

# BIOCHEMISTRY

**Phone:** (845) 257-3790

**Location:** Coykendall Science Building Room 105

**Web address:** [www.newpaltz.edu/biochemistry](http://www.newpaltz.edu/biochemistry)

The Departments of Biology and Chemistry offer an interdisciplinary major in Biochemistry, leading to a Bachelor of Science degree. The Biochemistry program provides students with a firm foundation in both biology and chemistry, extensively utilizing course offerings from both departments.

Biochemistry is the scientific discipline that seeks to understand life at a very fundamental level. Students who are interested in the intersection of biology and chemistry will find our program provides a rigorous, hands-on experience and the opportunity to form intimate scholarly relationships with our faculty. A degree in Biochemistry is excellent preparation for further studies in other closely related fields such as pharmacology and health science or a variety of bachelor-level positions with laboratories, research facilities, private industry, chemical, pharmaceutical and biotech firms. Additionally, the unique interdisciplinary nature of our liberal arts degree also builds skills in problem-solving and critical thinking that can be applied to a much broader range of career options in biology, chemistry, veterinary science, patent law and beyond.

## Biochemistry (BS) Program Learning Outcomes

Students who successfully complete the Biochemistry major will be able to:

- Apply quantitative reasoning and appropriate mathematics to describe or explain phenomena in the natural world.
- Demonstrate understanding of the process of scientific inquiry and explain how scientific knowledge is discovered and validated.
- Demonstrate knowledge of basic physical principles and their applications to the understanding of living systems.
- Demonstrate knowledge of basic principles of chemistry and some of their applications to the understanding of living systems.
- Demonstrate knowledge of how biomolecules contribute to the structure and function of cells.
- Apply understanding of principles of how molecular and cell assemblies, organs, and organisms develop structure and carry out function.
- Explain how organisms' sense and control their internal environment and how they respond to external change.

(73-74 credits)<sup>1</sup>

Code	Title	Credits
<b>Required Biochemistry Courses (12 Credits)</b>		
BCM360	Protein Structure and Function	4

BCM461	Biochemistry 1	3
BCM463	Biochemistry Lab	1
BCM470	Biochemistry 2	3
BCM475	Experimental Biochemistry	1

### Required Biology Courses (16 Credits)

BIO201 & BIO211	General Biology I and Gen Bio 1 Lab	4
BIO202 & BIO212	General Biology II and Gen Bio 2 Lab	4
BIO320 & BIO321	Genetics and Genetics Lab	4
BIO358	Molecular Biology	4

### Required Chemistry Courses (16 Credits)

CHE201 & CHE211	General Chemistry I and General Chemistry I Lab	4
CHE202 & CHE212	General Chemistry II and General Chemistry II Lab	4
CHE318 & CHE306	Organic Chemistry I and Organic Chemistry I Lab	4
CHE319 & CHE309	Organic Chemistry II and Organic Chemistry II Lab	4

### Biology Elective (4 Credits)

Select one of the following:		4
BIO350	General Microbiology	
BIO359	Cell Biology	
BIO370	Animal Physiology	
BIO413	Developmental Biology	

### Chemistry Elective (3-4 Credits)

Select one of the following:		3-4
CHE303	Introduction to Analytical Chemistry	
CHE314	Inorganic Chemistry	
CHE321	Physical Chemistry I	
CHE322	Physical Chemistry II	

### Additional Approved Electives (6 Credits)

Select a minimum 6 credits (may be from the above lists, independent study, or otherwise approved by advisor)		6
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### Required Cognates (16 Credits)

MAT251	Calculus I	4
MAT252	Calculus II	4
PHY201 & PHY211	General Physics 1 and Physics 1 Laboratory	4
PHY202 & PHY212	General Physics 2 and General Physics 2 Lab	4

**Total Credits** **73-74**

<sup>1</sup> Minimum grade requirements:

- A minimum grade of C- is required to advance from CHE201 General Chemistry I to CHE202 General Chemistry II, from CHE202 General Chemistry II to CHE318 Organic Chemistry I, and from CHE318 Organic Chemistry I to CHE319 Organic Chemistry II.
- A minimum grade of C- in CHE319 Organic Chemistry II is required to enroll in BCM461 Biochemistry 1.

