BIOCHEMISTRY (BA)

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.

Learning Outcomes

Students will be able to:

- Perform experiments in the domain of biochemistry, using discipline specific techniques.
- Apply proper safety protocols for biochemical laboratory environments.
- Responsibly collect, analyze, and represent scientific data from biochemical experiments.
- Proficiently explain and apply, in writing, core biochemical principles to the results of biochemical 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 “Modern Language Option” of the Liberal Studies Program. While Bachelor of Science (BS) students are not required to demonstrate competency in a modern language, the “Modern Language 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 Modern Language 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.
Junior Year

Experiential Learning

CHE 392  INTERNSHIP  4

or

CHE 397  RESEARCH  4

Senior Year

CHE 330  SENIOR CAPSTONE IN THE PHYSICAL SCIENCES 1,2  4

1 Students must earn a C- or better in this course.

2 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) ([link](https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/arts-and-literature/))

- 3 Courses Required

Historical Inquiry (HI) ([link](https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/historical-inquiry/))

- 2 Courses Required

Philosophical Inquiry (PI) ([link](https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/philosophical-inquiry/))

- 2 Courses Required

Religious Dimensions (RD) ([link](https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/religious-dimensions/))

- 2 Courses Required

Scientific Inquiry (SI) ([link](https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/scientific-inquiry/))

- Not required

Social, Cultural, and Behavioral Inquiry (SCBI) ([link](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.

In addition, the Department of Chemistry recommends that students who are seeking accreditation by the American Chemical Society fulfill the Modern Language Option by completing a three-course language sequence. Please see an advisor for further information.

Major Requirements

Course Requirements

Common Core

All students pursuing a Bachelor of Arts in Biochemistry 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:

Introductory Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Quarter Hours</th>
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<tbody>
<tr>
<td>Select one of the following:</td>
<td></td>
<td>4-6</td>
</tr>
<tr>
<td>CHE 130 &amp; CHE 131</td>
<td>GENERAL CHEMISTRY I and GENERAL CHEMISTRY I LABORATORY</td>
<td></td>
</tr>
<tr>
<td>CHE 120 &amp; CHE 131</td>
<td>GENERAL CHEMISTRY II and GENERAL CHEMISTRY II LABORATORY</td>
<td></td>
</tr>
</tbody>
</table>

Select one of the following: 4-6

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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</tr>
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<tbody>
<tr>
<td>CHE 132 &amp; CHE 133</td>
<td>GENERAL CHEMISTRY III and GENERAL CHEMISTRY III LABORATORY</td>
<td></td>
</tr>
<tr>
<td>CHE 122 &amp; CHE 133</td>
<td>GENERAL CHEMISTRY IIP and GENERAL CHEMISTRY IIP LABORATORY</td>
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</tr>
<tr>
<td>CHE 134 &amp; CHE 135</td>
<td>GENERAL CHEMISTRY IV and GENERAL CHEMISTRY IV LABORATORY</td>
<td>4</td>
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The department offers General Chemistry each 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

<table>
<thead>
<tr>
<th>Course</th>
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<th>Quarter Hours</th>
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</thead>
<tbody>
<tr>
<td>CHE 204 &amp; CHE 205</td>
<td>ANALYTICAL CHEMISTRY and ANALYTICAL CHEMISTRY LABORATORY</td>
<td>4</td>
</tr>
<tr>
<td>CHE 230 &amp; CHE 231</td>
<td>ORGANIC CHEMISTRY I and ORGANIC CHEMISTRY I LABORATORY</td>
<td>4</td>
</tr>
<tr>
<td>CHE 232 &amp; CHE 233</td>
<td>ORGANIC CHEMISTRY II and ORGANIC CHEMISTRY II LABORATORY</td>
<td>4</td>
</tr>
<tr>
<td>CHE 234 &amp; CHE 235</td>
<td>ORGANIC CHEMISTRY III and ORGANIC CHEMISTRY III LABORATORY</td>
<td>4</td>
</tr>
<tr>
<td>CHE 261</td>
<td>INSTRUMENTAL ANALYSIS (lecture and lab)</td>
<td>4</td>
</tr>
<tr>
<td>CHE 308 &amp; CHE 309</td>
<td>PHYSICAL CHEMISTRY FOR BIOLOGICAL SCIENCE and PHYSICAL CHEMISTRY FOR BIOLOGICAL SCIENCES LAB</td>
<td>4</td>
</tr>
</tbody>
</table>
Biochemistry (BA)

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 Course

Course Title Quarter Hours

CHE 342 BIOCHEMISTRY II and EXPERIMENTAL BIOCHEMISTRY II 4

Biology

One year of General Biology, 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

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 five course sequences offered by the Department of Mathematical Sciences:

Course Title Quarter Hours

Sequence One
MAT 147 CALCULUS WITH INTEGRATED PRECALCULUS I 6
MAT 148 CALCULUS WITH INTEGRATED PRECALCULUS II 6
MAT 149 CALCULUS WITH INTEGRATED PRECALCULUS III 6

Sequence Two
MAT 150 CALCULUS I 4
MAT 151 CALCULUS II 4
MAT 152 CALCULUS III 4

Sequence Three
MAT 160 CALCULUS FOR MATHEMATICS AND SCIENCE MAJORS I 5
MAT 161 CALCULUS FOR MATHEMATICS AND SCIENCE MAJORS II 5
MAT 162 CALCULUS FOR MATHEMATICS AND SCIENCE MAJORS III 5

Sequence Four
MAT 170 CALCULUS FOR LIFE SCIENCES I 5
MAT 171 CALCULUS FOR LIFE SCIENCES II 5
MAT 172 CALCULUS III WITH DIFFERENTIAL EQUATIONS 5

Sequence Five
MAT 155 SUMMER CALCULUS I 6
MAT 156 SUMMER CALCULUS II 6

Students interested in earning credit for multi-variable calculus should not take the MAT 170/171/172 sequence. Business calculus cannot be substituted for any of the sequences above.

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

Sequence One
PHY 170 UNIVERSITY PHYSICS I 4
PHY 171 UNIVERSITY PHYSICS II 4
PHY 172 UNIVERSITY PHYSICS III 4

Sequence Two
PHY 150 GENERAL PHYSICS I 4
PHY 151 GENERAL PHYSICS II 4
PHY 152 GENERAL PHYSICS III 4

Open Electives

Open elective credit also is 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 and successfully complete the General Chemistry placement examination. 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 are typically 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 may be taken as soon as students have met the appropriate prerequisites.