

BIOCHEMISTRY, B.A.

Saint Louis University's Bachelor of Arts in Biochemistry is designed for students interested in the applications of chemistry to the life sciences. The program prepares students for professional schools such as medicine, dentistry, law and pharmacy, and provides excellent preparation for those interested in working in biochemistry, molecular biology or biotechnology.

SLU's chemistry department places great emphasis on participation in undergraduate research, and biochemistry majors have ample opportunities to involve themselves in research projects under the close mentorship of a full-time faculty member. Students will also be able to use a variety of specialized equipment and computers in instructional and research laboratories.

Other highlights include:

- A rigorous program that makes graduates competitive for employment in STEM areas.
- Opportunities for students to strengthen their scientific communication skills through research activities that pair an undergraduate student with a faculty researcher.
- A unique mentoring program that lasts from freshman to senior year that provides guidance and support for students in reaching their professional goals.
- Annual department-hosted social events and a chemistry club for interested students.

Curriculum Overview

- **First year:** General Chemistry 1 and 2, Calculus I and II, Principles of Biology I and II
- **Second year:** Organic Chemistry 1 and 2, Analytical Chemistry 1
- **Third year:** Biochemistry 1 and 2, Engineering Physics I and II
- **Fourth year:** Principles of Genetics, Physical Chemistry 1 or 2, two chemistry electives

Fieldwork and Research Opportunities

Benefits of SLU's biochemistry program also include internship and career opportunities. Selected undergraduate students may be considered to work with faculty members as laboratory assistants in undergraduate laboratories and receive a stipend.

Undergraduates who study biochemistry at SLU can attend professional meetings and present their research results. In recent years, SLU students have presented numerous talks and poster presentations at regional and national meetings of the American Chemical Society and other scientific conferences.

Careers

Career options in biochemistry include:

- Teaching at the university, college or high school level
- Chemical research and development in industry or government laboratories
- Pharmaceutical research
- Drug discovery and drug development
- Biotechnology
- Environmental research

- Management and administration in the chemical industry
- Chemical and pharmaceutical sales
- Patent law and environmental law
- Opportunities in the public health sector

A degree in biochemistry is excellent preparation for students wishing to continue their education in graduate school studying chemistry, biochemistry and health-related areas such as pharmacology and toxicology, as well as in professional schools studying medicine, law, pharmacy or dentistry.

Admission Requirements

Freshman

Begin your application for this program at www.slu.edu/apply. Saint Louis University also accepts the Common App.

All applications are thoroughly reviewed with the highest degree of individual care and consideration to all credentials that are submitted. Solid academic performance in college preparatory course work is a primary concern in reviewing a freshman applicant's file. College admission test scores (ACT or SAT) are used as an additional indicator of the student's ability to meet the academic rigors of Saint Louis University and are used as qualifiers for certain University scholarship programs. To be considered for admission to any Saint Louis University undergraduate program, the applicant must be graduating from an accredited high school or have an acceptable score on the General Education Development (GED) test.

Begin Your Application (<http://www.slu.edu/apply.php>)

Transfer

Begin your application for this program at www.slu.edu/apply.

Applicants must be a graduate of an accredited high school or have an acceptable score on the GED. An official high school transcript and official test scores are required only of those students who have attempted fewer than 24 transferable semester credits (or 30 quarter credits) of college credit. Those having completed 24 or more of college credit need only submit a transcript from previously attended college(s). In reviewing a transfer applicant's file, the office of admission holistically examines the student's academic performance in college-level coursework as an indicator of the student's ability to meet the academic rigors of Saint Louis University.

International Applicants

Begin your application for this program at www.slu.edu/apply.

All admission policies and requirements for domestic students apply to international students along with the following:

- Demonstrate English Language Proficiency (<http://catalog.slu.edu/academic-policies/office-admission/undergraduate/english-language-proficiency>)
- Proof of financial support must include:
 - A letter of financial support from the person(s) or sponsoring agency funding the time at Saint Louis University
 - A letter from the sponsor's bank verifying that the funds are available and will be so for the duration of study at the University
- Academic records, in English translation, of students who have undertaken postsecondary studies outside the United States must include the courses taken and/or lectures attended, practical

laboratory work, the maximum and minimum grades attainable, the grades earned or the results of all end-of-term examinations, and any honors or degrees received. WES and ECE transcripts are accepted.

Scholarships and Financial Aid

There are two principal ways to help finance a Saint Louis University education:

- Scholarships: awarded based on academic achievement, service, leadership and financial need.
- Financial Aid: provided in the form of grants and loans, some of which require repayment.

For priority consideration for merit-based scholarships, applicants should apply for admission by Dec. 1 and complete a Free Application for Federal Student Aid (FAFSA) by March 1.