- A minimum grade of C- is required to advance from [BIO201](#) General Biology I to [BIO202](#) General Biology II and from [BIO202](#) General Biology II to [BIO320](#) Genetics .
- A minimum grade of C- in [BIO320](#) Genetics is required to advance to [BCM360](#) Protein Structure and Function and most upper-division biology courses, including those in the Biochemistry major ([BIO350](#) General Microbiology , [BIO358](#) Molecular Biology, [BIO359](#) Cell Biology, [BIO370](#) Animal Physiology, [BIO413](#) Developmental Biology).
- A minimum grade of C- in [MAT251](#) Calculus I is required to enroll in [MAT252](#) Calculus II and in [PHY201](#) General Physics 1.

### **BCM295. Independent Study Biochemistry. 1-12 Credits.**

#### **Restrictions:**

- Must have the following level: Undergraduate

May be repeated for credit

### **BCM360. Protein Structure and Function. 4 Credits.**

We will be investigating the inter-relationship between the Structure & Function of Proteins. In this course, you will learn to use molecular visualization tools to investigate real three dimensional structures of proteins produced by modern structural biology research in conjunction with primary scientific literature.

#### **Attributes:**

- Liberal Arts

#### **Restrictions:**

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

#### **Prerequisites:**

- [BIO320](#) Minimum Grade of C-
- [CHE319](#) Minimum Grade of C-\*

\* May be taken at the same time

May not be repeated for credit

### **BCM393. Biochemistry Selected Topic. 1-12 Credits.**

Selected topics courses are regularly scheduled courses that focus on a particular topic of interest. Descriptions are printed in the Schedule of Classes each semester. Selected topics courses may be used as elective credit and may be repeated for credit, provided that the topic of the course changes.

May be repeated for credit

### **BCM461. Biochemistry 1. 3 Credits.**

Examination of the chemistry of cellular constituents, especially biopolymers and how the structure of these macromolecules effects their function.

#### **Restrictions:**

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

#### **Prerequisites:**

- [CHE319](#) Minimum Grade of C-

May not be repeated for credit

### **BCM463. Biochemistry Lab. 1 Credit.**

Introduction to biochemical techniques with emphasis on protein biochemistry. Provides laboratory experience that reinforces concepts taught in [BCM461](#).

#### **Attributes:**

- Liberal Arts

#### **Restrictions:**

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

#### **Prerequisites:**

- [BCM461](#) Minimum Grade of D-\*
- [CHE318](#) Minimum Grade of D-
- [CHE319](#) Minimum Grade of D-

\* May be taken at the same time

May not be repeated for credit

### **BCM470. Biochemistry 2. 3 Credits.**

Enzyme kinetics, bioenergetics and examination of metabolic reactions leading to biologically useful energy production. Control of intermediary metabolism at molecular level.

#### **Attributes:**

- Liberal Arts

#### **Restrictions:**

- Must not be enrolled in the following class: Freshman

#### **Prerequisites:**

- [BCM461](#) Minimum Grade of D-

### **BCM475. Experimental Biochemistry. 1 Credit.**

Laboratory work in methodology and techniques used in biochemistry. Stresses design and interpretation of experiments.

#### **Attributes:**

- Practicum - Non-Clinical
- Creative Works
- Liberal Arts

#### **Restrictions:**

- Must have the following level: Undergraduate
- Must not be enrolled in the following class: Freshman

#### **Prerequisites:**

- [BCM463](#) Minimum Grade of D-\*
- [BCM360](#) Minimum Grade of D-\*

\* May be taken at the same time

May not be repeated for credit

### **BCM495. Independent Study Biochemistry. 1-12 Credits.**

May be repeated for credit

## **Faculty**

See [Biology](#) and [Chemistry](#) faculty lists