

UMBC UGC Program Changes & Other Request: Biochemistry & Molecular Biology, B.S. degree: Upper Level Electives

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Proposed Effective Date: Spring 2019

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Specifics (see instructions):

Upper Level Electives

Students must complete two of the following courses with a grade of "D" or higher (6-8 credits).

Current Elective Options

BIOL 411	Bacterial Physiology
BIOL 414	Eukaryotic Molecular Genetics
BIOL 420	Adv Topics:Cell Biology
BIOL 425	Immunology
BIOL 426	Appr To Molecular Biol
BIOL 428	Computer Appl Molec Biol
BIOL 434	Microbial Molec Genetics
BIOL 443	Adv Topics:Devel 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
BIOL 483	Evol: From Genes To Genomes
BIOL 486	Genome Science
CHEM 406	Bioinorganic Chemistry
CHEM 431	Chemistry Of Proteins
CHEM 432	Advanced Biochemistry
CHEM 433	Biochem Of Nucleic Acids
CHEM 435	Cpx Carbohydrates
CHEM 441	Macromolecules
CHEM 442	Physical Biochemistry
CHEM 443	Spectroscopy/Biopolymers
CHEM 444	Molecular Modeling
CHEM 450	Chem Hetero Compds
CHEM 451	Mech Of Organic Reaction
CHEM 453	Org Chem Nucl Acid
CHEM 455	Intro Biomedical Chem
CHEM 457	Total Syn Nat Products

Proposed Elective Options

BIOL 411	Bacterial Physiology
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CHEM 461 Adv Instrumental Methods
CHEM 470 Toxicological Chemistry
CHEM 472 Enzyme Reaction Mech'ism
CHEM 490 Special Topics In Chemistry
CHEM 601 Current Topics In Chem
CHEM 635 Cpx Carbohydrates
CHEM 640 Spec Top:Molecular Struc
CHEM 670 Sp Top:Dynamcs/Mechisms
CHEM 680 Sem In Biophysical Chem
CHEM 682 Special Topics
CHEM 684 Spec Topics In Chemistry

CHEM 461 Adv Instrumental Methods
CHEM 467 Advanced Analytical Methods
CHEM 470 Toxicological Chemistry
CHEM 472 Enzyme Reaction Mech'ism
CHEM 490 Special Topics In Chemistry
CHEM 601 Current Topics In Chem
CHEM 635 Cpx Carbohydrates
CHEM 640 Spec Top:Molecular Struc
CHEM 670 Sp Top:Dynamcs/Mechisms
CHEM 680 Sem In Biophysical Chem
CHEM 682 Special Topics
CHEM 684 Spec Topics In Chemistry

Rationale (see instructions):

We would like to request CHEM 467 – Advanced Analytical Methods be added to the list of upper level elective options for Biochemistry & Molecular Biology majors. For the BIOC BS major, students must complete 6-8 credits of upper level electives from a given list. This course is relevant to the field of biochemistry and would broaden the course options for our students.

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 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		
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
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BIOL 483 - Evolution: From Genes to Genomes
BIOL 486 - Genome Science
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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 - Biomedical 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.