

# BIOCHEMISTRY (BS)

As a Biochemistry major, you will learn the fundamentals of chemical and biochemical theory and practice through scientific investigation, laboratory experience and research opportunities.

All Biochemistry students will take core courses in chemistry and biochemistry, biology, physics and mathematics.

Faculty in the Department of Chemistry and Biochemistry research projects in biochemistry, chemical biology, biophysical chemistry, medicinal chemistry and bioanalytical chemistry in addition to traditional subdisciplines of chemistry. Their projects are funded internally and also through government, foundation and industry grants, providing students with multiple opportunities to gain hands-on research experience. Being in Chicago also allows you to attend many scientific conferences hosted in the city throughout the year.

Program Requirements	Quarter Hours
Liberal Studies Requirements	76
Major Requirements	104
Open Electives	12
<b>Total hours required</b>	<b>192</b>

## Learning Outcomes

Students will be able to:

- Design and perform biochemical experiments and use chemical instrumentation.
- Apply proper safety protocols while in laboratory environments.
- Responsibly collect, analyze, and represent scientific data.
- Proficiently explain, both orally and in writing, and apply core chemical principles to the results of experiments and to representative problems.

## College Core Requirements

### Modern Language Requirements

Students who intend to graduate with the Bachelor of Arts (BA) degree will be required to demonstrate competence in a modern language equivalent to the proficiency attained from one year of college-level language study. Such competence may be demonstrated in one of several ways:

- completing the last course in the fourth-year high school sequence of any language
- completing the last course in the first-year college sequence of any language
- completing a college course beyond the first-year level in any language
- achieving a satisfactory score on any of the Modern Language placement examinations administered at DePaul
- achieving a satisfactory rating in a proficiency examination accepted by DePaul
- achieving a score of 3 or higher on the Advance Placement (AP) test for any language

- achieving a score of 5 or higher in the Language B assessment from a Standard or Higher Level International Baccalaureate (IB) program
- achieving a satisfactory score on the CLEP examination

Please note: Modern Languages courses with an E-designation are taught in English and may not be applied to the Modern Language Requirement.

For further information regarding satisfactory scores and possible credit from the DePaul placement, AP, CLEP, or IB examinations, please contact Student Records.

Students who complete an Inter-College Transfer (ICT) to the College of Science and Health will abide by the College of Science and Health Modern Language Requirement in place on the effective date of the ICT.

BA students who meet College requirements and wish to pursue further work in the language may elect the Language for Liberal Studies Option (<https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-program-guidelines/language-for-liberal-studies-option/>) of the Liberal Studies Program. While Bachelor of Science (BS) students are not required to demonstrate competency in a modern language, the Language for Liberal Studies Option is available to them for language study at any level. Modern Languages courses with an E-designation are taught in English and may not be applied to the Language for Liberal Studies Option.

## Major Declaration Requirements

All students in the College are required to declare a major field prior to beginning their junior year. After researching College programs, the student should declare a major field by visiting Campus Connection and using the Declarations and Inter-College Transfer tool. The student will then be assigned a faculty advisor or staff advisor in the department or program and should make an appointment to see that advisor at his or her earliest convenience.

To change major fields, or to declare a minor or concentration, the student must use the Declarations and Inter-College Transfer tool described above. However, for the purpose of exploring the possibility of changing a major field, the student should consult an academic advisor in the College or an academic advisor in the Office for Academic Advising Support.

## Liberal Studies Requirements

Honors program requirements can be found in the individual Colleges & Schools section of the University Catalog. Select the appropriate college or school, followed by Undergraduate Academics and scroll down.

First Year Program		Hours
<b>Chicago Quarter</b>		
LSP 110	DISCOVER CHICAGO	4
or LSP 111	or EXPLORE CHICAGO	
<b>Focal Point</b>		
LSP 112	FOCAL POINT SEMINAR	4
<b>Writing</b>		
WRD 103	COMPOSITION AND RHETORIC I <sup>1</sup>	4
WRD 104	COMPOSITION AND RHETORIC II <sup>1</sup>	4
<b>Quantitative Reasoning</b>		
Not Required		
<b>Sophomore Year</b>		
<b>Race, Power, and Resistance</b>		

LSP 200 SEMINAR ON RACE, POWER, AND RESISTANCE

### Junior Year

#### Experiential Learning

Required 4

### Senior Year

CHE 330 SENIOR CAPSTONE IN THE PHYSICAL SCIENCES<sup>1,2</sup> 4

<sup>1</sup> Students must earn a C- or better in this course.

