

BIOLOGY, PH.D.

Doctoral studies in biology at Saint Louis University emphasize intensive research training under the direction of a member of the graduate faculty. Once biology Ph.D. students at SLU successfully complete the required coursework and the written and oral qualifying examinations, they are expected to design and conduct an original research project and to work independently.

Students are required to present their work at local or national professional meetings and may also be expected to seek external funding to support the research project. Ideally, a student's research will be published in peer-reviewed scientific journals.

Curriculum Overview

SLU's Ph.D. in biology requires a minimum of 36 post-baccalaureate credits, with at least 24 credits of coursework and 12 credits of dissertation research.

Careers

Past biology Ph.D. students at SLU have gone on to careers as research scientists, teachers, university faculty and in various capacities at pharmaceutical companies and government agencies.

Admission Requirements

Suggested courses include biology (a minimum of eighteen [18] upper-division credits); chemistry (a minimum of eight [8] upper-division credits including two semesters of organic chemistry or one semester of organic chemistry and the other of biochemistry); physics (two semesters); mathematics (through a course in calculus). A formal minor is not permitted.

For students interested in ecology, evolution or systematics, additional coursework in some of the following areas is also recommended: genetics, general ecology, evolution, introductory statistics, general botany, and a taxonomically oriented course. For students interested in cell or molecular biology, additional coursework in some of the following areas is recommended: genetics, biochemistry, cell biology, physiology, molecular biology, microbiology or immunology.

Previous laboratory and research experience preferred.

Application Requirements

- Application form and fee
- Three letters of recommendation
- Transcript(s)
- Résumé
- Goal statement
- Interview (desired)

Requirements for International Students

All Saint Louis University admission policies and requirements for domestic students apply to international students. International students applying to SLU must also meet the following additional requirements:

- Demonstrate English language proficiency (<https://catalog.slu.edu/academic-policies/office-admission/undergraduate/english-language-proficiency/>)

- Academic records must include an English translation. Unofficial copies may be accepted in some cases for initial admission review, however official copies must be received prior to enrollment. Course-by-course transcript evaluations are accepted and are required in some cases.

Students must submit financial documents to be issued an I-20 for their F-1 visa application. Proof of financial support must include:

- A letter of financial support from the person(s) or sponsoring agency funding the student's 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 the student's study at the University

Assistantship Application Deadline

Students who want to be considered for an assistantship should submit their application by Dec. 15. Applications submitted after this deadline will be considered if assistantships are available.

Review Process

Faculty committee members examine each applicant's materials and make recommendations. Consideration is given to matching applicant interests with faculty research areas.

Applicants should outline their research goals in their professional goals statement. Additionally, they should identify and correspond with faculty members whose area of research matches their interests early in the application process.

Tuition

Tuition	Cost Per Credit
Graduate Tuition	\$1,450

Additional charges may apply. Other resources are listed below:

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-current/>)

Scholarships, Assistantships and Financial Aid

For priority consideration for a graduate assistantship, apply by the program admission deadlines listed. Fellowships and assistantships provide a stipend and may include health insurance and a tuition scholarship for the duration of the award.

Explore Scholarships and Financial Aid Options (<https://www.slu.edu/financial-aid/types-of-aid/>)

Learning Outcomes

1. Graduates will be able to critically analyze primary literature articles by evaluating the scientific contributions of peer-reviewed publications in biology.
2. Graduates will be able to effectively communicate scientific ideas.
3. Graduates will be able to demonstrate professional integrity.

4. Graduates will be able to use appropriate instrumentation and analytical methods to collect data.
5. Graduates will be able to draw statistically valid conclusions from quantitative data.
6. Graduates will be able to design novel research that advances knowledge of their field.
7. Graduates will be able to conduct self-directed research.

Requirements

The program for the Doctor of Philosophy in Biology degree requires a minimum of 36 credits, when pursued from the baccalaureate, including 24 credits of structured coursework and 12 credits of dissertation research. Courses may be chosen from upper-level electives within the Department of Biology or related departments; coursework may be tailored to the research interests in consultation with the advisory committees of students.

