MATHEMATICS, PH.D.

The Department of Mathematics and Statistics at Saint Louis University offers graduate programs of advanced study and research leading to Master of Arts and Doctor of Philosophy degrees in mathematics. Due to the low student-faculty ratio, SLU graduate students receive extensive individualized instruction. We encourage all graduate students seeking an assistantship to apply for a fall semester start as there is only occasionally financial assistance available for a spring semester start.

Curriculum Overview

The Ph.D. program at Saint Louis University consists of coursework highlighted by required core subject area courses and three written preliminary examinations. Students will gain fundamental knowledge in algebra, analysis, statistics and topology. After demonstrating mastery in these areas, they will develop original mathematics under the direction of a faculty member.

Fieldwork and Research Opportunities

Advanced graduate-level courses allow students to proceed beyond the standard graduate curriculum into research areas represented by the faculty. To graduate, students must write and successfully defend a dissertation that presents the results of their original and independent mathematical research with the guidance of a faculty member.

Careers

SLU's Ph.D. in mathematics prepares students for research or teaching careers in colleges, universities or industry.

Admission Requirements

Applicants should have a master's degree or a bachelor's degree in mathematics that includes a year of coursework in algebra and in analysis or topology.

Application Requirements

- Application form
- Transcript(s)
- Three letters of recommendation
- Résumé
- Professional goal statement

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 and Application Deadlines

We encourage all graduate students seeking an assistantship to apply for a fall semester start. There is only occasionally financial assistance available for a spring semester start. Students who want to be considered for an assistantship must therefore submit their application by Jan. 1.

U.S. students who want to be considered for the fall semester should apply by July 1 and for the spring semester by Nov. 1. International students should apply for the fall semester by May 1 and for the spring semester by Oct. 1.

Review Process

All applications are reviewed by a committee with about a six-week wait for decision notification to applicants. All applicants have until April 15 to decide to accept.

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 demonstrate fundamental knowledge in at least three of the areas of algebra, analysis, statistics and topology.
2. Graduates will be able to demonstrate mastery in at least two of the above four areas.
3. Graduates will be able to demonstrate the ability to identify and solve new research problems in pure or applied mathematics.
4. Graduates will be able to demonstrate the ability to effectively communicate new research in both a written and oral setting.
5. Graduates will be able to demonstrate the ability to manage a large research project and prepare a manuscript.

Requirements

Coursework for the Ph.D. Degree

Students who enter the Ph.D. program with a bachelor's degree in mathematics must complete 48 credit hours (16 courses) in addition to twelve hours of Dissertation Research (MATH 6990). For those who enter with a master's degree in mathematics, students will receive up to 24 credits advanced standing, leaving 24 credits (8 courses) of coursework at the 5000 or 6000-level plus twelve hours of dissertation research.

Beyond these required courses, students choose a set of courses that provide them with a broad knowledge of mathematics and a deep understanding of their intended research area. The department offers a variety of electives and advanced topics courses on a rotating basis. Full time students typically take three courses each semester, including reading courses and dissertation research.

Students must earn a grade of B or better in the required courses and the additional courses in the core areas.

Code	Title	Credits
Required Courses		**24**
Students should select 8 3-credit courses from at least 3 of the 4 areas below. These must include 3 courses from among MATH 5110, MATH 5210, MATH 5310 and STAT 5850. Students can do this in 1 of 2 ways: three courses from two subject areas and two courses from a third area (3-3-2) OR two courses from each of the four subject areas (2-2-2-2).		
Algebra		
MATH 5110	Algebraic Structures I	
MATH 5100-5199 or MATH 6100-6199		
Analysis		
MATH 5210	Measure Theory	
MATH 5200-5299 or MATH 6200-6299		
Topology		
MATH 5310	Point Set Topology	
MATH 5300-5399 or MATH 6300-6399		
Statistics		
STAT 5850	Statistical Inference	
STAT 5000-level courses and above		
Dissertation Research		**12**
MATH 6990	Dissertation Research (taken over multiple semesters, 12hrs total)	
Elective Courses		**24**
Eight additional MATH or STAT courses at the 5000-level or above.		
Total Credits		**60**

Non-Course Requirements

Written Examinations

Ph.D. students must pass three written examinations. Two of these examinations are from the core subject areas: algebra, analysis, topology, and statistics. The exams cover the topics from the associated core subject area course: MATH 5110 (Algebraic Structures I), MATH 5210 (Measure Theory), MATH 5310 (Point Set Topology), or STAT 5850 (Statistical Inference) and must be taken at the next exam opportunity following completion of the associated course. The third exam covers advanced topics from one area of specialization from among algebra, analysis, statistics, and topology. The area of specialization is the student's expected dissertation area and the topics are chosen from two advanced courses taken by the student in that subject area. The specific topics are chosen by the Graduate Program Coordinator in consultation with the student. These examinations are given twice each year – January and August. All exams must be completed prior to the student's seventh semester in the program. A student who fails three written examinations cannot continue in the Ph.D. program.

