

MATHEMATICS, B.A.

Mathematics emphasizes careful reasoning, along with the analysis and solution of problems. Hence, a major or minor in mathematics will appeal to students who like to develop their skills in problem solving and analytical thinking. For this reason, mathematics is also an appropriate major for students planning careers in law or medicine.

Saint Louis University's mathematics program combines the features of both small and large schools to create a compelling educational experience. Students can expect a student-friendly environment, with the math courses for majors small in size and taught by regular faculty (calculus classes are capped at 30 students). Faculty get to know students and give individual advice. Students are recruited for participation in math contests and other opportunities.

Like a large school's program, math at SLU also has enough breadth to let students tailor their upper-division math courses to their interests and goals. Students interested in pure mathematics can choose theoretical courses that provide a solid preparation for graduate school.

Curriculum Overview

SLU's Bachelor of Arts in Mathematics is designed to meet the needs of students with a wide variety of interests. All mathematics majors complete a basic core of required mathematics courses and then choose elective courses to tailor the program of study to meet their individual goals. Along with the standard program of study for the B.A. in mathematics, the department also offers a concentration in statistics and a teachers option. The concentration in statistics is designed to prepare students for careers in industry or for graduate study in statistics or data science. The teachers option requires students to choose courses that meet the requirements for state certification in mathematics.

Teaching Option

For students who are planning a career in secondary education, SLU's math degree offers an option featuring courses that meet the requirements for state certification in mathematics.

Concentration in Statistics

For students planning a career in analyzing data.

Fieldwork and Research Opportunities

The SLU Mathematics and Computer Science Club gives students interested in mathematics and computers a chance to explore relevant topics outside of the classroom. The club holds weekly meetings with activities such as game beta testing, dancing and coding.

Careers

Graduates in mathematics and statistics are versatile. They enter jobs in business, industry, medicine, government, and education. Mathematicians, statisticians, data scientists, actuaries, analysts and consultants are in high demand and this demand is growing, leading to rewarding and well compensated careers.

Many of our graduates pursue advanced degrees in mathematics, statistics, or other fields. Students with mathematics and statistics degrees are attractive to professional graduate schools in law, medicine, and business because these graduate programs value analytical skills and the ability to work in a problem solving environment.

Some of the industry and government employers where our graduates have found success include:

- Allstate
- Ameren
- Boeing
- Booz Allen Hamilton Consulting
- Boston Scientific
- Cofactor Genomics
- Georgia-Pacific
- Kemper Insurance
- MetLife
- National Geospatial-Intelligence Agency
- National Security Agency

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 demonstrate the ability to solve a variety of mathematical problems.
2. Graduates will be able to demonstrate an ability to recall important mathematical definitions and results (for example, theorems).
3. Graduates will be able to demonstrate an ability to apply mathematical reasoning, including formulating definitions.
4. Graduates will be able to demonstrate an ability to apply the methods of direct and indirect proof.
5. Graduates will be able to demonstrate an ability to communicate mathematical ideas and concepts clearly in written problem solutions.

Requirements

Mathematics students must complete a minimum total of **33 credit hours** for the major.

Code	Title	Credits
Core Requirements		
College core requirements (p. 3)		57-66
For additional information about core courses (http://catalog.slu.edu/colleges-schools/arts-sciences/#coretext)		
Mathematics Required Courses		
MATH 1510	Calculus I	4
MATH 1520	Calculus II	4
MATH 2530	Calculus III †	4
MATH 2660	Principles of Mathematics	3
MATH 3120	Introduction to Linear Algebra	3
STAT 3850	Foundation of Statistics	3

Beyond the foundation mathematics courses listed above, all students must complete a minimum of 12 further credits at the 3000-level or above, 6 credits of which must be at or above the 4000-level. These 12 credits, one sequence and electives. These courses ensure that all students learn fundamental topics in mathematics and have an opportunity to build depth in one or more areas of their choosing.

