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 Department of Chemistry 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 specialized equipment and computers in instructional and research laboratories.

Program Highlights

- A rigorous program that makes graduates competitive for employment in STEM areas.
- Students can 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 provides guidance and support for students to reach their professional goals.
- Monthly and 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

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

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

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 who want to continue their education in graduate school studying chemistry, biochemistry and health-related areas such as pharmacology and toxicology, and in professional schools studying medicine, law, pharmacy or dentistry.

Admission Requirements

Begin Your Application (https://www.slu.edu/apply.php)

Saint Louis University also accepts the Common Application.

Freshman

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 coursework is a primary concern in reviewing a freshman applicant's file.

To be considered for admission to any Saint Louis University undergraduate program, applicants must be graduating from an accredited high school, have an acceptable HiSET exam score or take the General Education Development (GED) test.

Transfer

Applicants must be a graduate of an accredited high school or have an acceptable score on the GED or HiSET.

Students who have attempted fewer than 24 semester credits (or 30 quarter credits) of college credit must follow the above freshmen admission requirements. Students who have completed 24 or more semester credits (or 30 quarter credits) of college credit must submit transcripts from all 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. Where applicable, transfer students will be evaluated on any courses outlined in the continuation standards of their preferred major.

International Applicants

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

- Demonstrate English Language Proficiency (https://catalog.slu.edu/academic-policies/office-admission/undergraduate/english-language-proficiency/)
- All academic records must include an English translation. An official course-by-course transcript evaluation may be required and accepted.

Tuition

Tuition/Fee	Cost Per Year
Undergraduate Tuition	$56,960

Additional charges may apply. Other resources are listed below:

Net Price Calculator (https://www.slu.edu/financial-aid/tuition-and-costs/calculator.php)

Information on Tuition and Fees (https://catalog.slu.edu/academic-policies/student-financial-services/tuition/)

Miscellaneous Fees (https://catalog.slu.edu/academic-policies/student-financial-services/fees/)

Information on Summer Tuition (https://catalog.slu.edu/academic-policies/student-financial-services/tuition-summer/)

Scholarships and Financial Aid

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

- **Scholarships:** Scholarships are awarded based on academic achievement, service, leadership and financial need.
- **Financial Aid:** Financial aid is provided through grants and loans, some of which require repayment.

Saint Louis University makes every effort to keep our education affordable. In fiscal year 2023, 99% of first-time freshmen and 92% of all students received financial aid (https://www.slu.edu/financial-aid/) and students received more than $459 million in aid University-wide.

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

For more information on scholarships and financial aid, visit the Office of Student Financial Services (https://www.slu.edu/financial-aid/).

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 in 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 59 credits for the B.A. major.

Code	Title	Credits
University Undergraduate Core (https://catalog.slu.edu/academic-policies/academic-policies-procedures/university-core/)		**32-35**
Major Requirements		
BIOL 1240 & BIOL 1245	General Biology: Information Flow and Evolution and Principles of Biology I Laboratory	4
BIOL 1260 & BIOL 1265	General Biology: Transformations of Energy and Matter and Principles of Biology II Laboratory	4
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 1520	Calculus II	4
PHYS 1610 & PHYS 1620	University Physics I and University Physics I Laboratory [1]	4
PHYS 1630 & PHYS 1640	University Physics II and University Physics II Laboratory [1]	4
Required biological elective [2]		*3*
Select 3 credits of electives from the approved list [2]		
CHEM 3000 or higher elective (excluding CHEM 3600)		3
General Electives		**30-33**
Total Credits		**120**

[1] Engineering Physics I and II with lab are recommended for majors unless they are pre-medical. PHYS 1310 College Physics I, PHYS 1320 College 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.

