Mathematics and Computer Science
http://mathcs.slu.edu
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Mathematics and Computer Science courses meet the needs of students with a wide variety of interests. We offer several introductory courses to satisfy the core curriculum requirements, as well as courses that provide students in other disciplines with the mathematical and computational background that they need for their chosen fields of study. Students who major in Mathematics and Computer Science are prepared for careers in business, industry, government, and education, or for further study at the graduate level, in math, computer science, law, or medicine.

Programs
In Mathematics, the department offers a Bachelor of Arts (B.A.), M.A. and Ph. D. in Mathematics, as well as a minor in mathematics, a minor in engineering mathematics, and a minor in actuarial mathematics. In Computer Science, the department offers a Bachelor of Arts (B.A.) and a Bachelor of Science (B.S.) as well as a minor. The department also participates in a Master of Science (M.S.) program in Bioinformatics and Computational Biology, and in Accelerated Bachelors/Masters programs that combine this M.S. degree with any of our Bachelors offerings.

Mathematics Major (Bachelor of Arts)

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

‡ Calculus III Must be taken at Saint Louis University with minimum grade of “C-”

Students then choose one of the following three track options. A 2.00 or “C” GPA is required in upper division mathematics courses counting toward the major.

Pure Mathematics
1. A sequence in Abstract Algebra:
   MATH 4110 Introduction to Abstract Algebra 3 and either
   MATH 4120 Linear Algebra 3 or
   MATH 4150 Number Theory 3

2. A sequence in Real Analysis:
   MATH 4210 Introduction to Analysis 3 and either
   MATH 4220 Metric Spaces 3 or
   MATH 4230 Multivariable Analysis 3

3. At least one additional upper division MATH course 3

Applied Mathematics
Any two of the year-long (two 3-credit courses) sequences:
1. MATH 3550 Differential equations I 3 and either
   MATH 4550 Nonlinear Dynamics & Chaos 3 or
   MATH 4570 Partial Differential Equations 3

2. MATH 4810 Elem. Theory of Probability 3 and either
   MATH 4820 Intro Mathematical Statistics 3

3. MATH 4110 Intro Abstract Algebra 3 and either
   MATH 4120 Linear Algebra 3 or
   MATH 4150 Number Theory 3

4. MATH 4210 Intro to Analysis 3 and either
   MATH 4220 Metric Spaces 3 or
   MATH 4230 Multivariable Analysis 3
Teachers Option
1. MATH 4810 Elementary Theory of Probability 3
2. MATH 4050 History of Mathematics 3
3. A course in pure math:
   MATH 4110 Introduction to Abstract Algebra 3 or
   MATH 4210 Intro to Analysis 3
4. A course in Geometry:
   MATH 4410 Foundations of Geometry 3 or
   MATH 4430 Non-Euclidean Geometry 3
5. One additional course chosen from the following:
   MATH 3550 Differential Equations 3
   MATH 4820 Introductory Mathematical Statistics 3
   MATH 4150 Number Theory 3
6. An upper-division mathematics elective approved by the student’s mathematics advisor 3

Mathematics Minor
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
One further course in upper division mathematics, chosen with attention to prerequisites 3

Actuarial Mathematics Minor
MATH 1510 Calculus I 4
MATH 1520 Calculus II 4
MATH 2530 Calculus III 4
MATH 3110 Linear Algebra 3
MATH 3760 Financial Mathematics 3
MATH 4810 Elementary Theory of Probability 3
One further course in upper division mathematics, chosen with attention to prerequisites 3

Students may not earn more than one minor among the minors in mathematics, engineering mathematics, or actuarial mathematics.

Computer Science
Michael Goldwasser, Ph.D., Director of Computer Science

Students completing the Bachelor of Arts curriculum in Computer Science obtain a rigorous, comprehensive background in the discipline. With this curriculum they are afforded time to delve into other academic interests, including pre-professional studies, or a minor or major in another discipline. Graduates with a BA in Computer Science have gone on to interesting jobs in software and hardware development and support, and obtained advanced degrees in a diversity of fields including medicine, law, and computer science. Students should consult with their advisor to tailor their CS electives to their individual goals.

