Mathematics, B.A.

Mathematics emphasizes careful reasoning, along with the analysis and solution of problems. A major or minor in mathematics at Saint Louis University 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.

Program highlights include:

- 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 math courses for majors being small in size and taught by regular faculty. Faculty get to know students and provide individual attention.
- Students are recruited for participation in math contests and other opportunities, including part-time positions as graders, tutors and learning assistants.
- 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.
- A Bachelor of Science in Math (https://catalog.slu.edu/colleges-schools/arts-sciences/mathematics-statistics/mathematics-bs/) is also available.

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 core of six required 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

The concentration in statistics is for students who plan to pursue a career in analyzing data.

Fieldwork and Research Opportunities

The SLU Mathematics and Computer Science Club gives students interested in mathematics and computer science a chance to explore relevant topics outside of the classroom. The club holds weekly meetings that bring students and faculty together for a wide range of activities, including mathematical puzzles, integration bees, game beta testing and career-focused presentations by industry experts.

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 lead 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 for their 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
- Mercer
- MetLife
- Milliman
- National Geospatial-Intelligence Agency
- National Security Agency
- NISA Investment Advisors
- Varsity Tutors

Admission Requirements

Begin Your Application (http://www.slu.edu/apply.php)

Saint Louis University also accepts the Common Application.

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 coursework is a primary concern in reviewing a freshman applicant’s file.

To be considered for admission to any Saint Louis University undergraduate program, applicants must be graduating from an accredited high school, have an acceptable HiSET exam score or take 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.

Students who have attempted fewer than 24 semester credits (or 30 quarter credits) of college credit must follow the above freshmen admission requirements. Students who have completed 24 or more semester credits (or 30 quarter credits) of college credit must submit transcripts from all 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. Where applicable, transfer students will be evaluated on any courses outlined in the continuation standards of their preferred major.

**International Applicants**

All admission policies and requirements for domestic students apply to international students along with the following:

- Demonstrate 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:** Scholarships are awarded based on academic achievement, service, leadership and financial need.
- **Financial Aid:** Financial aid is provided in the form of grants and loans, some of which require repayment.

For priority consideration for merit-based scholarships, 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://www.slu.edu/financial-aid](https://www.slu.edu/financial-aid).

**Learning Outcomes**

1. Graduates will be able to demonstrate conceptual competency in foundational areas of mathematics by developing problem solving skills and solving problems in these areas of mathematics.
2. Graduates will be able to demonstrate an ability to write and comprehend mathematical proofs using both direct and indirect methods.
3. Graduates will be able to demonstrate an ability to analyze data and perform appropriate statistical analyses.
4. Graduates will be able to demonstrate an ability to write computer programs that implement mathematical or statistical algorithms.
5. Graduates will be able to demonstrate an ability to communicate mathematical ideas and concepts both orally and in writing.
6. Graduates will be able to demonstrate an understanding of at least one advanced, in-depth topic in mathematics or statistics.

**Requirements**

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

**Core Requirements**

College core requirements (p. 3)  57-66

For additional information about core courses

**Mathematics Required Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 1510</td>
<td>Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 1520</td>
<td>Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>MATH 2530</td>
<td>Calculus III ‡</td>
<td>4</td>
</tr>
<tr>
<td>MATH 2660</td>
<td>Principles of Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 3120</td>
<td>Introduction to Linear Algebra</td>
<td>3</td>
</tr>
<tr>
<td>STAT 3850</td>
<td>Foundation of Statistics</td>
<td>3</td>
</tr>
</tbody>
</table>

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 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. The remaining coursework will depend on the particular program of study chosen. The requirements for the Concentration in Statistics and Teachers Option are described separately, below.