[2] BIOL 3010 Evolutionary Biology (3 cr), BIOL 3030 Principles of Genetics (0,3 cr), BIOL 3400X Introduction to Neuroscience 1: Cellular, Molecular and Systemic (3 cr), BIOL 4070 Advanced Biological Chemistry (3 cr), BIOL 4250 Neurobiology of Disease (3 cr), BIOL 4430 Principles of Virology (3 cr), BIOL 4460 Exercise Physiology (3 cr), BIOL 4520 Biochemical Pharmacology (3 cr), BIOL 4540 Human Systemic Physiology (3 cr), BIOL 4600 Developmental Biology (3 cr), BIOL 4630 Foundations of Immunobiology (3 cr), BIOL 4640 General Microbiology (3 cr), BIOL 4720 Cancer Biology (3 cr), BME 2200 Applied Physiology for Engineers (3 cr), PPY 2540 Human Physiology (4 cr), PPY 4410 Molecular Pharmacology (3 cr)

Non-Course Requirements

All School of Science and Engineering B.A. and B.S. students must complete an exit interview/survey near the end of their bachelor's program.

Continuation Standards

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

- Students must earn a "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.

Roadmap

Roadmaps are recommended semester-by-semester plans of study for programs and assume full-time enrollment unless otherwise noted.

Courses and milestones designated as critical (marked with !) must be completed in the semester listed to ensure a timely graduation. Transfer credit may change the roadmap.

This roadmap should not be used in the place of regular academic advising appointments. All students are encouraged to meet with their advisor/mentor each semester. Requirements, course availability and sequencing are subject to change.

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	General Biology: Information Flow and Evolution	3
BIOL 1245	Principles of Biology I Laboratory	1
University 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	General Biology: Transformations of Energy and Matter	3
BIOL 1265	Principles of Biology II Laboratory	1
University 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	3
CHEM 2205	Analytical Chemistry 1 Laboratory	1
University Core		6
	Credits	**14**
Spring		
CHEM 2440	Organic Chemistry 2 for Majors	3
CHEM 2445	Organic Chemistry 2 Laboratory for Majors	1
University Core		6
General Electives		6
	Credits	**16**
Year Three		
Fall		
CHEM 4610	Biochemistry 1	3
CHEM 4615	Biochemistry 1 Laboratory	1
PHYS 1610	University Physics I	3
PHYS 1620	University Physics I Laboratory	1
University Core		6
	Credits	**14**
Spring		
CHEM 4620	Biochemistry 2	3
PHYS 1630	University Physics II	3
PHYS 1640	University Physics II Laboratory	1
University Core		6
General Elective		3
	Credits	**16**
Year Four		
Fall		
CHEM 3330	Physical Chemistry 1 (or CHEM 3XXX Elective) [1]	3
Required biological elective [2]		3
University Core		4
General Electives		6
	Credits	**16**
Spring		
Completion of Exit Interview		
CHEM 3340	Physical Chemistry 2 (or CHEM 3XXX Elective) [1]	3
CHEM 3XXX	Elective	3
General Electives		8
	Credits	**14**
	Total Credits	**120**

1. At least one semester of Physical Chemistry is required.
2. Select 3 credits of electives from the approved list: BIOL 3010 Evolutionary Biology (0,3 cr), BIOL 3030 Principles of Genetics (0,3 cr), BIOL 3400X Introduction to Neuroscience 1: Cellular, Molecular and Systemic (3 cr), BIOL 4070 Advanced Biological Chemistry (3 cr), BIOL 4250 Neurobiology of Disease (3 cr), BIOL 4430 Principles of Virology (3 cr), BIOL 4460 Exercise Physiology (3 cr), BIOL 4520 Biochemical Pharmacology (3 cr), BIOL 4540 Human Systemic Physiology (3 cr), BIOL 4600 Developmental Biology (3 cr), BIOL 4630 Foundations of Immunobiology (3 cr), BIOL 4640 General Microbiology (3 cr), BIOL 4720 Cancer Biology (3 cr), BME 2200 Applied Physiology for Engineers (3 cr), PPY 2540 Human Physiology (4 cr), PPY 4410 Molecular Pharmacology (3 cr)

Program Notes

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

2+SLU

2+SLU programs provide a guided pathway for students transferring from a partner institution.

Biochemistry, B.A. (STLCC 2+SLU) (https://catalog.slu.edu/academic-policies/office-admission/undergraduate/2plusslu/stlcc/biochemistry/)