

*Additional information may
be obtained from:*

*UM-St. Louis Admissions Office
One University Boulevard
St. Louis, Missouri 63121-4400
(314) 516-5451
<http://www.umsl.edu/>*



University of Missouri-St. Louis Mathematics & Computer Science

Why UM-SL?

In the Department of Mathematics and Computer Science at UM-St. Louis, students will study in a rigorous academic program with faculty who are leaders in their field. Classes at the upper level are small in size, and seniors often take classes along with graduate students. Our students have the opportunity to finish their program by taking mathematics and computer science courses in the day or in the evening. This attracts the working student as well as the traditional student who plans to become a professional or enter graduate school. Degree requirements are streamlined to allow students to conveniently complete a double degree, either within this department or with another department. This is a particularly attractive option for computer science majors who would like to also obtain a degree in mathematics.

General Information

Degrees and Areas of Concentration

The Department of Mathematics and Computer Science offers work leading to the B.A. in mathematics, the B.S. in mathematics, the B.S. in computer science, and, in cooperation with the College of Education, the B.S.Ed. in secondary education with an emphasis in mathematics. The department also offers minors in computer science, mathematics, and statistics.

At the graduate level, the department offers a Master of Arts (M.A.) degree in mathematics, a Master of Science (M.S.) degree in mathematics, a Master of Science (M.S.) degree in computer science and a Ph.D. in applied mathematics.

The program leading to the B.A. in mathematics provides a broad grounding in different areas of mathematics, giving students the depth necessary to pursue various aims such as graduate studies or other career choices.

The B.S. in mathematics provides a substantial background in mathematics, statistics, and computer science to produce graduates who can work as mathematicians. Both the B.A. and the B.S. in mathematics allow optional courses that enable the student to focus on areas of interest like pure or applied mathematics.

The B.S.Ed. in secondary education with an emphasis in mathematics introduces students to those branches of mathematics most relevant to the teaching of secondary-school mathematics.

The B.S. in computer science prepares students for employment in modern computing technology and careers in computer science.

Students pursuing the M.A. degree in mathematics may choose an emphasis in either pure or applied mathematics. The pure mathematics emphasis is well suited for students preparing to teach at the high school, junior college, or four-year liberal arts college level. Those who concentrate on applied courses in the M.A. program build a foundation for the application of mathematics in industry and the continuation of their education in the Ph.D. program in applied mathematics.

The M.S. degree in computer science emphasizes practical aspects of the field.

The Ph.D. in applied mathematics prepares students for a leadership role involving research and development in both industrial and academic settings.

Students may enroll in any of these graduate programs on a part-time basis.

Career Outlook

A degree in mathematics or computer science prepares well-motivated students for interesting careers. Our graduates find positions in industry, government, and education. The demand for individuals well trained in statistics, computer science, and applied mathematics is greater than the available supply. In addition, a number of graduates in mathematics have elected careers in business, law, and other related fields where they find logical and analytical skills valuable.

Graduates in computer science and mathematics from UM-St. Louis have a strong local presence. They have careers in finance, public service, management, and actuarial management. Many are working in areas such as systems management, information systems and data management, scientific computing, and scientific positions in the

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armed services. Others have careers in education, especially at secondary and higher levels.

Undergraduate Studies

General Education Requirements

All majors must satisfy the University and appropriate College general education requirements.

All mathematics courses may be used to meet the University's general education breadth of study requirement in natural sciences and mathematics.

Satisfactory/Unsatisfactory Restrictions

Majors in mathematics and computer science may not take mathematical sciences or related area courses on a satisfactory/unsatisfactory basis. Students considering graduate study should consult with their advisors about taking work on a satisfactory/unsatisfactory basis.

Degree Requirements

All mathematical sciences courses presented to meet the degree requirements must be completed with a grade of C- or better. At least four courses numbered 3000 or above must be taken in residence. Students must have a 2.0 grade point average in the mathematical sciences courses completed.

Students enrolling in introductory mathematics courses should check the prerequisites to determine if a satisfactory score on the Mathematics Placement Test is necessary. The dates on which this test is administered are given at www.umsl.edu/services/cad. Placement into introductory courses assumes a mastery of two years of high school algebra.

A minimum grade of C- is required to meet the prerequisite requirement for any course except with permission of the department.

Note: Courses that are prerequisites for higher-level courses may not be taken for credit or quality points if the higher-level course has been satisfactorily completed.

Many students are qualified, as a result of having studied calculus in high school, to begin their major with Math 1900, Analytic Geometry and Calculus II, or Math 2000, Analytic Geometry and Calculus III. These students are urged to consult with the department before planning their programs. Credit for Mathematics 1800, Analytic Geometry and Calculus I, will be granted to those students who complete Mathematics 1900 with a grade of C- or better.

Similarly, students who are ready to begin their computer science studies with Computer Science 2250, Program-

ming and Data Structures, will be granted credit for Computer Science 1250, Introduction to Computing, once they complete Computer Science 2250 with a grade of C- or better.

Degree Requirements in Mathematics

All mathematics majors in all undergraduate programs must complete the mathematics core requirements.

Core Requirements

1. The following courses are required:

1250, Introduction to Computing
1320, Applied Statistics I
1800, Analytic Geometry and Calculus I
1900, Analytic Geometry and Calculus II
2000, Analytic Geometry and Calculus III
2020, Introduction to Differential Equations
2450, Elementary Linear Algebra
3000, Discrete Structures
4100, Advanced Calculus I

2. The related area requirements as described below must be satisfied.

Students seeking a double degree, either within this department or with another department, do not have to fulfill the related area requirements.

