

# BIOCHEMISTRY, BS

Roosevelt University offers three chemistry-related degrees: a Bachelor of Arts (BA) in Chemistry, a Bachelor of Science (BS) in Chemistry, and a BS in Biochemistry. All three programs provide sound training in fundamental principles and experimental techniques for understanding and manipulating the interactions of matter. Course requirements differ for each degree. Regardless of the degree selected, chemistry or biochemistry majors interested in teaching science at the elementary or secondary level should meet with an advisor early in their program to plan an appropriate course sequence. Chemistry or biochemistry majors with strong academic backgrounds are encouraged to apply to the Roosevelt Scholars Program.

The BS degree in Biochemistry provides thorough training in the fundamental principles and experimental techniques of chemistry and biology as they apply to biological systems, and emphasizes the interdisciplinary nature of these sciences. This program prepares students for a wide variety of careers, including biological or biochemical research, secondary education, health sciences, government, or industry. The Biochemistry major may lead to work in interdisciplinary sciences such as biotechnology, forensics, environmental science, or pharmacology, and it is well suited to the needs of pre-professional students, including pre-medical students and pre-pharmacy students.

## Standards

All courses applying to the biochemistry major, including required supporting courses, must be passed with a grade of C- or higher and a minimum cumulative GPA of 2.0.

## Requirements

- Courses applying to the Biochemistry major, including required supporting courses, must be taken on a letter grade basis.
- At least 25 credit hours of the required Biochemistry, Chemistry and/or Biology courses must be completed at Roosevelt University.
- All Biochemistry, Chemistry, and Biology courses must be taken within eight years of graduation to be accepted for credit without examination.
- Entering students with a score of at least 4 on the AP chemistry exam receive 3 credit hours of CHEM 1xx AP Chemistry credit and are waived from CHEM 201 GENERAL CHEMISTRY I. Students with a 3 on the AP chemistry exam receive 3 credit hours of CHEM 1xx AP Chemistry credit and satisfy the physical science general education lecture requirement.

Biology Core		15
BIOL 201	ORGANISMIC BIOLOGY (3 credit hour lecture, 2 credit hour lab) <sup>1</sup>	
BIOL 202	ECOLOGY, EVOLUTION, AND GENETICS (3 credit hour lecture, 2 credit hour lab)	
BIOL 301	CELLULAR & MOLECULAR BIOLOGY (3 credit hour lecture, 2 credit hour lab)	
Chemistry Core		25
CHEM 201	GENERAL CHEMISTRY I (3 credit hour lecture, 2 credit hour lab)	
CHEM 202	GENERAL CHEMISTRY II (3 credit hour lecture, 2 credit hour lab)	

CHEM 211	ORGANIC CHEMISTRY I (3 credit hour lecture, 2 credit hour lab)	
CHEM 212	ORGANIC CHEMISTRY II (3 credit hour lecture, 2 credit hour lab)	
CHEM 237	QUANTITATIVE ENVIRONMENTAL ANALYSIS (3 credit hour lecture, 2 credit hour lab)	
Biochemistry Core		9
BCHM 354	EXPERIMENTAL METHODS IN BIOCHEMISTRY & BIOTECHNOLOGY (2 credit hour lab)	
BCHM 355	BIOCHEMISTRY (3 credit hour lecture)	
BCHM 357	ADVANCED BIOCHEMISTRY (3 credit hour lecture)	
BCHM 393	BIOCHEMISTRY SEMINAR (1 credit hour seminar)	
or CHEM 393	CHEMISTRY SEMINAR	
Physical Chemistry Elective		3
Select one choice from the menu below		
BCHM 320	PHYSICAL CHEMISTRY FOR BIOSCIENCE (3 credit hour lecture)	
CHEM 321	PHYSICAL CHEMISTRY: THERMODYNAMICS (3 credit hour lecture. Optional 2 credit hour lab may be taken in partial fulfillment of advanced electives)	
CHEM 322	PHYSICAL CHEMISTRY: QUANTUM MECHANICS (3 credit hour lecture. Optional 2 credit hour lab may be taken in partial fulfillment of advanced electives)	
CHEM 323	ATOMIC AND MOLECULAR SPECTROSCOPY (3 credit hour lecture. Optional 2 credit hour lab may be taken in partial fulfillment of advanced electives)	
Advanced electives		8-10
At least two additional BCHM, BIOL or CHEM courses, including at least two disciplines and at least one laboratory. Up to 3 credit hours of CHEM, BIO or BCHM research may be applied to this requirement. <sup>2</sup>		
BIOL 3XX: Advanced biology elective, above BIO 301		
CHEM 3XX: Advanced chemistry elective, 300 level		
BCHM 3xx: Advanced biochemistry elective, 300 level		
Supporting Sequence		20
MATH 231	CALCULUS I (5 credit hours)	
MATH 232	CALCULUS II (5 credit hours)	
PHYS 201	INTRODUCTION TO NON-CALCULUS BASED PHYSICS I (4 credit hours)	
PHYS 202	INTRO TO NON-CALCULUS PHYSICS II (4 credit hours)	
PHYS 233	CALCULUS-BASED PHYSICS I DISCUSSION (1 credit hours)	
PHYS 234	CALCULUS-BASED PHYSICS II DISCUSSION (1 credit hours)	
General Education Requirements including University Writing Requirement <sup>3,4,5</sup>		36-39

See College of Arts & Sciences General Education Requirements below, as well as footnotes 3-5

<b>Minor or free elective courses to total 120</b> <sup>5</sup>	<b>4</b>
<b>Total Credit Hours</b>	<b>120-125</b>

<sup>1</sup> With the approval of an advisor, B.S. Biochemistry majors with a pre-pharmacy designation may substitute BIO 201 Organismic Biology (5 credit hours) with the combination of BIO 123 Anatomy & Physiology I (4 credit hours) plus BIO 124 Anatomy & Physiology II (4 credit hours) for a total of 8 credit hours.