Students completing the Bachelor of Science curriculum in Computer Science obtain a technically rigorous and comprehensive degree, modeled upon recommendations of the ABET Computing Accreditation Commission. They take two additional mathematics and two additional computer science courses than are required for the BA. The BS degree also requires twelve credits of science, including one sequence of two lab courses. Graduates have obtained interesting jobs in the field and earned advanced degrees.

The two curricula follow very similar paths the first two years, thus students can choose between the variants of the degree after completing the introductory sequence.

Computer Science Major (Bachelor of Arts)

Required courses in Computer Science: 36
CSCI 10xx Introduction to Computer Science* 3
CSCI 1300 Intro to Object-Oriented Programming 4
CSCI 2100 Data Structures 4
CSCI 2300 Object-Oriented Software Design 3
CSCI 2400 Computer Architecture 3
CSCI 3500 Operating Systems 3
CSCI 4961 Capstone Project I 2
CSCI 4962 Capstone Project II 2
One course chosen from list of Applications Courses† 3

Notes: 1. Prerequisites for these courses must also be met.
2. Credit cannot be earned for both MATH 3110 and MATH 3120.
One course chosen from list of Theory Courses\(\S\) 3
Two additional CSCI courses at 3000-level or higher 6

**Required courses in Mathematics:** 14
MATH 1510 Calculus I 4
MATH 1520 Calculus II 4
MATH 1660 Discrete Mathematics 3
One additional MATH course at the 2000-level or higher 3

**Additional requirement** 3
PHIL 3410 Computer Ethics

### Computer Science Major (Bachelor of Science)

**Required courses in Computer Science:** 42
CSCI 10xx Introduction to Computer Science\* 3
CSCI 1300 Intro to Object-Oriented Programming 4
CSCI 2100 Data Structures 4
CSCI 2300 Object-Oriented Software Design 3
CSCI 2400 Computer Architecture 3
CSCI 3100 Algorithms 3
CSCI 3200 Programming Languages 3
CSCI 3300 Software Engineering 3
CSCI 3500 Operating Systems 3
CSCI 4961 Capstone Project I 2
CSCI 4962 Capstone Project II 2
One course chosen from list of Applications Courses\(\dagger\) 3
Two additional CSCI courses at 3000-level or higher 6

**Required courses in Mathematics:** 20
MATH 1510 Calculus I 4
MATH 1520 Calculus II 4
MATH 1660 Discrete Mathematics 3
Three additional MATH courses at the 2000-level or higher 9

**Science Requirements:** 12
Two-course sequence in a lab science 8
Additional credits of science 4

**Additional requirement:** 3
PHIL 3410 Computer Ethics

### Secondary Computer Science Major

Students completing a primary major in another field may complete a secondary major in Computer Science by fulfilling the version of these requirements that is commensurate with the credentials of their primary degree (i.e., the B.A. requirements if doing a primary B.A., the B.S. requirements if doing a primary B.S.). This includes not only the CSCI coursework, but all stated Math, Science, and Ethics requirements.

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Students whose primary majors are outside of the College of Arts & Sciences are not required to complete the formal A&S Core. However, students who are receiving a B.S. degree with a secondary major in Computer Science are required, for breadth, to complete at least 27 credits of coursework outside of science, technology, engineering, and math.

### Computer Science Minor

Students from any College may complete a Minor in Computer Science by fulfilling the following requirements.

**Required courses:** 20
CSCI 10xx Introduction to Computer Science\* 3
CSCI 1300 Intro to Object-Oriented Programming 4
CSCI 2100 Data Structures 4
Two additional CSCI courses at the 2000-level or higher 6
MATH 1660 Discrete Mathematics 3

**Notes**

* When completing a major or minor in Computer Science, the requirement designated as “CSCI 10xx” can be met using any 3-credit course numbered from 1010 to 1090. With permission, a computing-intensive course from another discipline may be substituted. Examples of such courses include BME 2000 and CVNG 1500.

\(\dagger\) Applications Courses

- CSCI 3650 Network Programming I 3
- CSCI 3710 Databases 3
- CSCI 3820 Computer Graphics I 3
- CSCI 4550 Advanced Operating Systems 3
- CSCI 4650 Computer Security 3
- CSCI 4850 High-Performance Computing 3

\(\S\) Theory Courses

- CSCI 3100 Algorithms 3
- CSCI 3200 Programming Languages 3
- CSCI 3250 Compilers 3
- CSCI 4130 Automata 3