

Name:

Campus ID:

**Bachelor of Science - Biochemistry and Molecular Biology Requirements (BIOC)**  
79-82 credits

<b>Biology (18 credits; 10 upper-level)</b>	<b>Pre-requisites</b>	<b>Cr.</b>	<b>Semesters Offered</b>	<b>Semester Taken</b>	<b>Grade</b>
BIOL 140 - Foundations of Biology: Ecology and Evolution*	MATH 150 or higher or placement in MATH151	4	FSZ		
BIOL 141 - Foundations of Biology: Cells, Energy & Organisms*	MATH 150 or higher or placement in MATH151	4	FSZ		
BIOL 302 - Molecular and General Genetics*	MATH 150 or higher or placement in MATH151, BIOL 140, BIOL 141. Co-/Pre-Req: CHEM 102/120 (co- req)	4	FSZ		
BIOL 303 - Cell Biology	MATH 150 or higher or placement in MATH151; BIOL 140; BIOL 141; BIOL302; CHEM 102	4	FSZ		
BIOL 300L - Experimental Biology Laboratory	MATH 150 or higher or placement in MATH151; BIOL 140; BIOL 141; BIOL 302; CHEM 102; CHEM 102L	2	FSZ		
<b>Chemistry (27-28 credits; 17-18 upper-level)</b>					
CHEM 101 - Principles of Chemistry I*	MATH 106 or higher	4	FSZ		
CHEM 102 - Principles of Chemistry II*	CHEM 101	4	FSZ		
CHEM 102L - Introductory Chemistry Lab I*	CHEM 101; CHEM 102 (pre/co-req)	2	FSZ		
CHEM 300 - Analytic Chemistry*	CHEM 102; CHEM 102L	4	FSZ		
CHEM 301 - Physical Chemistry I OR	CHEM 102; MATH 152; PHYS 122 (pre/co-req)	4	F		
CHEM 303 - Physical Chemistry for the Biochemical Sciences	CHEM 351; MATH 152; PHYS 112/122 (pre-/co-req)	3	S		
CHEM 351 - Organic Chemistry I*	CHEM 102	3	FSZ		
CHEM 351L - Organic Chemistry Lab I*	CHEM 102; CHEM 102L; CHEM 351 (pre-/co-req)	2	FSZ		
CHEM 352 - Organic Chemistry II*	CHEM 102; CHEM 351	3	SZ		
CHEM 352L - Organic Chemistry Lab II*	CHEM 102L; CHEM 351; CHEM 351L; CHEM 352 (pre-/co-req)	2	SZ		
<b>Biochemistry (12 credits; all upper-level)</b>					
CHEM 437 - Comprehensive Biochemistry I*	CHEM 352	4	F		
CHEM 437L - Biochemistry Laboratory* (WI)	CHEM 351L; CHEM 300; CHEM 437 (pre-/co-req); ENGL 100	4	FS		
CHEM 438 - Comprehensive Biochemistry II*	CHEM 437	4	S		
<b>Upper-Level Electives (list on reverse side of this sheet) (6-8 credits; all upper level)</b>					
<b>Physics and Math (16 credits)</b>					
MATH 151 - Calculus & Analytical Geometry I*	MATH 150	4	FSZ		
MATH 152 - Calculus & Analytical Geometry II*	MATH 151	4	FSZ		
PHYS 121 - Intro Physics I: Mechanics*	MATH 151 (pre-/co-req)	4	FSZ		
PHYS 122 - Intro Physics II: Electricity & Magnetism*	PHYS121; MATH 152 (pre-/co-req)	4	FSZ		
Individual Research 1-4 credits (recommended) Students have the opportunity to integrate what they have learned by doing research with participating faculty. Those working with a Biological Sciences faculty member may register for BIOL 399 or 499. Those working in a Chemistry and Biochemistry departmental faculty laboratory may register for CHEM 399 or 499.					

\* These courses must be completed with a grade of "C" or better. All courses that students take as pre-requisites for other courses must be passed with a "C" or better. An overall "C" average must be maintained in required major courses.

F = Fall, S = Spring, Z = Summer. Courses marked with a "Z" have been taught in the Summer in recent years; there is no guarantee that they will be offered ever Summer.

(WI) - Writing Intensive

**Electives List (from the 2023-2024 General Catalog with additional approved courses):**

BIOL 414 - Eukaryotic Molecular Genetics (4)  
BIOL 420 - Advanced Topics in Cell Biology (4)  
BIOL 421 - Topics in Molecular Genetics (4)  
BIOL 425 - Immunology (4)  
BIOL 426 - Approaches to Molecular Biology (4)  
BIOL 428 - Computer Applications in Molecular Biology (4)  
BIOL 429 - Advanced Topics in Molecular Biology (4)  
BIOL 434 - Microbial Molecular Genetics (4)  
BIOL 443 - Advanced Topics in Developmental Biology (4)  
BIOL 444 - Development and Cancer (4)  
BIOL 445 - Signal Transduction (4)  
BIOL 451 - Neurobiology (4)  
BIOL 454 - Vision Science (4)  
BIOL 456 - Plant Molecular Biology (4)  
BIOL 476 - Antibiotics: Origin, Mechanism, Resistance (4)  
BIOL 483 - Evolution: From Genes to Genomes (4)  
BIOL 486 - Genome Science (4)  
CHEM 406 - Bioinorganic Chemistry (3)  
CHEM 431 - Chemistry of Proteins (3)  
CHEM 432 - Advanced Biochemistry (3)  
CHEM 433 - Biochemistry of Nucleic Acids (3)  
CHEM 435 - Biochemistry of Complex Carbohydrates (3)  
CHEM 441 - Physical Chemistry of Macromolecules (3)  
CHEM 442 - Physical Biochemistry (3)  
CHEM 443 - Molecular Spectroscopy and Biomacromolecules (3)  
CHEM 444 - Molecular Modeling In Biochemistry (3)  
CHEM 450 - Chemistry of Heterocyclic Compounds (3)  
CHEM 451 - Mechanisms of Organic Reactions (3)  
CHEM 453 - Organic Chemistry of Nucleic Acids (3)  
CHEM 455 - Introduction to Biomedical Chemistry (3)  
CHEM 457 - Total Synthesis of Natural Products (3)  
CHEM 461 - Advanced Instrumental Methods of Analysis (4)  
CHEM 465 - Mass Spectrometry at the Chemistry-Biology Interface (3)  
CHEM 467 - Advanced Analytical Methods (3)  
CHEM 470 - Toxicological Chemistry (3)  
CHEM 472 - Enzyme Reaction Mechanisms (3)  
CHEM 490 - Special Topics in Chemistry (3) (approved topics)  
CHEM 601 - Current Topics in Chemistry (approved topics) (1)  
CHEM 635 - Biochemistry of Complex Carbohydrates (3)  
CHEM 640 - Special Topics in Molecular Structure (3)  
CHEM 670 - Special Topics in Dynamics and Mechanisms (approved topics) (3)  
CHEM 680 - Seminar in Biophysical Chemistry (3)  
CHEM 682 - Current Topics in Biochemistry (3)  
CHEM 684 - Special Topics in Chemistry (approved topics) (3)

NOTE: Not all courses in this list are offered on a regular basis. Always consult the UMBC Schedule of Classes for exact course offerings and plan accordingly.