**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.

**Differential Equations Sequence:**

- MATH 3550 Differential Equations
- And one of the following:
  - MATH 4550 Nonlinear Dynamics and Chaos
  - MATH 4570 Partial Differential Equations

**Statistics Sequence:**

- STAT 3850 Foundation of Statistics
- And one of the following:
  - MATH 4800 Probability Theory
  - STAT 4840 Time Series
  - STAT 4870 Applied Regression

**Algebra Sequence:**

- MATH 4110 Introduction to Abstract Algebra
- And one of the following:
  - MATH 4120 Linear Algebra
  - MATH 4190 Number Theory

**Analysis Sequence:**

- MATH 4210 Introduction to Analysis
- And one of the following:
  - MATH 4220 Metric Spaces
  - MATH 4230 Multivariable Analysis

**Complex Analysis Sequence:**

- MATH 4310 Introduction to Complex Variables
- And one of the following:
  - MATH 4320 Complex Variables II
  - 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

<table>
<thead>
<tr>
<th>Code</th>
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<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CSCI 1060</td>
<td>Introduction to Computer Science: Scientific Programming</td>
<td>3-4</td>
</tr>
<tr>
<td>or CSCI 1300</td>
<td>Introduction to Object-Oriented Programming</td>
<td></td>
</tr>
</tbody>
</table>

### Track and Concentration Requirements

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

#### Teachers Option

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 4050</td>
<td>History of Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 4110</td>
<td>Introduction to Abstract Algebra</td>
<td>3</td>
</tr>
<tr>
<td>or MATH 4210</td>
<td>Introduction to Analysis</td>
<td></td>
</tr>
<tr>
<td>MATH 4410</td>
<td>Foundations of Geometry</td>
<td>3</td>
</tr>
<tr>
<td>or MATH 4430</td>
<td>Non-Euclidean Geometry</td>
<td></td>
</tr>
</tbody>
</table>

#### Elective

Select one of the following: 3

- MATH 3550 | Differential Equations                     |
- MATH 4800 | Probability Theory                         |
- STAT 4850 | Mathematical Statistics                    |
- STAT 4870 | Applied Regression                         |
- MATH 4150 | Number Theory                              |

Total Credits 12

### Statistics Concentration

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 4800</td>
<td>Probability Theory</td>
<td>3</td>
</tr>
<tr>
<td>STAT 4850</td>
<td>Mathematical Statistics</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 1300</td>
<td>Introduction to Object-Oriented Programming</td>
<td>4</td>
</tr>
</tbody>
</table>

#### Elective Courses

Select two of the following: 6

- MATH 4210 | Introduction to Analysis                   |
- MATH 4230 | Multivariable Analysis                     |
- STAT 4840 | Time Series                                |
- STAT 4870 | Applied Regression                         |
- CSCI 4750 | 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 course counting toward their major or minor in each academic year (until all requirements are completed).

### Bachelor of Arts Core Curriculum Requirements

Please note: beginning in Fall 2022, all incoming SLU undergraduates—regardless of major, program, college or school—will complete the University Core curriculum. You can find more information about SLU’s common Core here: [https://www.slu.edu/core/index.php](https://www.slu.edu/core/)

#### Core Components and Credits

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Foundations of Discourse</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Diversity in the U.S.</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Global Citizenship</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Foreign Language</td>
<td>0-9</td>
</tr>
<tr>
<td></td>
<td>Fine Arts</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Literature</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Mathematics</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Natural Science</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Philosophy</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Social Science</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Theology</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>World History</td>
<td>6</td>
</tr>
</tbody>
</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 electives 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 department/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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year One</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 1510  Calculus I</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>UNIV 1010 Enhancing First-Year Success</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>A&amp;S Core</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>A&amp;S Core</td>
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<tr>
<td>A&amp;S Core</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Elective (if needed)</td>
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<tr>
<td>Credits</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>Spring</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 1520  Calculus II</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>A&amp;S Core</td>
<td>3</td>
<td></td>
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<tr>
<td>A&amp;S Core</td>
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<td></td>
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<tr>
<td>A&amp;S Core</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Elective (if needed)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Credits</td>
<td>16</td>
<td></td>
</tr>
</tbody>
</table>

| 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       |
| STAT 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                                           | 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      |

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 MATH 4560 Nonlinear Dynamics and Chaos (3 cr).
- **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: MATH 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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year One</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 1510  Calculus I</td>
<td>4</td>
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<tr>
<td>UNIV 1010 Enhancing First-Year Success</td>
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<td></td>
</tr>
<tr>
<td>A&amp;S Core</td>
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<td></td>
</tr>
<tr>
<td>A&amp;S Core</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>
### Year One

