

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-