CHEMISTRY, B.S.

The B.S. in Chemistry provides excellent preparation for students seeking employment in industry (chemical, pharmaceutical, agriculture, etc.) or the government (Department of Defense labs, regulatory agencies, law enforcement) as well as for those wishing to continue their studies in professional school (medical, dental, veterinary, law, etc.) and graduate school.

The Department of Chemistry places a great emphasis on undergraduate research. Thus, chemistry majors have ample opportunity to pursue research projects under the close mentorship of a full-time faculty member. Students use a variety of specialized equipment and computers in their laboratories and in their research. Students in upper-level chemistry courses enjoy small classes and personalized attention.

Other highlights include:

• The chemistry program provides a rigorous program, which makes graduates competitive for employment in STEM areas.
• The chemistry program provides opportunities for students to strengthen their scientific communication skills through research activities that pair an undergraduate with a faculty researcher.
• We offer a unique mentoring program freshman through senior year to provide guidance and support students in reaching their professional goals.

Curriculum Overview

• First year: General Chemistry 1 and 2, Calculus I and II
• Second year: Organic Chemistry 1 and 2, Analytical Chemistry 1, Engineering Physics I and II
• Third year: Physical Chemistry 1 and 2, Biochemistry, physical chemistry lab, Organic Spectroscopy, Chemical Literature, undergraduate research
• Fourth year: Analytical Chemistry 2 and 3, General Biochemistry, Inorganic Chemistry, inorganic chemistry lab, undergraduate research, and Mathematical Techniques in Chemistry

Fieldwork and Research Opportunities

Benefits of this program also include internship and career opportunities. Selected undergraduate students can apply to work with faculty in undergraduate laboratories as laboratory assistants. Lab assistants receive a stipend. Internships in the St. Louis area are also available.

Undergraduates who study chemistry at SLU can attend professional school (medical, dental, veterinary, law, etc.) and graduate school.

Careers

Career options in chemistry include:

• Education
• Chemical research and development in industry or government laboratories
• Pharmaceutical research and drug development
• Environmental research

• Management and administration in the chemical industry
• Chemical and pharmaceutical sales

Other graduates continue through law school and specialize in patent law or environmental law. The public health sector is also a common area for chemists to work.

Admission Requirements

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 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.

Transfer

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

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 http://finaid.slu.edu.

Accreditation

The Bachelor of Science in Chemistry has been continuously certified by the American Chemical Society since 1946.

Learning Outcomes

1. Graduates will be able to demonstrate a foundational understanding of inorganic, physical, and biochemistry and advanced knowledge in organic and analytical chemistry.

2. Graduates will be able to demonstrate proficiency of basic (general, physical, inorganic) and advanced (organic and analytical) 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, especially through written reports and oral presentations.

5. Graduates will be able to design and conduct independent research.

Requirements

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MATH 1510</td>
<td>Calculus I</td>
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<tr>
<td>PHYS 1610 &amp; PHYS 1620</td>
<td>Engineering Physics I and Engineering Physics I Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 1630 &amp; PHYS 1640</td>
<td>Engineering Physics II and Engineering Physics II Laboratory</td>
<td>4</td>
</tr>
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<td>Total Credits</td>
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¹ Students take 3 semesters, 1 credit per semester
² Engineering Physics I and II with lab are recommended for majors unless they are pre-medical. Physics I and II with lab (PHYS 1310 Physics I (3 cr), PHYS 1320 Physics Laboratory (1 cr), PHYS 1330 Physics II (3 cr), and PHYS 1340 Physics II Laboratory (1 cr)) also fulfill the physics requirement and are recommended for pre-medical students.

For any of the B.S. programs, a combination of MATH 2530 Calculus III (4 cr) and MATH 3110 Linear Algebra for Engineers (3 cr) can be used as a substitute for CHEM 4300 Mathematical Techniques in Chemistry (3 cr).