Sequence requirement

Students must complete a sequence at the upper division level, selected with the educational and career plans of the individual student in mind. 6

Differential Equations Sequence:

MATH 3550 Differential Equations

And one of the following:

MATH 4550 Nonlinear Dynamics and Chaos

or MATH 4570 Partial Differential Equations

Statistics Sequence:

MATH 3850 Foundation of Statistics

And one of the following:

STAT 4800 Probability Theory

or STAT 4840 Time Series

or STAT 4870 Applied Regression

Algebra Sequence:

MATH 4110 Introduction to Abstract Algebra

And one of the following:

MATH 4120 Linear Algebra

or MATH 4150 Number Theory

Analysis Sequence:

MATH 4210 Introduction to Analysis

And one of the following:

MATH 4220 Metric Spaces

or MATH 4230 Multivariable Analysis

Complex Analysis Sequence:

MATH 4310 Introduction to Complex Variables

And one of the following:

MATH 4320 Complex Variables II

or MATH 4360 Geometric Topology

Mathematics Electives

Depending on the number of credits taken to satisfy the other requirements, students will need to take 2-3 additional courses at the 3000 level or higher. Students must include at least two 4000 level classes. MATH 3110 does not count as an elective, since credit is not given for both MATH 3110 and MATH 3120.

Computer Programming

CSCI 1060 Introduction to Computer Science: Scientific Programming 3-4

or CSCI 1300 Introduction to Object-Oriented Programming

Track or Concentration Option

Students have the option to pursue one of the following, if desired 15-18

Teachers Option (p. 3)

Statistics Concentration (p. 3)

General Electives

5-18

Total Credits

120

‡ MATH 2530 Calculus III (4 cr) must be taken at Saint Louis University with minimum grade of “C-”

Track and Concentration Requirements

Students have the option to pursue one of the following, if desired:

Teachers Option

Code	Title	Credits
Required Courses		
MATH 4050	History of Mathematics	3
MATH 4110	Introduction to Abstract Algebra	3
or MATH 4210	Introduction to Analysis	
MATH 4410	Foundations of Geometry	3
or MATH 4430	Non-Euclidean Geometry	
Elective		
Select one of the following:		3
MATH 3550	Differential Equations	
MATH 4800	Probability Theory	
MATH 4850	Mathematical Statistics	
MATH 4870	Applied Regression	
MATH 4150	Number Theory	
Total Credits		12

Statistics Concentration

Code	Title	Credits
Required Courses		
MATH 4800	Probability Theory	3
MATH 4850	Mathematical Statistics	3
CSCI 1300	Introduction to Object-Oriented Programming	4
Elective Courses		
Select two of the following:		6
MATH 4210	Introduction to Analysis	
MATH 4230	Multivariable Analysis	
MATH 4840	Time Series	
MATH 4860	Statistical Models	
MATH 4870	Applied Regression	
CSCI 5750	Machine Learning	
Total Credits		16

Continuation Standards

Students must have a minimum of a 2.00 cumulative GPA in their mathematics major or minor courses by the conclusion of their sophomore year, must maintain a minimum of 2.00 cumulative GPA in these courses at the conclusion of each semester thereafter, and must be registered in at least one mathematics course counting toward their major or minor in each academic year (until all requirements are completed).

Bachelor of Arts Core Curriculum Requirements

Code	Title	Credits
Core Components and Credits		
	Foundations of Discourse (http://catalog.slu.edu/colleges-schools/arts-sciences/ba-core/foundations-discourse)	3

Diversity in the U.S. (http://catalog.slu.edu/colleges-schools/arts-sciences/ba-core/cultural-diversity)	3
Global Citizenship (http://catalog.slu.edu/colleges-schools/arts-sciences/ba-core/global-citizenship)	3
Foreign Language (http://catalog.slu.edu/colleges-schools/arts-sciences/ba-core/foreign-language)	0-9
Fine Arts (http://catalog.slu.edu/colleges-schools/arts-sciences/ba-core/fine-arts)	3
Literature (http://catalog.slu.edu/colleges-schools/arts-sciences/ba-core/literature)	6
Mathematics (http://catalog.slu.edu/colleges-schools/arts-sciences/ba-core/mathematics)	3
Natural Science (http://catalog.slu.edu/colleges-schools/arts-sciences/ba-core/sciences)	6
Philosophy (http://catalog.slu.edu/colleges-schools/arts-sciences/ba-core/philosophy)	9
Social Science (http://catalog.slu.edu/colleges-schools/arts-sciences/ba-core/social-science)	6
Theology (http://catalog.slu.edu/colleges-schools/arts-sciences/ba-core/theology)	9
World History (http://catalog.slu.edu/colleges-schools/arts-sciences/ba-core/world-history)	6
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.