<sup>2</sup> Students with a primary major in Biochemistry are required to complete the Capstone offered by the Chemistry department. Students double majoring or pursuing dual degrees with the primary major or primary degree in Biochemistry are required to complete the Capstone offered by the Chemistry department. Biochemistry students in the University Honors Program shall take the University Honors Capstone. They are not expected to take both the Honors Capstone and the primary major or primary degree Capstone.

## Learning Domains

**Arts and Literature (AL)** (<https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/arts-and-literature/>)

- 3 Courses Required

**Historical Inquiry (HI)** (<https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/historical-inquiry/>)

- 2 Courses Required

**Math and Computing (MC)** (<https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/math-and-computing/>)

- Not Required

**Philosophical Inquiry (PI)** (<https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/philosophical-inquiry/>)

- 2 Courses Required

**Religious Dimensions (RD)** (<https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/religious-dimensions/>)

- 2 Courses Required

**Scientific Inquiry (SI)** (<https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/scientific-inquiry/>)

- Not Required

**Social, Cultural, and Behavioral Inquiry (SCBI)** (<https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/social-cultural-and-behavioral-inquiry/>)

- 3 Courses Required

## Notes

Courses offered in the student's primary major cannot be taken to fulfill LSP Domain requirements. If students double major, LSP Domain courses may double count for both LSP credit and the second major. Students who choose to take an experiential learning course offered by

the major may count it either as a general elective or the Experiential Learning requirement.

In meeting learning domain requirements, no more than one course that is outside the student's major and is cross-listed with a course within the student's major, can be applied to count for LSP domain credit.

This policy does not apply to those who are pursuing a double major or earning BFA or BM degrees.

## Major Requirements

### Course Requirements

#### Common Core

All students pursuing a Bachelor of Arts or Bachelor of Science in chemistry must complete a common core of courses in the department. These courses are consistent with the requirements of all degree programs accredited by the American Chemical Society. The courses in the common core consist of:

Course	Title	Quarter Hours
Select one of the following:		4-6
CHE 130 & CHE 131	GENERAL CHEMISTRY I and GENERAL CHEMISTRY I LABORATORY	
CHE 120 & CHE 131	GENERAL CHEMISTRY IP and GENERAL CHEMISTRY I LABORATORY	
Select one of the following:		4-6
CHE 132 & CHE 133	GENERAL CHEMISTRY II and GENERAL CHEMISTRY LABORATORY II	
CHE 122 & CHE 133	GENERAL CHEMISTRY IIP and GENERAL CHEMISTRY LABORATORY II	
CHE 134 & CHE 135	GENERAL CHEMISTRY III and GENERAL CHEMISTRY LABORATORY III	4

The department occasionally offers General Chemistry in the summer. In this case, the combination of CHE 136/CHE 137 and CHE 138/CHE 139 may substitute for the three-quarter sequences above.

#### Foundation Courses

Course	Title	Quarter Hours
CHE 204 & CHE 205	ANALYTICAL CHEMISTRY and ANALYTICAL CHEMISTRY LABORATORY	4
CHE 230 & CHE 231	ORGANIC CHEMISTRY I and ORGANIC CHEMISTRY LABORATORY I	4
CHE 232 & CHE 233	ORGANIC CHEMISTRY II and ORGANIC CHEMISTRY LABORATORY II	4
CHE 234 & CHE 235	ORGANIC CHEMISTRY III and ORGANIC CHEMISTRY LABORATORY III	4
CHE 261	INSTRUMENTAL ANALYSIS (lecture and lab)	4
CHE 300	THERMODYNAMICS AND INTRODUCTION TO QUANTUM MECHANICS	4