<sup>2</sup> To apply to the major, undergraduate research should be a substantive laboratory or computational project, approved by the chemistry/biochemistry program chair, performed under the direction of a faculty sponsor, resulting in a report, paper, poster or presentation, and completed with a minimum acceptable grade of C. Each credit hour of BIOL, CHEM or BCHM 392 requires the equivalent of 3 credit hours of active research per week over a 15 week semester.

<sup>3</sup> B.S. Biochemistry majors satisfy the general education mathematics requirement through the major (Math 231)

<sup>4</sup> B.S. Biochemistry majors satisfy all science general education requirements, including biology, physical science and laboratory requirements through the major.

<sup>5</sup> B.S. Biochemistry majors are highly encouraged to fill one of their social science or humanities general education electives with a course that simultaneously satisfies the nonwestern attribute. Additionally, B.S. Biochemistry majors intending to pursue graduate programs in pharmacy should fulfill one social science requirement with ECON 101 or ECON 102, and should fulfill one humanities general education requirement with SPCH 101.

<sup>6</sup> B.S. Biochemistry majors may not minor in either biology or chemistry. A mathematics minor is encouraged, but no minor is required.

## General Education Requirements

Code	Title	Credit Hours
<b>Academic Communities of Practice</b>		
ACP 101	FIRST YEAR SEMINAR <sup>1</sup>	3
ACP 110	PRIMARY TEXTS	3
ACP 250	FOUNDATIONS FOR CHANGE	3
<b>English Composition</b> <sup>2</sup>		
ENG 101	COMPOSITION I: CRITICAL READING & WRITING	3
ENG 102	COMPOSITION II: INTRODUCTION TO ACADEMIC RESEARCH	3
<b>Humanities</b>		
	Select 9 credits from the following subject areas: African-American Studies, Art History, English (excluding ENG 101 and ENG 102), History, Languages, Music, Philosophy, Theatre, Speech and Women's and Gender Studies	9
<b>Mathematics</b>		
MATH 110	QUANTITATIVE LITERACY (or above) <sup>3</sup>	3
<b>Non-Western requirement</b>		
	Non-Western course (can be used for Humanities or Social Sciences general education requirements)	3
<b>RU mission-related course</b> <sup>2</sup>		
LIBS 201	WRITING SOCIAL JUSTICE	3

<b>Science</b>	
One biological science and one physical science required (at least one must be a four-hour lab (not applicable for science majors))	7-8

<b>Social Sciences</b>	
Select 9 credits from the following subject areas: African-American Studies, Anthropology, Economics, History, Journalism, Philosophy, Political Science, Psychology, Sociology and Women's and Gender Studies	9
<b>Total Credit Hours</b>	<b>49-50</b>

<sup>1</sup> Required for students who enter RU with fewer than 12 credit hours

<sup>2</sup> Minimum grade of C- required

<sup>3</sup> Math, Computer Science & Technology, and Science majors have different requirements—see advisor

These quantitative requirements also apply to degrees in the College of Arts and Sciences:

- Students may apply no more than 60 credit hours of 100-level courses toward the degree.
- Students must apply no fewer than 60 credit hours of 200- and 300-level courses toward the degree.
- Students must have at least 18 credit hours (of the 60 credit hours above) at the 300 level.
- Students may transfer in no more than 66 credit hours from community colleges.
- Students must take their final 30 hours at Roosevelt University. Note that some majors have additional requirements for RU hours.
- Students must have a grade point average of 2.0 or higher to graduate. Note that some majors have additional GPA requirements.
- Students must have a minimum of 90 hours in Arts and Sciences.
- Students may apply no more than 51 hours in the major (BA) or 57 hours in the major (BS)

Your degree map is a general guide suggesting courses to complete each term on the academic pathway to your degree. It is based on the most current scheduling information from your academic program. Your program's degree map is reviewed annually and updated as schedules change (although you retain the same course requirements as long as you are continuously enrolled in your degree program).

Always work closely with your academic advisor to understand curriculum requirements and scheduling, as each student's academic plan can look slightly different.

<b>Year 1</b>			
Fall	Credit Hours	Spring	Credit Hours
ACP 101		3 ACP 110	3
CHEM 201		5 BIOL 201	5
ENG 101		3 CHEM 202	5
MATH 121		3 ENG 102	3
Humanities Course #1		3	
		17	16

<b>Year 2</b>			
Fall	Credit Hours	Spring	Credit Hours
BIOL 202		5 BIOL 301	5

CHEM 211	5 MATH 122	3
MATH 217	3 CHEM 212	5
LIBS 201 or ACP 250	3	
	16	13

**Year 3**

<b>Fall</b>	<b>Credit Hours Spring</b>	<b>Credit Hours</b>
BCHM 354	2 ACP 250 or LIBS 201	3
BCHM 355	3 BCHM 357	3
CHEM 237	5 BCHM 393	1
MATH 231	5 MATH 232	5
	Social Science Course #1	3
	15	15

**Year 4**

<b>Fall</b>	<b>Credit Hours Spring</b>	<b>Credit Hours</b>
BIOL 351, 360, or 367	5 PHYS 202	3
BCHM 320	3 PHYS 234	1
CHEM 344	3 Social Science Course #2	3
PHYS 201	3 Social Science Course #3	3
PHYS 233	1 Humanities Course #2	3
	Humanities Course #3	3
	15	16

Total Credit Hours 123

- <sup>1</sup> Or course towards an optional Minor.  
<sup>2</sup> Any course at the 200 level within the discipline.  
<sup>3</sup> Any course at the 300 level within the discipline.