BIOLOGY, B.A.

Biology is a dynamic science aimed at gaining a better understanding of living organisms and how they interact with the environment. Biological research seeks to answer a broad range of questions, from factors that affect human health to ecological issues.

Saint Louis University's biology program offers courses that emphasize concepts over facts and aim to provide a foundation for careers in the life sciences, health professions, K-12 education and advanced post-graduate study in a broad variety of disciplines. The B.A. in biology degree at Saint Louis University provides maximum flexibility in selecting upper-division courses and is favored by students seeking to have double majors.

SLU's biology program is enriched by interactions with the School of Medicine, Missouri Botanical Garden, Donald Danforth Plant Science Center and Saint Louis Zoo, as well as a growing number of St. Louis-based life science companies. Research experiences and internships provide students with opportunities to study biology beyond the classroom.

The Department of Biology has a field station that provides unique opportunities for students to explore ecology, conservation and environmental science in an Ozark forest ecosystem. The field station offers students opportunities to take a summer class, conduct undergraduate research and participate in a semester-long program of field biology coursework.

Biology students at SLU are encouraged to participate in co-curricular activities. Groups such as Beta Beta Beta, the biology honorary society, and Alpha Epsilon Delta, the pre-professional honor society, are social and academic organizations that further students' interest in biology while exposing them to its relationship with other scientific disciplines.

Curriculum Overview

The undergraduate curriculum in the Department of Biology is diverse and will meet a variety of interests in the rapidly expanding fields of the biological sciences. It is also designed to provide an intensive educational experience for students in other disciplines who have an interest in biology. In addition to courses offered in Macelwane Hall, the department offers courses at the University’s Reis Biological Station located by the Huzzah Creek in the Ozarks.

The Bachelor of Arts degree in biology provides flexibility in selecting upper-level courses and is favored by students interested in double majors.

Fieldwork and Research Opportunities

Benefits of the biology program include several internship and career opportunities. Advanced undergraduate students with good academic records are encouraged to apply for positions as teaching or learning assistants. In addition to stipend, students gain teaching experience and the opportunity to help others become interested in the field of biology.

Biology majors can enroll in courses that provide credit for structured internships through collaborations with a variety of local organizations including the Missouri Botanical Garden, Saint Louis Zoo, Sigma Aldrich, Monsanto and firms in the growing biotechnology field.

Careers

The biology major develops strong critical thinking and problem-solving skills that provide excellent preparation for professional schools, such as:

- Medical school
- Veterinary science school
- Dental school
- Optometry school
- Graduate school in a broad range of disciplines

The skills biology majors gain also open the door to a wide variety of career options in areas such as health care, biotechnology, environmental management, conservation, education and the pharmaceutical industry.

Recent biology majors have been awarded grants from Sigma Xi and the National Science Foundation, as well as prestigious fellowships from the NSF, Fulbright Scholar Program, Mayo Clinic, Smithsonian Institution, NeuroSURF and the American Society for Microbiology.

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 effectively apply core biological concepts to solve problems.
2. Graduates will be able to critically evaluate scientific information from multiple sources, including that from the primary literature.
3. Graduates will be able to apply biological principles to global societal issues.
4. Graduates will be able to draw valid conclusions from quantitative data.
5. Graduates will be able to formulate hypotheses that address research questions.
6. Graduates will be able to correctly perform common laboratory and/or field techniques.

**Requirements**

Biology students must complete a minimum total of 48 credits for the major.

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<thead>
<tr>
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<td>Principles of Biology I</td>
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<td>BIOL 1260</td>
<td>Principles of Biology II</td>
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<td>BIOL 3010</td>
<td>Evolutionary Biology</td>
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<tr>
<td>BIOL 3020</td>
<td>Biochemistry and Molecular Biology</td>
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<td>BIOL 3030</td>
<td>Principles of Genetics</td>
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<tr>
<td>BIOL 3040</td>
<td>Cell Structure &amp; Function</td>
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<td>General Chemistry 1</td>
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<td>CHEM 1120</td>
<td>General Chemistry 2</td>
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<td>MATH 1510</td>
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**Statistics Course**

MATH 1300 Elementary Statistics with Computers
or BIOL 4790 Biometry

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<td>BIOL 3010</td>
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<td>BIOL 3040</td>
<td>Cell Structure &amp; Function</td>
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<td>Calculus I</td>
<td>4</td>
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**Biology Elective Courses**