Bachelor of Arts in Mathematics

In addition to the core requirements and the College of Arts and Sciences foreign language requirement, three mathematics courses at the 4000-level or higher must be completed. Of these, one must be 4400, Introduction to Abstract Algebra.

B.S. Ed. in Secondary Education with an Emphasis in Mathematics

In addition to the core requirements and the required education courses, three mathematical/statistics courses at the 4000-level or higher must be completed. Of these, one must be 4400, Introduction to Abstract Algebra, and one must be chosen from: 4660, Foundations of Geometry or 4670, Introduction to Non-Euclidean Geometry.

Bachelor of Science in Mathematics

In addition to the core requirements, the B.S. in Mathematics degree requires:

- i) Completing all of the following:
4160, Functions of a Complex Variable
4400, Introduction to Abstract Algebra
4450, Linear Algebra

ii) Completing an additional three courses numbered above 4000 in mathematics, statistics, or computer science, at least one of which must be in mathematics/statistics.

Degree Requirements in Computer Science

Candidates for the Bachelor of Science in Computer Science degree must complete the following work:

1. Computer Science

1250, Introduction to Computing
2250, Programming and Data Structures
2260, Object-Oriented Programming with C++
2700, Computer Systems: Architecture and Organization
2710, Computer Systems: Programming
2750, Advanced Programming with UNIX
3000, Discrete Structures
3130, Design and Analysis of Algorithms
4250, Programming Languages
4280, Program Translation Techniques
4760, Operating Systems

2. Mathematics and Statistics

1800, Analytic Geometry and Calculus I
1900, Analytic Geometry and Calculus II
2000, Analytic Geometry and Calculus III
2450, Elementary Linear Algebra
1320, Applied Statistics I

3. Philosophy

4458, Ethics and the Computer

4. Five more elective courses, numbered above 4000 if in computer science, and above 2010 if in mathematics or statistics. At least three of these elective courses must be in computer science, and at least one must be in mathematics or statistics.

5. Satisfy the **related area requirements** listed below.

Related Area Requirements

Candidates for the B.A. in mathematics must satisfy the requirements in one of the groups below with a grade of C- or better. Candidates for the B.S. Ed. in mathematics, B.S. in mathematics and B.S. in computer science must satisfy the requirements in two of the groups below with a grade of C- or better.

Candidates for the B.S. in computer science may not choose group 1. Candidates for the B.A. in mathematics, B.S. Ed. in mathematics, or B.S. in mathematics may not choose group 2 or 3.

Students seeking a double degree, either within this department or with another department, do not have to fulfill the related area requirements.

Related Area Courses

1. Computer Science

Two courses from the following list:
2250, Programming and Data Structures
2700, Computer Systems
3130, Design and Analysis of Algorithms
4140, Theory of Computation
4410, Computer Graphics
4440, Digital Image Processing

2. Mathematics (Analysis)

Two courses from the following list:
2020, Introduction to Differential Equations
4030, Applied Mathematics I
4100, Advanced Calculus
4160, Functions of a Complex Variable
4230, Numerical Analysis I

3. Mathematics (Algebra)

Two courses from the following list:
4350, Theory of Numbers
4400, Introduction to Abstract Algebra
4450, Linear Algebra
4550, Combinatorics

4. Statistics

4200, Mathematical Statistics I
4210, Mathematical Statistics II

5. Biology:

2102, General Ecology
2103, General Ecology Laboratory

6. Biology:

2012, Genetics
4182, Population Biology

7. Chemistry:

1111, Introductory Chemistry I
1121, Introductory Chemistry II

8. Chemistry:

3312, Physical Chemistry I
and another 3000-level, or above, chemistry course.

9. Economics:

4100, Introduction to Econometrics,
and one of either:
4110, Applied Econometrics, or
4130, Econometric and Time Series Forecasting

10. Philosophy:

3360, Formal Logic
3380, Philosophy of Science
4460, Advanced Formal Logic

11. Physics:

2111, Physics: Mechanics and Heat
2112, Physics: Electricity, Magnetism, and Optics

12. Physics:

3221, Mechanics and another 3000-level, or above,
physics course.

13. Business Administration:

3320, Introduction to Operations Management
Plus one of the following:
4312, Business Forecasting
4324, Production and Operations Management – Service Systems
4326, Quality Assurance in Business
4330, Production and Operations Management – Logistics
4350, Operations Research

14. Engineering:

2310, Statics
2320, Dynamics

Minor Requirements

The Department offers minors in computer science, mathematics, and statistics. All courses presented for any of these minors must be completed with a grade of C- or better.

Minor in Computer Science

The requirements for the minor are:

1250, Introduction to Computing
2250, Programming and Data Structures
2700, Computer Systems: Architecture and Organization

and two additional computer science courses numbered above 2700.

A minimum of two computer science courses numbered above 2700 must be taken in residence in the Department of Mathematics and Computer Science at UM-St. Louis.

Minor in Mathematics

The requirements for the minor are:

1800, Analytic Geometry and Calculus I
1900, Analytic Geometry and Calculus II
2000, Analytic Geometry and Calculus III

and two additional three-hour mathematics courses numbered above 2400. A minimum of two mathematics courses numbered 2000 or above must be taken in residence in the Department of Mathematics and Computer Science at UM-St. Louis.

Minor in Statistics

The requirements for the minor are:

1320, Applied Statistics I
4200, Mathematical Statistics I

and two additional courses in statistics numbered above 4200. A minimum of two statistics courses numbered above 2000 must be taken in residence in the Department of Mathematics and Computer Science at UM-St. Louis.

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*Toll-free in MO and IL 618 area code:
1-888-GO-2-UMSL*

Career Services: (314) 516-5111

Mathematics and Computer Science Department:
(314) 516-5741

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