The following requirements govern which courses may be counted toward a degree:

- At least **20** credits of structured courses (these do not include BIOL 6970 Advanced Research Topics in Biology and/or BIOL 6980 Graduate Independent Study in Biology).
- At least **18** credits (exclusive of dissertation) must be 5000- and 6000- level courses.
- At least **12** credits (exclusive of dissertation) of the total program must be from the Department of Biology.
- No more than **6** credits of BIOL 6970 Advanced Research Topics in Biology and/or BIOL 6980 Graduate Independent Study in Biology.
- 12 credits exactly of BIOL 6990 Dissertation Research.
- Students must be enrolled in a course (even if it is for zero credits) every fall and spring semester to maintain standing in the program; students on 11-month assistantships must also enroll during the summer.

Code	Title	Credits
Required Courses		
BIOL 5800	Research Colloquium (taken twice for 1 credit hour each time)	1
BIOL 5860	Scientific Communication	1
Dissertation Research		12
BIOL 6990	Dissertation Research (taken over multiple semesters)	
Seminars		
BIOL 6810	Departmental Seminar (must be taken each semester enrolled)	1
Take two semesters of the following:		
BIOL 5820	Graduate Seminar in Cell and Molecular Regulation (two semesters total; may be taken for 1-2 credits)	1-2
or BIOL 5840	Graduate Seminar in Ecology, Evolution and Systematics	
Elective Courses		16-18
Elective Courses (p. 2)		
Total Credits		36

Elective Courses

Electives can be selected from any 4000-level or higher courses in Biology or related areas (subject to limits on 4000-level, 5970, and 5980 credit hours). Among the courses that can be taken as electives are:

Code	Title	Credits
BIOL 4090	Plant Ecology	3
BIOL 4100	Natural History of Vertebrates	4
BIOL 4120	Field Botany	5
BIOL 4130	Field Mammalogy	5
BIOL 4140	Field Ornithology	5
BIOL 4160	Microbial Ecology and Molecular Evolution	4
BIOL 4200	Aquatic Ecology	4
BIOL 4260	Biology of Amphibians and Reptiles	4
BIOL 4280	Biology of Fishes	4
BIOL 4320	Cave Biology	4
BIOL 4330	Spring Flora of the Ozarks	4
BIOL 4360	Animal Behavior	3
BIOL 4370	Animal Behavior Lab	1
BIOL 4410	Comparative Animal Physiology	3
BIOL 4440	Vertebrate Histology: Structure and Function of Tissues	4
BIOL 4480	Conservation Biology	3
BIOL 4540	Human Systemic Physiology	3
BIOL 4640	General Microbiology	3
BIOL 4650	General Microbiology Laboratory	2
BIOL 4720	Cancer Biology	3
BIOL 4910	Internship in Conservation	1-6
BIOL 4912	Internship in Plant Science	1-3
BIOL 5000	Problems in Vertebrate Morphology	2-5
BIOL 5030	Genomics	3
BIOL 5050	Molecular Techniques Lab	2
BIOL 5070	Advanced Biological Chemistry	3
BIOL 5080	Advanced Cell Biology	3
BIOL 5090	Biometry	4
BIOL 5190	Geographic Information Systems in Biology	3
BIOL 5350	Current Topics in Cell Biology	2
BIOL 5400	Problems in Genetics	1-4
BIOL 5480	Conservation Biology	3
BIOL 5550	Advanced Ecology	3
BIOL 5560	Advanced Evolution	3
BIOL 5610	Principles of Develop Biology	3
BIOL 5630	Concepts of Immunobiology	3
BIOL 5640	Advanced Microbiology	3
BIOL 5670	Advanced Population Biology	3
BIOL 5700	Advanced Molecular Biology	3
BIOL 5780	Molecular Phylogenetic Analysis	3
BIOL 5820	Graduate Seminar in Cell and Molecular Regulation	1-2
BIOL 5840	Graduate Seminar in Ecology, Evolution and Systematics	1
BIOL 6150	Neural Basis of Behavior	3

Non-Course Requirements

New Ph.D. degree students who enter the program with a B.S. or B.A. degree may take the written preliminary exam the first or second spring semester they are in the program. New Ph.D. students who enter the program with a master's degree are required to take the written preliminary exam the first spring semester they are at SLU.