Select at least one plant science course and a structured laboratory course:

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<td>BIOL 3100</td>
<td>Experiments in Genetics Lab</td>
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<tr>
<td>BIOL 3420</td>
<td>Comparative Anatomy of the Vertebrates</td>
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<td>BIOL 3470</td>
<td>General Physiology Laboratory</td>
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<tr>
<td>BIOL 3480</td>
<td>Exercise Physiology ¹</td>
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<tr>
<td>BIOL 3490</td>
<td>Plant Physiology</td>
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<td>BIOL 4030</td>
<td>Introduction to Genomics</td>
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<tr>
<td>BIOL 4050</td>
<td>Molecular Technique Lab</td>
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<tr>
<td>BIOL 4070</td>
<td>Advanced Biological Chemistry</td>
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<tr>
<td>BIOL 4080</td>
<td>Advanced Cell Biology</td>
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<tr>
<td>BIOL 4150</td>
<td>Nerve Cell Mechanisms in Behavior</td>
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<tr>
<td>BIOL 4160</td>
<td>Microbial Ecology and Molecular Evolution</td>
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<tr>
<td>BIOL 4410</td>
<td>Comparative Animal Physiology</td>
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<tr>
<td>BIOL 4440</td>
<td>Vertebrate Histology: Structure and Function of Tissues</td>
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<td>BIOL 4500</td>
<td>Introductory Endocrinology</td>
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<td>BIOL 4510</td>
<td>Behavioral Endocrinology</td>
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<tr>
<td>BIOL 4540</td>
<td>Human Systemic Physiology</td>
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<td>Developmental Biology</td>
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<td>BIOL 4630</td>
<td>Foundations of Immunobiology</td>
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<td>BIOL 4640</td>
<td>General Microbiology</td>
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<td>BIOL 4700</td>
<td>Molecular Biology</td>
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<td>BIOL 4720</td>
<td>Cancer Biology</td>
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<td>BIOL 3220</td>
<td>Biology of Invertebrates</td>
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<tr>
<td>BIOL 3260</td>
<td>Biology of Plants &amp; Fungi ¹</td>
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<tr>
<td>BIOL 3280</td>
<td>Ethnobotany ¹</td>
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<td>BIOL 3450</td>
<td>Economic Botany ¹</td>
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<td>BIOL 4010</td>
<td>Sex, Evolution, and Behavior</td>
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<tr>
<td>BIOL 4040</td>
<td>Pollination Biology ¹</td>
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<td>BIOL 4090</td>
<td>Plant Ecology ¹</td>
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<td>BIOL 4100</td>
<td>Natural History of Vertebrates</td>
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<td>BIOL 4120</td>
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<td>BIOL 4130</td>
<td>Field Mammalogy</td>
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<td>BIOL 4140</td>
<td>Field Ornithology</td>
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<td>BIOL 4160</td>
<td>Microbial Ecology and Molecular Evolution</td>
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<td>BIOL 4170</td>
<td>Introduction to GIS</td>
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<td>BIOL 4180</td>
<td>Intermediate Geographic Information Systems</td>
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<tr>
<td>BIOL 4190</td>
<td>GIS in Biology</td>
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For additional information about core courses (http://catalog.slu.edu/colleges-schools/arts-sciences/#policytext)

For additional information about core courses (http://catalog.slu.edu/colleges-schools/arts-sciences/#policytext)
Biology and Classification of Orchids
Biology of Amphibians and Reptiles
Biology of Fishes
Biology of Birds
Cave Biology
Spring Flora of the Ozarks
Systematic Biology
Biological Behavior
Spring Flora of the Ozarks
Animal Behavior
Animal Behavior Lab
Biology of Mammals
Systematic Biology Lab
Conservation Biology
Applied Population Genetics
Population Biology
General Ecology
Introduction to Neuroscience I: Cellular, Molecular and Systemic
Neuroscience Laboratory
Principles of Virology
Biochemical Pharmacology
Biological Conflicts
Biometry
Internship in Conservation
Integrated Bioinformatics Internship
Internship in Plant Science
Independent Research
Library Project
Advanced Independent Study

