Credit Count						
At least 40 credits, no more than 12 credits with the same course code						
Course	Credits	Grade		Course	Credits	Grade
*BIO 101	3					
*BIO 103	1					
*BIO 102	3					
*BIO 104	1					
*CHM 101	3					
*MTH ____						
*PHY ____	3					
*PHY ____	1					
*PHY ____	3					
*PHY ____	1					
*CMB 211	4					
				Total Gen Ed Credits		

**NOTE: BECAUSE MOST COURSES MEET MORE THAN ONE OUTCOME, YOUR OUTCOME AUDIT MIGHT BE COMPLETED BEFORE YOU REACH YOUR 40 CREDITS. HOWEVER, YOU MUST STILL COMPLETE 40 CREDITS OF GENERAL EDUCATION**

\*course fulfills general education and a major requirement

**LIST COURSE AS EACH OUTCOME IS MET:**

General Education Outcome Audit		
	Course	Grade
<b>KNOWLEDGE</b>		
A1. STEM	BIO 101	
A2. Social & Behavioral Sciences		
A3. Humanities		
A4. Arts & Design		
<b>COMPETENCIES</b>		
B1. Write effectively		
B2. Communicate effectively		
B3. Mathematical, statistical, or computational strategies	MTH ____	
B4. Information literacy		
<b>RESPONSIBILITIES</b>		
C1. Civic knowledge & responsibilities		
C2. Global responsibilities		
C3. Diversity & Inclusion		
<b>INTEGRATE &amp; APPLY</b>		
D1. Ability to synthesize	CMB 211	
<b>GRAND CHALLENGE</b>		
G. At least one course of your 40 credits is an approved "G" course		

**The requirement for transfer to CELS from University College for Academic Success is:**

Minimum 30 credits and a minimum cumulative GPA of 2.0 or better.

**Advising Notes:** \_\_\_\_\_

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

**Sample 4 Year Plan - Effective Fall 2021**

**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
*MTH ____	Precalculus, Applied Calculus I, or Introductory Calculus	3-4
*CHM 101/102	General Chemistry I/Lab	4
	*General Education	3-4
		<b>15-17</b>

**Freshman Year *Spring* Semester**

Course Code	Description	Cr
*BIO 102/104	Principles of Biology II/Lab	4
*CHM 112/114	General Chemistry II/Lab	4
	2nd required CSC, MTH, or STA course	3-4
	*General Education	3-4
	*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
CHM 227	Organic Chemistry Lecture I	3
CMB 211	Integrative Microbiology	4
*PHY ____	General Physics I Lecture/Lab	4
	*General Education	3-4
	*General Education	3-4
		<b>15-17</b>

**Sophomore Year *Spring* Semester**

Course Code	Description	Cr
CHM 228	Organic Chemistry Lecture II	3
CMB 311	Introductory Biochemistry Lecture	3
*PHY ____	General Physics II Lecture/Lab	4
	Professional Elective	3
	*General Education	3-4
		<b>15-17</b>

**Year 2 Milestones:** Complete **CMB** 211, and 311. Begin Organic Chemistry sequence. Begin Physics sequence. 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
CHM 226	Organic Chemistry Lab	2
CMB 333	Immunology and Serology	3
BIO 341	<i>Cell Biology</i>	3
CMB Elective	CMB Elective	3
	*General Education/Free Elective	3-4
		<b>15-17</b>

**Junior Year *Spring* Semester**

Course Code	Description	Cr
CMB 352	General Genetics	4
CMB 421	<i>Physical Biochemistry</i>	3
	*General Education/Free Elective	3-4
CMB 312 or 412	<i>Introductory Biochemistry Lab or Advanced Biochemistry Lab</i>	2-3
		<b>15-17</b>

**Year 3 Milestones:** Complete **BIO** 341, **CMB** 312 (**312, 412, 421, 437, & 482 are only taught in the Spring**), 333, & 352.. Complete Organic Chemistry sequence. Meet with a CMB Faculty advisor to plan year 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
CMB 491	Research in Cell and Molecular Biology	1-6
	*General Education/Free Elective	3-4
	*General Education/Free Elective	3-4

**Senior Year *Spring* Semester**

Course Code	Description	Cr
CMB 492	Research in Cell and Molecular Biology	1-6
CMB 437	<i>Fundamentals of Molecular Biology</i>	3
CMB 482	<i>Proteins and Enzymes</i>	3
	*General Education/Free Elective	3-4

**Year 4 Milestones:** Complete CMB remaining Biochemistry concentration courses. Earn total 120 credits with a cumulative GPA of 2.0 or higher. Minimum 2.0 cumulative GPA in CMB concentration courses.