All doctoral students must pass written and oral exams to advance to candidacy; these are typically attempted at the end of the second and third semesters, respectively. All doctoral students must also complete one year of teaching. This can be accomplished by serving as a graduate teaching assistant, by completing two semesters of a practicum in a teaching course, or by other teaching experience approved by the student's committee and the department chair.

Continuation Standards

Students must maintain a cumulative grade point average (GPA) of 3.00 in all graduate/professional courses.

Roadmap

This roadmap is just one example of a semester-by-semester plan of study for this program. There are other plans students can and do take. The plan of study for each particular student is established in consultation with each student's academic advisor; *this roadmap does not replace academic advising appointments.*

Roadmap notes:

- This Roadmap assumes full-time enrollment unless otherwise noted.
- Courses/Milestones marked with an "!" are critical and must be completed in the semester listed in the Roadmap to ensure a timely graduation.
- Course availability and sequencing are subject to change.

General Schedule

Course	Title	Credits
Year One		
Fall		
4000/5000 level electives ¹		5-6
BIOL 5800	Research Colloquium	1
BIOL 6810	Departmental Seminar	0
Credits		6-7
Spring		
Completion of Written Exams in May		
4000/5000 level electives		3
BIOL 5820 or BIOL 5840	Graduate Seminar in Cell and Molecular Regulation or Graduate Seminar in Ecology, Evolution and Systematics	1-2
BIOL 5860	Scientific Communication	1
BIOL 6810	Departmental Seminar	0
Credits		5-6
Summer		
BIOL 6970	Advanced Research Topics in Biology	1
Credits		1

Year Two

Fall

Completion of Oral Exams		
4000/5000 level electives		4-3
BIOL 6810	Departmental Seminar	0
BIOL 5800	Research Colloquium	1
Credits		5-4

Spring

4000/5000 level electives		3-2
BIOL 5820 or BIOL 5840	Graduate Seminar in Cell and Molecular Regulation or Graduate Seminar in Ecology, Evolution and Systematics	2-1
BIOL 6810	Departmental Seminar	0
BIOL 6990	Dissertation Research	1
Credits		6-4

Summer

BIOL 6990	Dissertation Research	2
Credits		2

Year Three

Fall

4000/5000 level electives		2-3
BIOL 6990	Dissertation Research	1
BIOL 6810	Departmental Seminar	0
Credits		3-4

Spring

BIOL 6810	Departmental Seminar	0
BIOL 6990	Dissertation Research	1
Credits		1

Summer

BIOL 6990	Dissertation Research	2
Credits		2

Year Four

Fall

BIOL 6810	Departmental Seminar	0
BIOL 6990	Dissertation Research	1
Credits		1

Spring

BIOL 6810	Departmental Seminar	0
BIOL 6990	Dissertation Research	1
Credits		1

Summer

BIOL 6990	Dissertation Research	1
Credits		1

Year Five

Fall

BIOL 6810	Departmental Seminar	0
BIOL 6990	Dissertation Research	1
Credits		1

Spring

BIOL 6810	Departmental Seminar	0
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BIOL 6990	Dissertation Research	1
Credits		1
Total Credits		36

¹ A maximum of six hours of 4000-level courses can count toward the Ph.D.

Sample Schedule Cell/Molecular Biology Focus

Course	Title	Credits
Year One		
Fall		
BIOL 5050	Molecular Techniques Lab	2
BIOL 5700	Advanced Molecular Biology	3
BIOL 5800	Research Colloquium	1
BIOL 6810	Departmental Seminar	0
Credits		6
Spring		
BIOL 5070	Advanced Biological Chemistry	3
BIOL 5820	Graduate Seminar in Cell and Molecular Regulation	2
BIOL 5860	Scientific Communication	1
BIOL 6810	Departmental Seminar	0
Credits		6
Summer		
BIOL 6970	Advanced Research Topics in Biology	1
Credits		1
Year Two		
Fall		
BIOL 5030	Genomics	3
BIOL 5640	Advanced Microbiology	3
BIOL 5800	Research Colloquium	1
BIOL 6810	Departmental Seminar	0
Credits		7
Spring		
BIOL 5630	Concepts of Immunobiology	3
BIOL 5820	Graduate Seminar in Cell and Molecular Regulation	1
BIOL 6990	Dissertation Research ¹	1
BIOL 6810	Departmental Seminar	0
Credits		5
Summer		
BIOL 6990	Dissertation Research ¹	2
Credits		2
Year Three		
Fall		
BIOL 6810	Departmental Seminar	0
BIOL 6990	Dissertation Research ¹	1
Credits		1
Spring		
BIOL 6810	Departmental Seminar	0