For information on other scholarships and financial aid, visit the student financial services office online at <https://finaid.slu.edu>.

Learning Outcomes

1. Graduates will be able to demonstrate a foundational understanding of organic, analytical and physical chemistry, and advanced knowledge in biochemistry.
2. Graduates will be able to demonstrate proficiency of basic (general, organic, analytical and biochemistry) laboratory techniques and conduct laboratory experiments safely.
3. Graduates will be able to collect, interpret and analyze quantitative data.
4. Graduates will be able to communicate scientific results effectively.

Requirements

Biochemistry students must complete a minimum total of **63 credit hours** for the B.A. major.

Code	Title	Credits
Core Requirements		
College core requirements (p. 2)		57-66
For additional information about core courses (http://catalog.slu.edu/colleges-schools/arts-sciences/#coretext)		
Required Courses		
BIOL 1240 & BIOL 1245	Principles of Biology I and Principles of Biology I Laboratory	4
BIOL 1260 & BIOL 1265	Principles of Biology II and Principles of Biology II Laboratory	4
BIOL 3030	Principles of Genetics	3
CHEM 1130 & CHEM 1115	General Chemistry 1 for Majors and General Chemistry 1 Laboratory	4
CHEM 1140 & CHEM 1125	General Chemistry 2 for Majors and General Chemistry 2 Laboratory	4
CHEM 2200 & CHEM 2205	Analytical Chemistry 1 and Analytical Chemistry 1 Laboratory	4
CHEM 2430 & CHEM 2435	Organic Chemistry 1 for Majors and Organic Chemistry 1 Lab for Majors	4
CHEM 2440 & CHEM 2445	Organic Chemistry 2 for Majors and Organic Chemistry 2 Laboratory for Majors	4
CHEM 3330	Physical Chemistry 1 (or CHEM 3000 or higher)	3
CHEM 3340	Physical Chemistry 2 (or CHEM 3000 or higher)	3

CHEM 4610 & CHEM 4615	Biochemistry 1 and Biochemistry 1 Laboratory	4
CHEM 4620	Biochemistry 2	3
MATH 1510	Calculus I †	4
MATH 1520	Calculus II	4
PHYS 1610 & PHYS 1620	Engineering Physics I and Engineering Physics I Laboratory †‡	4
PHYS 1630 & PHYS 1640	Engineering Physics II and Engineering Physics II Laboratory †	4
CHEM 3000 or higher elective		3
General Electives		8
Total Credits		120-121

† Engineering Physics I and II with lab are recommended for majors unless they are pre-medical. PHYS 1310 Physics I, PHYS 1320 Physics I Laboratory, PHYS 1330 Physics II, and PHYS 1340 Physics II Laboratory) also fulfill the physics requirement and are recommended for pre-medical students.

‡ In addition to the major this course fulfills the A&S college core requirements

Non-Course Requirements

All undergraduate majors must complete an exit interview with the department chair during their final semester.

Continuation Standards

The following standards apply to all new freshmen and transfer students:

- Students must earn C- or better in CHEM 1110 General Chemistry 1 or CHEM 1130 General Chemistry 1 for Majors) and a C- or better in CHEM 1120 General Chemistry 2 or CHEM 1140 General Chemistry 2 for Majors), or the equivalent in transfer.
- Students must earn a C- or better in CHEM 2200 Analytical Chemistry 1.

Students who do not earn a C- in any of the identified courses must retake the course at SLU in the following semester. If a C- is not earned on the second attempt the student will be dismissed from the major. A student who withdraws from one of these courses on the first attempt thus has one more attempt to earn a C-.

Students must maintain a 2.00 GPA in their major (CHEM) and required related courses (BIOL, PHYS, MATH, etc.) If a student falls below a 2.00 major GPA the student must meet with the undergraduate program director to review their academic performance. If the student cannot raise the major GPA to 2.0 in two semesters, the student will be dismissed from the major.

Bachelor of Arts Core Curriculum Requirements

Code	Title	Credits
Core Components and Credits		
Foundations of Discourse (http://catalog.slu.edu/colleges-schools/arts-sciences/ba-core/foundations-discourse)		3
Diversity in the U.S. (http://catalog.slu.edu/colleges-schools/arts-sciences/ba-core/cultural-diversity)		3
Global Citizenship (http://catalog.slu.edu/colleges-schools/arts-sciences/ba-core/global-citizenship)		3
Foreign Language (http://catalog.slu.edu/colleges-schools/arts-sciences/ba-core/foreign-language)		0-9

