Bachelor of Science – Biochemistry and Molecular Biology Requirements (BIOC)

79-82 credits

Biology (18 credits; 10 upper-level)	Pre-requisites	Cr.	Semesters Offered	Semester Taken	Grade
BIOL 141 – Foundations of Biology: Cells, Energy & Organisms	MATH 150 or higher or placement in MATH151	4	FSZ		
BIOL 142 – Foundations of Biology: Ecology and Evolution	MATH 150 or higher or placement in MATH151; BIOL 141	4	FSZ		
BIOL 302 – Molecular and General Genetics	MATH 150 or higher or placement in MATH151; BIOL 141; BIOL 142; CHEM 101/123; CHEM 102/124 (co-req)	4	FSZ		
BIOL 303 – Cell Biology	MATH 150 or higher or placement in MATH151; BIOL 141; BIOL 142; BIOL302; CHEM 102	4	FSZ		
BIOL 300L – Experimental Biology Laboratory	MATH 150 or higher or placement in MATH151; BIOL 141; BIOL 142; BIOL 302; CHEM 102; CHEM 102L	2	FSZ		
Chemistry (27-28 credits; 17-18 upper-level)					
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	FS		
CHEM 301 – Physical Chemistry I OR CHEM 303 – Physical Chemistry for the Biochemical Sciences	CHEM 102; MATH 152; PHYS 122 (pre/co-req) CHEM 351; MATH 152; PHYS 112/122 (pre-/co-req)	4 3	F 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		
Biochemistry (12 credits; all upper-level)					
CHEM 437 – Comprehensive Biochemistry I*	CHEM 352	4	F		
CHEM 437L – Biochemistry Laboratory*	CHEM 351L; CHEM 300; CHEM 437 (pre-/co-req)	4	FS		
CHEM 438 – Comprehensive Biochemistry II*	CHEM 437	4	S		
Upper-Level Electives (list on reverse side of this sheet) (6-8 credits; all upper level)					
Physics and Math (16 credits)					
MATH 151 – Calculus & Analytical Geometry I*	MATH 150	4	FSZ		
MATH 152 – Calculus & Analytical Geometry II*	MATH 151	4	FSZ		
PHYS 121 – Introductory Physics I*	MATH 151 (pre-/co-req)	4	FSZ		
PHYS 122 – Introductory Physics II*	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.

Electives List (from the 2014-2015 General Catalog with additional approved courses):

BIOL 411 – Bacterial Physiology
BIOL 414 – Eukaryotic Genetics & Molecular Biology
BIOL 418 – Human Molecular Biology
BIOL 420 – Advanced Topics in Cell Biology
BIOL 425 – Immunology
BIOL 426 – Approaches to Molecular Biology
BIOL 428 – Computer Applications in Molecular Biology
BIOL 434 – Microbial Molecular Genetics
BIOL 443 – Advanced Topics in Developmental Biology
BIOL 444 – Development and Cancer
BIOL 445 – Signal Transduction
BIOL 451 – Neurobiology
BIOL 454 – Vision Science
BIOL 456 – Plant Molecular Biology
BIOL 470 – General Virology
BIOL 476 – Antibiotics: Origin, Mechanism, Resistance
BIOL 483 – Evolution: From Genes to Genomes
BIOL 486 – Genome Science
CHEM 406 – Bioinorganic Chemistry
CHEM 431 – Chemistry of Proteins
CHEM 432 – Advanced Biochemistry
CHEM 433 – Biochemistry of Nucleic Acids
CHEM 435 – Biochemistry of Complex Carbohydrates
CHEM 441 – Physical Chemistry of Macromolecules
CHEM 442 – Physical Biochemistry
CHEM 443 – Spectroscopy of Biopolymers
CHEM 444 – Molecular Modeling
CHEM 450 – Chemistry of Heterocyclic Compounds
CHEM 451 – Mechanisms of Organic Reactions
CHEM 453 – Organic Chemistry of Nucleic Acids
CHEM 455 – Biomedicinal Chemistry
CHEM 457 – Total Synthesis of Natural Products
CHEM 461 – Advanced Instrumental Methods of Analysis
CHEM 470 – Toxicological Chemistry
CHEM 472 – Enzyme Reaction Mechanisms
CHEM 490A – Special Topics in Chemistry**
CHEM 601 – Special Topics in Chemistry**
CHEM 601 – Special Topics in Chemistry: Advanced NMR Spectroscopy**
CHEM 635 – Biochemistry of Complex Carbohydrates
CHEM 640 – Special Topics in Molecular Structure
CHEM 670 – Special Topics in Dynamics and Mechanism**
CHEM 680 – Seminar in Biophysical Chemistry
CHEM 682 – Current Topics in Biochemistry
CHEM 684 – Special Topics in Chemistry**
CHEM 684A – Special Topic: Organic Spectroscopy**

** Special Topics course that may be approved as electives in those years when their topic is appropriate (subject to confirmation by the Biochemistry Undergraduate Committee)**

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.