BIOL 6990	Dissertation Research ¹	1
Credits		1
Summer		
BIOL 6990	Dissertation Research ¹	2
Credits		2
Year Four		
Fall		
BIOL 6810	Departmental Seminar	0
BIOL 6990	Dissertation Research ¹	1
Credits		1
Spring		
BIOL 6810	Departmental Seminar	0
BIOL 6990	Dissertation Research ¹	1
Credits		1
Summer		
BIOL 6990	Dissertation Research ¹	1
Credits		1
Year Five		
Fall		
BIOL 6810	Departmental Seminar	0
BIOL 6990	Dissertation Research ¹	1
Credits		1
Spring		
BIOL 6810	Departmental Seminar	0
BIOL 6990	Dissertation Research ¹	1
Credits		1
Total Credits		36

¹ After the second year, students should register for dissertation research (BIOL 6990 Dissertation Research (0-6 cr)), 1-3 credits/semester, until 12 credits are reached. After 12 credits have been reached, students should register for 0 hrs of BIOL 6990 Dissertation Research (0-6 cr) each semester until they graduate.

Sample Schedule Ecology/Evolutionary Biology Focus

Course	Title	Credits
Year One		
Fall		
BIOL 5550	Advanced Ecology	3
BIOL 5030	Genomics	3
BIOL 5800	Research Colloquium	1
BIOL 6810	Departmental Seminar	0
Credits		7
Spring		
BIOL 5110	Advanced Sex, Evolution and Behavior	3
BIOL 5840	Graduate Seminar in Ecology, Evolution and Systematics	1
BIOL 5860	Scientific Communication	1
BIOL 6810	Departmental Seminar	0
Elective		2
Credits		7

Summer		
BIOL 6990	Dissertation Research	1
Credits		1

Year Two

Fall		
BIOL 5480	Conservation Biology	3
BIOL 5560	Advanced Evolution	3
BIOL 5800	Research Colloquium	1
BIOL 6810	Departmental Seminar	0
Credits		7

Spring

BIOL 5840	Graduate Seminar in Ecology, Evolution and Systematics	1
BIOL 5670	Advanced Population Biology	3
BIOL 6990	Dissertation Research ¹	1
BIOL 5810	Department Seminar	0
Credits		5

Summer

BIOL 6990	Dissertation Research ¹	1
Credits		1

Year Three

Fall		
BIOL 6810	Departmental Seminar	0
BIOL 6990	Dissertation Research ¹	1
Credits		1

Spring

BIOL 6810	Departmental Seminar	0
BIOL 6990	Dissertation Research ¹	1
Credits		1

Summer

BIOL 6990	Dissertation Research ¹	1
Credits		1

Year Four

Fall		
BIOL 6810	Departmental Seminar	0
BIOL 6990	Dissertation Research ¹	1
Credits		1

Spring

BIOL 6810	Departmental Seminar	0
BIOL 6990	Dissertation Research ¹	1
Credits		1

Summer

BIOL 6990	Dissertation Research ¹	1
Credits		1

Year Five

Fall		
BIOL 6810	Departmental Seminar	0
BIOL 6990	Dissertation Research ¹	1
Credits		1

Spring

BIOL 6810	Departmental Seminar	0
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BIOL 6990	Dissertation Research	1
Credits		1
Total Credits		36

¹ After the second year, students should register for dissertation research (BIOL 6990 Dissertation Research), 1-3 credits/semester, until 12 credits are reached. After 12 credits have been reached, students should register for 0 credits of Dissertation Research (BIOL 6990) each semester until they graduate.

Contact Us

For additional information about this program, please contact biology@slu.edu or call 314-977-3900.