CHE 320 & CHE 321	INTERMEDIATE INORGANIC CHEMISTRY and INTERMEDIATE INORGANIC CHEMISTRY LABORATORY	4
CHE 340 & CHE 341	BIOCHEMISTRY I and EXPERIMENTAL BIOCHEMISTRY I	4

### In-Depth Courses

Course	Title	Quarter Hours
CHE 315	PHYSICAL CHEMISTRY LAB	4
CHE 342 & CHE 343	BIOCHEMISTRY II and EXPERIMENTAL BIOCHEMISTRY II	4
Select 12 credit hours from any of CHE 250 through CHE 399, excluding CHE 346. One course may be CHE 392, CHE 397, or CHE 398. <sup>1</sup>		12

<sup>1</sup> One 300-level biology course may replace an In-Depth Chemistry course in consultation with a student's academic advisor. Suggested options include BIO 370, BIO 375, and HLTH 320.

### Biology

One year of General Biology and a course in Cell Biology, all offered by the Department of Biological Sciences, are required to earn a baccalaureate degree in biochemistry.

Course	Title	Quarter Hours
BIO 191	GENERAL BIOLOGY I FOR SCIENCE MAJORS	4
BIO 192	GENERAL BIOLOGY II FOR SCIENCE MAJORS	4
BIO 193	GENERAL BIOLOGY III FOR SCIENCE MAJORS	4
BIO 250	CELL BIOLOGY	4

### Calculus

One year of calculus is required to earn a baccalaureate degree in biochemistry. This may be accomplished by completing any one of the following three course sequences offered by the Department of Mathematical Sciences:

Course	Title	Quarter Hours
<b>Sequence One</b>		
MAT 147	CALCULUS WITH INTEGRATED PRECALCULUS I	6
MAT 148	CALCULUS WITH INTEGRATED PRECALCULUS II	6
MAT 149	CALCULUS WITH INTEGRATED PRECALCULUS III	6
<b>Sequence Two</b>		
MAT 150	CALCULUS I	4
MAT 151	CALCULUS II	4
MAT 152	CALCULUS III	4
<b>Sequence Three</b>		
MAT 155	SUMMER CALCULUS I	6
MAT 156	SUMMER CALCULUS II	6

### Physics

One year of general physics is required to earn a baccalaureate in biochemistry. This may be accomplished by completing one of the following three-course sequences offered by the Department of Physics:

Course	Title	Quarter Hours
<b>Sequence One</b>		
PHY 170	UNIVERSITY PHYSICS I	4
PHY 171	UNIVERSITY PHYSICS II	4
PHY 172	UNIVERSITY PHYSICS III	4
<b>Sequence Two</b>		
PHY 150	GENERAL PHYSICS I	4
PHY 151	GENERAL PHYSICS II	4
PHY 152	GENERAL PHYSICS III	4

### Open Electives

Open elective credit is also required to meet the minimum graduation requirement of 192 hours.

### Departmental Program Requirements

The following enrollment-related policies are fully enforced by the Department of Chemistry and Biochemistry

1. All students enrolling in the first course of a General Chemistry sequence must independently meet a minimum mathematics requirement. See the course descriptions for General Chemistry for up-to-date information.
2. All prerequisite chemistry courses must be completed with a C- or better. Students not meeting this requirement may be removed from course rosters before the start of an academic session. This requirement may be waived only with departmental consent.
3. The department offers lower-level sequences several times each academic year. Due to potentially small class sizes, upper-level courses may be scheduled every other year. Students should consult with their faculty academic advisor to develop a program they can complete in a timely fashion.

### Sequencing and Prerequisites

Students should begin their General Chemistry and General Biology sequences in their freshman year provided they have an adequate mathematics background. Students not yet prepared for calculus should take the prerequisite courses in their first year. The Calculus and Physics sequences should be taken no later than their sophomore and junior year, respectively. The Organic Chemistry sequence, Analytical Chemistry and Instrumental Analysis should be taken in the sophomore year. The Biochemistry sequence should be taken in their junior year. Advanced courses in Chemistry and courses in biology may be taken as soon as students have met the appropriate prerequisites.

Students are advised to talk with their advisor before double majoring, because some major combinations are prohibited. No more than 50% of the credits that apply to one major may be drawn from another major.