Standard Track

Course	Title	Credits
Year One		
Fall		
!MATH 1510	Calculus I	4
UNIV 1010	Enhancing First-Year Success	1
A&S Core		3
A&S Core		3
A&S Core		3
Credits		14
Spring		
!MATH 1520	Calculus II	4
A&S Core		3
A&S Core		3
A&S Core		3
Elective (if needed)		3
Credits		16
Year Two		
Fall		
!MATH 2530	Calculus III	4
!MATH 2660	Principles of Mathematics	3
A&S Core		3
A&S Core		3
Elective (if needed)		3
Credits		16
Spring		
!MATH 3120	Introduction to Linear Algebra	3
!MATH 3850	Foundation of Statistics	3
A&S Core		3
A&S Core		3
Elective (if needed)		3
Credits		15
Year Three		
Fall		
Mathematics or Statistics Sequences ¹		3
!CSCI 1300	Introduction to Object-Oriented Programming	4
A&S Core		3
A&S Core		3
Elective (if needed)		3
Credits		16
Spring		
Mathematics or Statistics Sequences ¹		3
A&S Core		3

A&S Core	3	
A&S Core	3	
Elective (if needed)	3	
Credits		15
Year Four		
Fall		
Mathematics or Statistics Elective ²	3	
A&S Core	3	
A&S Core	3	
A&S Core	3	
Elective (if needed)	3	
Credits		15
Spring		
Mathematics or Statistics Elective ²	3	
A&S Core	3	
A&S Core	3	
Elective (if needed)	3	
Elective (if needed)	3	
Credits		15
Total Credits		122

- ¹ Students may choose among five different sequences in Mathematics and Statistics.
- **Algebra Sequence:** MATH 4110 Introduction to Abstract Algebra (3 cr) and one of either MATH 4120 Linear Algebra (3 cr) or MATH 4150 Number Theory (3 cr).
 - **Complex Analysis Sequence:** MATH 4310 Introduction to Complex Variables (3 cr) and either MATH 4320 Complex Variables II (3 cr) or MATH 4360 Geometric Topology (3 cr).
 - **Differential Equations Sequence:** MATH 3550 Differential Equations (3 cr) and either MATH 4550 Nonlinear Dynamics and Chaos (3 cr) or
 - **Real Analysis Sequence:** MATH 4210 Introduction to Analysis (3 cr) and one of either MATH 4220 Metric Spaces (3 cr) or MATH 4230 Multivariable Analysis (3 cr).
 - **Statistics Sequence:** STAT 3850 Foundation of Statistics (3 cr) and one of: STAT 4800 Probability Theory (3 cr), STAT 4840 Time Series (3 cr), or STAT 4870 Applied Regression (3 cr).

² Any 3000- or 4000-level MATH or STAT course numbered higher than MATH 3120 Introduction to Linear Algebra. **Students must complete at least two 4000-level MATH or STAT courses.**

Teachers Option

Course	Title	Credits
Year One		
Fall		
MATH 1510	Calculus I	4
UNIV 1010	Enhancing First-Year Success	1
A&S Core		3
A&S Core		3
A&S Core		3
Credits		14
Spring		
MATH 1520	Calculus II	4
A&S Core		3
A&S Core		3
A&S Core		3

Elective (if needed)	3
Credits	16

Year Two

Fall

MATH 2530	Calculus III	4
MATH 2660	Principles of Mathematics	3
A&S Core		3
A&S Core		3
Elective (if needed)		3
Credits		16

Spring

MATH 3120	Introduction to Linear Algebra	3
A&S Core		3
A&S Core		3
A&S Core		3
Elective (if needed)		3
Credits		15

