

COMPUTATIONAL BIOCHEMISTRY B.S.

The Biochemistry Program is a joint program between the Department of Chemistry and Biochemistry and the Division of Biological Sciences. Biochemistry is an interdisciplinary science that integrates chemistry and biology to understand the molecular basis of life. The program offers a B.S. in Biochemistry, a B.S. in Computational Biochemistry and M.S. and Ph.D. degrees in Biochemistry & Biophysics. The Biochemistry Program is accredited by the American Society for Biochemistry and Molecular Biology (ASBMB).

The program also offers a B.S. in Computational Biochemistry. This degree incorporates both foundational and advanced level courses in chemistry, biology, computer science and biochemistry to prepare students who plan to pursue careers in computationally intensive fields including bioinformatics, molecular-modeling and structure-based design.

Bachelor of Science - Computational Biochemistry General Education Requirements

Information regarding these requirements can be found in the General Education Section (<http://catalog.umd.edu/academics/general-education-requirements/>) of the catalog.

Summary

Code	Title	Hours
Lower Division Core		
	Biochemistry	1
	Biology	8
	Computer Science	10
	General Organic Chemistry	20
	Physics	10
	Math	8
Upper Division Core		
	Biochemistry	9
	Biology	3
	Analytical Chemistry	8
	Physical Chemistry	4
	Computer Science	6
Advanced Electives		
	Total Hours	96

Degree Specific Credits: 96

Required Cumulative GPA: 2.0

Lower-Division Core

Rule: Must complete the following subcategories. 57 total credits required.

Biochemistry

Code	Title	Hours
Complete all of the following courses:		
BCH 294	Seminar/Workshop	1
Total Hours		1

Minimum Required Grade: C-

Biology

Code	Title	Hours
Complete the following course:		
BIOB 160N	Principles of Living Systems	3
BIOB 161N	Principles of Living Systems Lab	1
BIOB 272	Genetics and Evolution	4
Total Hours		8

Minimum Required Grade: C-

Computer Science

Code	Title	Hours
Complete the following:		
CSCI 151	Interdisciplinary Computer Science I	3
CSCI 152	Interdisciplinary Computer Science II	3
CSCI 232	Intermediate Data Structures and Algorithms	4
Total Hours		10

Minimum Required Grade: C-

General and Organic Chemistry

Code	Title	Hours
Complete all of the following courses:		
CHMY 141N & CHMY 142N	College Chemistry I and College Chemistry I Lab	5
CHMY 143N & CHMY 144N	College Chemistry II and College Chemistry II Lab	5
CHMY 221 & CHMY 222	Organic Chemistry I and Organic Chemistry I Lab	5
CHMY 223 & CHMY 224	Organic Chemistry II and Organic Chemistry II Lab	5
Total Hours		20

Minimum Required Grade: C-

Physics

Code	Title	Hours
Complete all of the following courses:		
PHSX 215N & PHSX 216N	Fundamentals of Physics with Calculus I and Physics Laboratory I with Calculus	5
PHSX 217N & PHSX 218N	Fundamentals of Physics with Calculus II and Physics Laboratory II with Calculus	5
Total Hours		10

Minimum Required Grade: C-

Mathematics

Code	Title	Hours
Complete all of the following courses:		
M 171	Calculus I	4
M 172	Calculus II	4
Total Hours		8

Minimum Required Grade: C-

Upper-Division Core

Rule: Must complete the following subcategories. 30 total credits required.

Biochemistry

Code	Title	Hours
Complete all of the following courses:		
BCH 480	Advanced Biochemistry I	3
BCH 482	Advanced Biochemistry II	3
BCH 486	Biochemistry Research Lab	3
Total Hours		9

Minimum Required Grade: C-

Biology

Code	Title	Hours
Complete the following course:		
BIOB 486	Genomics	3
Total Hours		3

Minimum Required Grade: C-

Analytical Chemistry

Code	Title	Hours
Complete all of the following courses:		
CHMY 311	Analytical Chemistry-Quantitative Analysis	4
CHMY 421	Advanced Instrument Analysis	4
Total Hours		8

Minimum Required Grade: C-

Physical Chemistry

Code	Title	Hours
Complete the following course:		
CHMY 373	Physical Chemistry-Kinetics & Thermodynamics	4
Total Hours		4

Minimum Required Grade: C-

Computer Science

Code	Title	Hours
Complete all of the following courses:		
CSCI 315E	Computers, Ethics, and Society	3
CSCI 451	Computational Biology	3
Total Hours		6

Minimum Required Grade: C-

Advanced Electives

Note: No more than 3 credits combined of BIOB 490, CHMY 490, CHMY 498 and BCH 490. No more than 3 credits combined of CHMY 397 and CHMY 494.

Code	Title	Hours
Complete 3 credits from the following courses:		3
CSCI 332	Advanced Data Structures and Algorithms	
CSCI 340	Database Design	
CSCI 444	Data Visualization	
CSCI 447	Machine Learning	
Complete 6 credits from the following courses:		6
BCH 490	Undergraduate Research	
BIOB 301	Developmental Biology	
BIOB 375	General Genetics	
BIOB 410	Immunology	
BIOB 411	Immunology Laboratory	
BIOB 425	Advanced Cellular & Molecular Biology	
BIOB 490	Advanced Undergraduate Research	
BIOH 365	Human Anatomy and Physiology for Health Professions I	
BIOH 370	Human Anatomy and Physiology for Health Professions II	
BIOH 405	Hematology	
BIOH 462	Principles of Medical Physiology	
BIOM 360	General Microbiology	
BIOM 361	General Microbiology Lab	
BIOM 410	Microbial Genetics	
BIOM 411	Experimental Microbial Genetics Lab	
BIOM 427	General Parasitology	
BIOM 428	General Parasitology Lab	
BIOM 435	Virology	
CHMY 371	Physical Chemistry-Quantum Chemistry & Spectroscopy	
CHMY 397	Teaching Chemistry	
CHMY 401	Advanced Inorganic Chemistry	
CHMY 402	Advanced Inorganic Chemistry Lab	
CHMY 442	Aquatic Chemistry	
CHMY 465	Organic Spectroscopy	
CHMY 466	FT-NMR Option for Undergraduate Research	
CHMY 490	Undergraduate Research	
CHMY 494	Seminar/Workshop	
CHMY 498	Internship/Cooperative Education	
PHAR 421	Medicinal Chemistry I	
PHAR 422	Medicinal Chemistry II	
Total Hours		9

Minimum Required Grade: C-

Advanced College Writing Requirement

Rule: To complete the Advanced College Writing Requirement, Biochemistry students may take the following courses or any other stand-alone advanced writing course.

Code	Title	Hours
BCH 482	Advanced Biochemistry II	3
BCH 486	Biochemistry Research Lab	3

Minimum Required Grade: C-