<table>
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<tr>
<td>BIOL 4200</td>
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<td>Biology and Classification of Orchids</td>
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<tr>
<td>BIOL 4260</td>
<td>Biology of Amphibians and Reptiles</td>
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<tr>
<td>BIOL 4280</td>
<td>Biology of Fishes</td>
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<td>BIOL 4310</td>
<td>Biology of Birds</td>
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<td>BIOL 4320</td>
<td>Cave Biology</td>
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<td>BIOL 4350</td>
<td>Biology of Parasitic Organisms</td>
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<td>BIOL 4360</td>
<td>Animal Behavior</td>
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<td>BIOL 4370</td>
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<td>BIOL 4380</td>
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<td>Applied Population Genetics</td>
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<td>Population Biology</td>
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<td>BIOL 4750</td>
<td>General Ecology</td>
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<td>BIOL 4911</td>
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<td>BIOL 4970</td>
<td>Library Project</td>
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<td>BIOL 4980</td>
<td>Advanced Independent Study</td>
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</tbody>
</table>

General Electives  6-15
Total Credits  120

1 Courses that satisfy the plant requirement
2 These courses do not count as structured lab courses nor can they satisfy elective requirements

Independent Research
A total of 3 credits of BIOL 4960 Independent Research (1-3 cr), BIOL 4970 Library Project (1-3 cr), and/or BIOL 4980 Advanced Independent Study (1-4 cr) can be counted toward the B.S. degree. These courses do not count as structured lab courses.

Non-Course Requirements
All Biology majors are required to participate in first and second year mentoring sessions and meet with their mentor when in residence.

Continuation Standards
Students must have a minimum of a 2.00 GPA in their major courses (BIOL) and required related credits (Chemistry, Mathematics & Statistics, Physics etc.) by the conclusion of their freshman year. Students that fall below a 2.00 GPA will be placed on probation. If a student fails to obtain at least a 2.00 GPA in their major courses (BIOL) and required related credits by the conclusion of their sophomore year they will not be allowed to continue in the program.

Bachelor of Arts Core Curriculum Requirements

<table>
<thead>
<tr>
<th>Core Components and Credits</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Foundations of Discourse</td>
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<tr>
<td>Diversity in the U.S.</td>
<td>3</td>
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<tr>
<td>Global Citizenship</td>
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<tr>
<td>Foreign Language</td>
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<tr>
<td>Fine Arts                                    <img src="http://catalog.slu.edu/colleges-schools/arts-sciences/ba-core/fine-arts" alt="Link" /></td>
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<tr>
<td>Literature                                   <img src="http://catalog.slu.edu/colleges-schools/arts-sciences/ba-core/literature" alt="Link" /></td>
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<td>Mathematics                                  <img src="http://catalog.slu.edu/colleges-schools/arts-sciences/ba-core/mathematics" alt="Link" /></td>
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<td>Natural Science                              <img src="http://catalog.slu.edu/colleges-schools/arts-sciences/ba-core/sciences" alt="Link" /></td>
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<td>Philosophy                                   <img src="http://catalog.slu.edu/colleges-schools/arts-sciences/ba-core/philosophy" alt="Link" /></td>
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<td>Theology                                     <img src="http://catalog.slu.edu/colleges-schools/arts-sciences/ba-core/theology" alt="Link" /></td>
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<td>World History                                <img src="http://catalog.slu.edu/colleges-schools/arts-sciences/ba-core/world-history" alt="Link" /></td>
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</table>

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

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.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<td><strong>Fall</strong></td>
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<tr>
<td>Participation in First-year Mentoring Events</td>
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1 See information in Program Notes

Program Notes

Statistics Electives

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BIOL 4200  Aquatic Ecology  4
BIOL 4260  Biology of Amphibians and Reptiles  4
BIOL 4280  Biology of Fishes  4
BIOL 4310  Biology of Birds  1-4
BIOL 4320  Cave Biology  4
BIOL 4330  Spring Flora of the Ozarks  4
BIOL 4350  Biology of Parasitic Organisms  4
BIOL 4370  Animal Behavior Lab  1
BIOL 4380  Biology of Mammals  4
BIOL 4440  Vertebrate Histology: Structure and Function of Tissues  4
BIOL 4610  Developmental Biology Lab  2
BIOL 4650  General Microbiology Laboratory  2

**Plant Electives**

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