Oral Examination

After a Ph.D. student has completed the written examinations and chosen a dissertation advisor and an area of research, she or he must pass an oral examination administered by a committee of five faculty members. This oral examination involves a presentation on the student's area of intended research, followed by questions from the examiners.

Dissertation

After passing the written and oral Ph.D. examinations, the student is eligible to "advance to candidacy." This step involves writing a prospectus for the dissertation and identifying the three faculty members who will serve as readers of the student's dissertation. Students who want to apply for certain Graduate School fellowships, such as Dissertation Fellowships, must have advanced to candidacy. The culminating requirement for the Ph.D. degree is writing and successfully defending a dissertation that presents the results of the original and independent mathematical research that the student has carried out, with the guidance of a faculty member. The student must also complete 12 credits hours of MATH 6990 Dissertation Research.

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.

Course	Title	Credits
Year One		
Fall		
Participation in first-year mentoring program		
MATH 5080	Probability Theory	3
MATH 5130	Computational Algebra	3
MATH 5310	Point Set Topology	3
	Credits	**9**
Spring		
MATH 5110	Algebraic Structures I	3
MATH 5220	Complex Analysis	3

MATH 6310	Algebraic Topology	3
	Credits	**9**
Year Two		
Fall		
Algebra core written examination (August)		
MATH 5210	Measure Theory	3
MATH 5360	Applied Topology and the Shape of Data	3
MATH or STAT graduate elective		3
	Credits	**9**
Spring		
Analysis core written examination (January)		
MATH 5015	Number Theory	3
MATH 5022	Metric Spaces	3
MATH 5140	Algebraic Combinatorics	3
	Credits	**9**
Year Three		
Fall		
Algebra specialization written examination (August)		
MATH 6990	Dissertation Research	3
MATH 5XXX or 6XXX	Topics course or Graduate Reading Course	3
	Credits	**6**
Spring		
MATH 6990	Dissertation Research	3
MATH 5XXX or 6XXX	Topics course or Graduate Reading Course	3
	Credits	**6**
Year Four		
Fall		
MATH 6990	Dissertation Research	3
MATH 5XXX or 6XXX	Topics course or Graduate Reading Course	3
	Credits	**6**
Spring		
MATH 6990	Dissertation Research	3
MATH 5XXX or 6XXX	Topics course or Graduate Reading Course	3
	Credits	**6**
	Total Credits	**60**

Program Notes

This is presented as one example of how a student could complete the Ph.D. in four years, or perhaps an additional two semesters of dissertation research would lead to a five-year Ph.D.

Students who enter the Ph.D. program with a bachelor's degree in mathematics must complete 48 credit hours (16 courses) in mathematics at the 4000 level or higher, in addition to 12 hours of MATH 6990 Dissertation Research. At most six of these 48 hours can be at the 4000-level with the remaining 42 hours at the 5000 or 6000-level. For those who enter with a master's degree in mathematics, the requirement is 24 hours (eight courses) of coursework at the 5000 or 6000-level plus 12 hours of dissertation research. All Ph.D. students must complete eight core subject area courses at the 5000-level or higher in algebra, analysis, statistics or topology. These eight courses can be distributed in one of the following ways:

1. Three courses from two subject areas and two courses from a third area (3-3-2). These must include three courses from among MATH 5110 Algebraic Structures I, MATH 5210 Measure Theory, MATH 5310 Point Set Topology, and STAT 5850 Statistical Inference .
2. Two courses from each of the four subject areas (2-2-2-2). These courses must include the courses MATH 5110 Algebraic Structures I, MATH 5210 Measure Theory, MATH 5310 Point Set Topology, and STAT 5850 Statistical Inference.

Beyond these required courses, students choose a set of courses that provide them with a broad knowledge of mathematics and a deep understanding of their intended research area. The department offers a variety of electives and advanced topics courses on a rotating basis. Full-time students typically take three courses each semester, including reading courses and dissertation research.

Contact Us

For more information about our program, please contact mathstat@slu.edu or call 314-977-2444.