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 General Chemistry I (CHEM 1110 General Chemistry 1 (0.3 cr)/CHEM 1130 General Chemistry 1 for Majors (0.3 cr)) and a C- or better in General Chemistry II (CHEM 1120 General Chemistry 2 (0.3 cr), CHEM 1140 General Chemistry 2 for Majors (0.3 cr)), or the equivalent in transfer.

• Students must earn a C- or better in CHEM 2200 Analytical Chemistry 1 (2 cr).

Students who do not earn a C- in any of the identified courses must re-take 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 2.0 GPA in their major (CHEM) and required related courses (BIOL, PHYS, MATH, etc.) If a student falls below a 2.0 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 Science Core Curriculum Requirements

<table>
<thead>
<tr>
<th>Code</th>
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<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CHEM 3100</td>
<td>The Chemical Literature</td>
<td>1</td>
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<tr>
<td>CHEM 3970</td>
<td>Undergraduate Research ¹</td>
<td>3</td>
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<tr>
<td>CHEM 4500 &amp; CHEM 4505</td>
<td>Inorganic Chemistry and Inorganic Chemistry Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 4200 &amp; CHEM 4205</td>
<td>Analytical Chemistry 2 and Analytical Chemistry 2 Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 4300</td>
<td>Mathematical Techniques in Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 4400</td>
<td>Organic Spectroscopy</td>
<td>3</td>
</tr>
<tr>
<td>MATH 1510</td>
<td>Calculus I</td>
<td>4</td>
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¹ Foundations of Discourse (http://catalog.slu.edu/colleges-schools/arts-sciences/ba-core/foundations-discourse) 3
² Diversity in the U.S. (http://catalog.slu.edu/colleges-schools/arts-sciences/ba-core/cultural-diversity) 3
³ Global Citizenship (http://catalog.slu.edu/colleges-schools/arts-sciences/ba-core/global-citizenship) 3
⁴ Foreign Language (http://catalog.slu.edu/colleges-schools/arts-sciences/ba-core/foreign-language) 0-9
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
A&S Core 3
A&S Core 3

Credits 14

Spring
CHEM 1140 General Chemistry 2 for Majors 3

Year Two

Fall
CHEM 2430 Organic Chemistry 1 for Majors 3
CHEM 2435 Organic Chemistry 1 Lab for Majors 1
PHYS 1610 Engineering Physics I 3
PHYS 1620 Engineering Physics I Laboratory 1
A&S Core 3
A&S Core 3

Credits 14

Spring
CHEM 2200 Analytical Chemistry 1 2
CHEM 2205 Analytical Chemistry 1 Laboratory 2
CHEM 2440 Organic Chemistry 2 for Majors 3
CHEM 2445 Organic Chemistry 2 Laboratory for Majors 1
PHYS 1630 Engineering Physics II 3
PHYS 1640 Engineering Physics II Laboratory 1
A&S Core 3

Credits 15

Year Three

Fall
CHEM 3330 Physical Chemistry 1 3
CHEM 3100 The Chemical Literature 1
A&S Core 3
A&S Core 3
A&S Core 3
A&S Core 3

Credits 16

Spring
CHEM 3340 Physical Chemistry 2 3
CHEM 3345 Physical Chemistry Laboratory 1
CHEM 4400 Organic Spectroscopy 3
CHEM 3970 Undergraduate Research 1
A&S Core 3
A&S Core 3
A&S Core 3
A&S Core 3

Credits 17

Year Four

Fall
CHEM 4500 Inorganic Chemistry 3
CHEM 4200 Analytical Chemistry 2 3
CHEM 4205 Analytical Chemistry 2 Laboratory 1
CHEM 3970 Undergraduate Research 1
Elective 3
Elective 3
Elective 3

Credits 17

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.
Spring
Completion of Exit Interview
Completion of Undergraduate Thesis

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CHEM 3600</td>
<td>Principles of Biochemistry</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 4300</td>
<td>Mathematical Techniques in Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 4505</td>
<td>Inorganic Chemistry Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 3970</td>
<td>Undergraduate Research</td>
<td>1</td>
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<tr>
<td>Elective</td>
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<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

Credits 14

Total Credits 121

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.