#### Fall
- **MATH 1510** Calculus I  
  4 credits
- **UNIV 1010** Enhancing First-Year Success  
  1 credit
- A&S Core  
  3 credits
- A&S Core  
  3 credits
- Elective (if needed)  
  3 credits

#### Spring
- **MATH 1520** Calculus II  
  4 credits
- A&S Core  
  3 credits
- A&S Core  
  3 credits
- Elective (if needed)  
  3 credits

#### Credits
14

### Year Two

#### Fall
- **MATH 2530** Calculus III  
  4 credits
- **MATH 2660** Principles of Mathematics  
  3 credits
- A&S Core  
  3 credits
- A&S Core  
  3 credits
- Elective (if needed)  
  3 credits

#### Spring
- **MATH 3120** Introduction to Linear Algebra  
  3 credits
- A&S Core  
  3 credits
- A&S Core  
  3 credits
- Elective (if needed)  
  3 credits

#### Credits
16

### Year Three

#### Fall
- Pure Mathematics Elective  
  3 credits
- A&S Core  
  3 credits
- A&S Core  
  3 credits
- Elective (if needed)  
  3 credits

#### Spring
- **MATH 4050** History of Mathematics  
  3 credits
- **STAT 3850** Foundation of Statistics  
  3 credits
- A&S Core  
  3 credits
- A&S Core  
  3 credits
- Elective (if needed)  
  3 credits

#### Credits
15

### Year Four

#### Fall
- Mathematics or Statistics Elective  
  3 credits
- A&S Core  
  3 credits
- A&S Core  
  3 credits
- Elective (if needed)  
  3 credits

#### Spring
- Geometry Elective  
  3 credits
- A&S Core  
  3 credits
- A&S Core  
  3 credits
- Elective (if needed)  
  3 credits

#### Credits
15

### Elective (if needed)
- 3 credits

Total Credits: 121

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**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) 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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>Fall</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>MATH 1500</strong></td>
<td>Calculus I</td>
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<td><strong>UNIV 1000</strong></td>
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<tr>
<td>A&amp;S Core</td>
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</tr>
<tr>
<td>A&amp;S Core</td>
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</table>

#### Credits
14

<table>
<thead>
<tr>
<th>Spring</th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>MATH 1520</strong></td>
<td>Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>A&amp;S Core</td>
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<tr>
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<td></td>
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</table>

#### Credits
16

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
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<td></td>
<td></td>
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<tr>
<td><strong>MATH 2530</strong></td>
<td>Calculus III</td>
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</tr>
<tr>
<td><strong>MATH 2660</strong></td>
<td>Principles of Mathematics</td>
<td>3</td>
</tr>
<tr>
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<td></td>
<td>3</td>
</tr>
<tr>
<td>Elective (if needed)</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

#### Credits
16
### Saint Louis University Academic Catalog 2020-2021

#### Spring
- **MATH 3120**: Introduction to Linear Algebra
- **STAT 3850**: Foundation of Statistics
- A&S Core
- A&S Core
- A&S Core
- **Credits**: 15

#### Year Three

#### Fall
- **CSCI 1300**: Introduction to Object-Oriented Programming
- Mathematics or Statistics Elective
- A&S Core
- A&S Core
- Elective (if needed)
- **Credits**: 16

#### Spring
- Mathematics or Statistics Elective
- A&S Core
- A&S Core
- A&S Core
- Elective (if needed)
- **Credits**: 15

#### Year Four

#### Fall
- **MATH 4800**: Probability Theory
- A&S Core
- A&S Core
- A&S Core
- Elective (if needed)
- **Credits**: 15

#### Spring
- **STAT 4850**: Mathematical Statistics
- A&S Core
- A&S Core
- A&S Core
- Elective (if needed)
- **Credits**: 15

#### Total Credits: 122

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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), STAT 4840 Time Series (3 cr), STAT 4870 Applied Regression (3 cr), CSCI 5750 Introduction to Machine Learning (3 cr).