

# CHEMISTRY, 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 Chemistry degree is certified by the American Chemical Society and provides 55 to 57 credit hours of rigorous training in the five major chemistry sub-disciplines, including more than 400 hours of laboratory training beyond the general chemistry level. The ACS-certified BS degree is recommended for students whose career goals include direct employment as a professional chemist or graduate school in chemistry, engineering or other physical sciences. Chemistry majors obtain substantial practical experience using modern experimental methods and scientific equipment and are prepared for careers in such diverse settings as research, education, government, and industry. Some of the options that are available to Chemistry graduates include:

- Attend graduate school and earn MS or PhD degree in chemistry or related disciplines.
- Attend medical, dental, pharmacy, or veterinary school.
- Attend law school (specializing in environmental or patent law).
- Work in industry, for example in analytical chemistry, synthesis, formulations, quality assurance, or research and development.
- Work as a clinical laboratory scientist in a medical or hospital laboratory.
- Work as an analytical or forensic chemist for private contract laboratories or for city, state or federal government agencies.
- With education coursework, teach sciences at the primary or secondary level.
- Work in technical, chemical, pharmaceutical, or scientific/clinical instrument sales.

## Standards

- Chemistry, Biochemistry, Mathematics, and Physics courses may not be taken pass/fail and must be passed with a letter grade of C- or higher and a minimum cumulative math and science GPA of 2.0.
- At least 27 credit hours of the required Chemistry courses must be completed at Roosevelt University.
- All Chemistry and supporting Math and Physics 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 for 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.

### Required preparatory chemistry

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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)	
<b>Required chemistry foundation (21 credit hours, 172.5 lab hours)</b>		<b>21</b>
CHEM 211	ORGANIC CHEMISTRY I (3 credit hour lecture, 2 credit hour lab, 57.5 lab hours)	
CHEM 237	QUANTITATIVE ENVIRONMENTAL ANALYSIS (3 credit hour lecture, 2 credit hour lab, 57.5 lab)	
CHEM 321	PHYSICAL CHEMISTRY: THERMODYNAMICS (3 credit hour lecture, 2 credit hour lab, 57.5 lab)	
CHEM 341	INORGANIC CHEMISTRY (3 credit hour lecture)	
BCHM 355	BIOCHEMISTRY (3 credit hour lecture)	
<b>Required chemistry depth courses (11 credit hours, 115 lab hours)</b>		<b>11</b>
CHEM 212	ORGANIC CHEMISTRY II (3 credit hour lecture, 2 credit hour lab, 57.5 lab hours)	
CHEM 322	PHYSICAL CHEMISTRY: QUANTUM MECHANICS (3 credit hour lecture, 2 credit hour lab, 57.5 lab hours)	
CHEM 393	CHEMISTRY SEMINAR (1 credit hour)	
<b>Elective chemistry depth courses</b>		<b>10</b>
Select at least two of the following for at least 10 credit hours; and at least 112.5 lab hours:		
CHEM 313	ADVANCED ORGANIC CHEMISTRY LAB (3 credit hour lecture, 2 credit hour lab, 75 lab hours)	
CHEM 337	INSTRUMENTAL ANALYSIS (3 credit hour lecture, 2 credit hour lab, 75 lab hours)	
CHEM 347	ADVANCED INORGANIC CHEMISTRY LAB (3 credit hour lecture, 2 credit hour lab, 75 lab hours)	
BCHM 354 & BCHM 357	EXPERIMENTAL METHODS IN BIOCHEMISTRY & BIOTECHNOLOGY and ADVANCED BIOCHEMISTRY (Combination provides 5 credit hours and 45 lab hours)	
CHEM 323	ATOMIC AND MOLECULAR SPECTROSCOPY (3 credit hour lecture, 2 credit hour lab, 57.5 lab hours)	
<b>Chemistry or Biochemistry major elective or research</b> <sup>1</sup>		<b>3</b>
Select one of the following for at least 3 credit hours		
CHEM 392	RESEARCH IN CHEMISTRY <sup>1</sup>	
CHEM 3xx.	Any 3 credit hour CHEM course not otherwise applied to BS Chemistry requirements.	
BCHM 3xx.	Any 3 credit hour BCHM course not otherwise applied to BS Chemistry requirements, excluding BCHM 320.	
<b>Required supporting sequence</b>		<b>20</b>
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 hour)	
PHYS 234	CALCULUS-BASED PHYSICS II DISCUSSION (1 credit hour)	
<b>Required mathematics elective. Select one course for 3 credit hours from the following</b>		<b>3</b>
MATH 217	ELEMENTARY STATISTICS	
MATH 233	CALCULUS III	
MATH 238	APPLIED PROBABILITY AND STATISTICS	
MATH 245	DISCRETE STRUCTURES	
MATH 246	LINEAR ALGEBRA	
MATH 280	MATHEMATICAL MODELING	
MATH 307	DIFFERENTIAL EQUATION/MODELING	
<b>General Education Requirements including University Writing Requirement</b> <sup>2,3,4</sup>		<b>36-39</b>
See College of Arts & Sciences General Education Requirements below, as well as B.S. Chemistry major footnotes 2-4		
<b>Minor or free elective courses to total 120 credit hours</b>		<b>6</b>
Total Credit Hours		120-123

<sup>1</sup> To apply to the major, chemistry research should be a substantive laboratory or computational project, 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 CHEM 392 requires the equivalent of 3 hours of active research per week over a 15 week semester.

<sup>2</sup> B.S. Chemistry majors satisfy the general education mathematics requirement through the major (Math 231)

<sup>3</sup> B.S. Chemistry majors satisfy all science general education requirements, including biology, physical science and laboratory requirements through the major.

<sup>4</sup> B.S. Chemistry 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. Chemistry 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.

## 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
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<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

Total Credit Hours	49-50
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<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.

**Year 1**

<b>Fall</b>	<b>Credit Hours Spring</b>	<b>Credit Hours</b>
ACP 101	3 ACP 110	3
ENG 101	3 ENG 102	3
CHEM 201	5 CHEM 202	5
MATH 231	5 MATH 232	5
	16	16

**Year 2**

<b>Fall</b>	<b>Credit Hours Spring</b>	<b>Credit Hours</b>
CHEM 211	5 ACP 250 or LIBS 201	3
PHYS 201	4 CHEM 212	5
PHYS 233	1 PHYS 202	4
Humanities #1	3 PHYS 234	1
Social Science #1	3 Humanities #2	3
	16	16

**Year 3**

<b>Fall</b>	<b>Credit Hours Spring</b>	<b>Credit Hours</b>
CHEM 237 or 341	3 CHEM 3XX <sup>3</sup>	3
CHEM 321 or BCHM 355	5 CHEM 337 or 347	5
MATH 2XX <sup>2</sup>	3 CHEM 322, BCHM 3XX, or CHEM 3XX <sup>3</sup>	3
Social Science #2	3 Humanities #3	3
	Social Science #3	3
	14	17

**Year 4**

<b>Fall</b>	<b>Credit Hours Spring</b>	<b>Credit Hours</b>
CHEM 341 or 237	5 CHEM 3XX <sup>3</sup>	3
BCHM 355 or CHEM 321	3 CHEM 322, BCHM 3XX, or CHEM 3XX <sup>3</sup>	3
MATH 2XX <sup>2</sup>	3 CHEM 347 or 337	5
LIBS 201 or ACP 250	3 CHEM 393	1
Non-Western Studies Course <sup>4</sup>		
	14	12

Total Credit Hours 121

<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.

<sup>4</sup> This requirement can be fulfilled by other requirements.

<sup>5</sup> One Natural Science course must have a lab.