Fine Arts (http://catalog.slu.edu/colleges-schools/arts-sciences/ba-core/fine-arts)	3
Literature (http://catalog.slu.edu/colleges-schools/arts-sciences/ba-core/literature)	6
Mathematics (http://catalog.slu.edu/colleges-schools/arts-sciences/ba-core/mathematics)	3
Natural Science (http://catalog.slu.edu/colleges-schools/arts-sciences/ba-core/sciences)	6
Philosophy (http://catalog.slu.edu/colleges-schools/arts-sciences/ba-core/philosophy)	9
Social Science (http://catalog.slu.edu/colleges-schools/arts-sciences/ba-core/social-science)	6
Theology (http://catalog.slu.edu/colleges-schools/arts-sciences/ba-core/theology)	9
World History (http://catalog.slu.edu/colleges-schools/arts-sciences/ba-core/world-history)	6
Total Credits	57-66

Graduation Requirements

- Complete a minimum of 120 credits (excluding pre-college level courses [numbered below 1000]).
- Complete either the College of Arts and Sciences Bachelor of Arts or Bachelor of Science Core Curriculum Requirements
- Complete Major Requirements: minimum 30 credits required.
- Complete remaining credits with a second major, minor, certificate, and/or elective credits to reach the minimum of 120 credits required for graduation.
- Courses listed under the intensive English program do not count toward graduation requirements. EAP 1500 College Composition for International Students (3 cr), EAP 1900 Rhetoric & Research Strategies (3 cr) and EAP 2850 Nation, Identity and Literature (3 cr) count toward graduation requirements as equivalents to Department of English courses. In addition to those courses, six credits from EAP/MLNG courses at the 1000 level or higher may count toward graduation requirements
- Achieve at least a 2.00 cumulative grade point average, a 2.00 grade point average in the major(s) and a 2.00 grade point average in the minor/certificate, or related elective credits.
- Complete Dept/Program specific academic and performance requirements.
- Complete at least 50% of the coursework for the major and 75% for the minor/certificate through Saint Louis University or an approved study abroad program.
- Complete 30 of the final 36 credits through Saint Louis University or an approved study abroad program.
- Complete an online degree application by the required University deadline.

Roadmap

Course	Title	Credits
Year One		
Fall		
CHEM 1130	General Chemistry 1 for Majors	3
CHEM 1115	General Chemistry 1 Laboratory	1
MATH 1510	Calculus I	4
BIOL 1240	Principles of Biology I	3
BIOL 1245	Principles of Biology I Laboratory	1

A&S Core		3
Credits		15
Spring		
CHEM 1140	General Chemistry 2 for Majors	3
CHEM 1125	General Chemistry 2 Laboratory	1
MATH 1520	Calculus II	4
BIOL 1260	Principles of Biology II	3
BIOL 1265	Principles of Biology II Laboratory	1
A&S Core		3
Credits		15
Year Two		
Fall		
CHEM 2430	Organic Chemistry 1 for Majors	3
CHEM 2435	Organic Chemistry 1 Lab for Majors	1
CHEM 2200	Analytical Chemistry 1	2
CHEM 2205	Analytical Chemistry 1 Laboratory	2
A&S Core		3
A&S Core		3
Credits		14
Spring		
CHEM 2440	Organic Chemistry 2 for Majors	3
CHEM 2445	Organic Chemistry 2 Laboratory for Majors	1
A&S Core		3
A&S Core		3
A&S Core		3
A&S Core		3
Credits		16
Year Three		
Fall		
CHEM 4610	Biochemistry 1	3
CHEM 4615	Biochemistry 1 Laboratory	1
PHYS 1610	Engineering Physics I	3
PHYS 1620	Engineering Physics I Laboratory	1
A&S Core		3
A&S Core		3
A&S Core		3
Credits		17
Spring		
CHEM 4620	Biochemistry 2	3
PHYS 1630	Engineering Physics II	3
PHYS 1640	Engineering Physics II Laboratory	1
A&S Core		3
A&S Core		3
Credits		13
Year Four		
Fall		
CHEM 3330	Physical Chemistry 1 (or CHEM 3XXX Elective) ¹	3
BIOL 3030	Principles of Genetics	3
A&S Core		3
A&S Core		3

A&S Core		3
	Credits	15
Spring		
Completion of Exit Interview		
CHEM 3340	Physical Chemistry 2 (or CHEM 3XXX Elective) ¹	3
CHEM 3XXX	Elective	3
A&S Core		3
A&S Core		3
Elective		3
	Credits	15
	Total Credits	120

¹ At least one semester of Physical Chemistry is required

Program Notes

Engineering Physics (PHYS 1610 Engineering Physics I (3 cr)-PHYS 1640 Engineering Physics II Laboratory (1 cr)) is recommended. However, Physics (PHYS 1310 Physics I (3 cr)-PHYS 1340 Physics II Laboratory (1 cr)) also fulfills the physics requirement.