Year Three

Fall

Pure Mathematics Elective ¹		3
A&S Core		3
A&S Core		3
A&S Core		3
Elective (if needed)		3
Credits		15

Spring

MATH 4050	History of Mathematics ²	3
MATH/STAT 3850	Foundation of Statistics	3
A&S Core		3
A&S Core		3
Elective (if needed)		3
Credits		15

Year Four

Fall

Mathematics or Statistics Elective ³		3
A&S Core		3
A&S Core		3
A&S Core		3
Elective (if needed)		3
Credits		15

Spring

Geometry Elective ⁴		3
A&S Core		3
A&S Core		3
Elective (if needed)		3
Elective (if needed)		3
Credits		15
Total Credits		121

¹ See note below about the Pure Mathematics Requirement.
² See note below about the History of Mathematics Requirement.

³ See note below about Mathematics and Statistics Electives.
⁴ See note below about the Geometry Requirement.

Program Notes

Pure Mathematics Requirement

Students can satisfy the pure mathematics requirement by completing either MATH 4110 Introduction to Abstract Algebra (3 cr) or MATH 4210 Introduction to Analysis (3 cr).

History of Mathematics Requirement

MATH 4050 History of Mathematics (3 cr) is typically offered in the spring of even-numbered years. Students may need to adjust their schedule accordingly.

Mathematics and Statistics Elective

MATH 3550 Differential Equations (3 cr), MATH 4800 Probability Theory (3 cr)/STAT 4800 Probability Theory (3 cr), or MATH 4150 Number Theory (3 cr).

Geometry Requirement

Students can satisfy the geometry requirement by completing either MATH 4410 Foundations of Geometry (3 cr) or MATH 4430 Non-Euclidean Geometry (3 cr). One of these two courses will typically be offered in the spring of odd-numbered years. Students may need to adjust their schedule accordingly.

Statistics Concentration

Course	Title	Credits
Year One		
Fall		
MATH 1510	Calculus I	4
UNIV 1010	Enhancing First-Year Success	1
A&S Core		3
A&S Core		3
A&S Core		3
Credits		14
Spring		
MATH 1520	Calculus II	4
A&S Core		3
A&S Core		3
A&S Core		3
Elective (if needed)		3
Credits		16
Year Two		
Fall		
MATH 2530	Calculus III	4
MATH 2660	Principles of Mathematics	3
A&S Core		3
A&S Core		3
Elective (if needed)		3
Credits		16
Spring		
MATH 3120	Introduction to Linear Algebra	3
MATH/STAT 3850	Foundation of Statistics	3
A&S Core		3
A&S Core		3

A&S Core		3
	Credits	15
Year Three		
Fall		
CSCI 1300	Introduction to Object-Oriented Programming	4
Mathematics or Statistics Elective ¹		3
A&S Core		3
A&S Core		3
Elective (if needed)		3
	Credits	16
Spring		
Mathematics or Statistics Elective ¹		3
A&S Core		3
A&S Core		3
A&S Core		3
Elective (if needed)		3
	Credits	15
Year Four		
Fall		
MATH/STAT 4800	Probability Theory	3
A&S Core		3
A&S Core		3
A&S Core		3
Elective (if needed)		3
	Credits	15
Spring		
MATH/STAT 4850	Mathematical Statistics	3
A&S Core		3
A&S Core		3
A&S Core		3
Elective (if needed)		3
	Credits	15
	Total Credits	122

¹ See note below about Mathematics and Statistics Electives.

Program Notes

Mathematics and Statistics Elective

Students must choose two courses from: MATH 4210 Introduction to Analysis (3 cr), MATH 4230 Multivariable Analysis (3 cr), MATH 4840 Time Series (3 cr)/STAT 4840 Time Series (3 cr), MATH 4860 Statistical Models (3 cr)/STAT 4860 Statistical Models (3 cr), MATH 4870 Applied Regression (3 cr)/STAT 4870 Applied Regression (3 cr), CSCI 5750 Machine Learning (3 cr).