

Mathematics

Opportunities for mathematics majors have expanded greatly in recent years. Mathematics majors become actuaries, statisticians, mathematical computer scientists, applied mathematicians, operations research analysts and mathematical researchers. Mathematics is growing and changing and holds fascinating challenges for inquiring minds.

As an undergraduate mathematics major at Southern Illinois University Carbondale, you may work toward a Bachelor of Science degree in the School of Mathematical and Statistical Science or the School of Education. The classes in the mathematics major curriculum are small and are taught by senior faculty members. A strong support system of college and program advisement is available to you at SIU throughout the year.

A student planning for employment with a bachelor's degree should consider a minor or a second major in some field in which mathematics is applied. Many students earn a double major in mathematics and computer science. All of the bachelor's degree programs in mathematics, including the Bachelor of Science degree in the School of Education, have sufficient flexibility to allow you to prepare for alternate career possibilities.

To prepare to major in mathematics at SIU, you should have a solid high school preparation in algebra, geometry in two and three dimensions, and trigonometry, including a substantial study of functions and graphing. Students transferring to SIU after two years at a community college should have completed the calculus sequence, linear algebra and a course in a high-level computer programming language.

As a mathematics major at SIU, you will meet with a School of Mathematical and Statistical Science advisor at least once each semester for planning and departmental approval of courses appropriate to your goals and interests.

A grade of C or better is required in every mathematics course used to satisfy departmental requirements. A student cannot repeat a course or its equivalent in which a grade of B or better was earned without the consent of the department. A math major is required to obtain the permission of the department for a second repeat (third attempt) of a course that is required or elective for the major.

Double majors in mathematics and related fields

Special provisions are made for students to earn a double major in mathematics and a field in which mathematics is extensively applied. The courses MATH 447, MATH 449, MATH 471, MATH 472, and MATH 475 carry credit in both mathematics and computer science. See Bachelor of Science Degree, School of Mathematical and Statistical Science for specific requirements in mathematics for students who also earn a major or minor in computer science.

For students pursuing a double major in math and engineering, physics, or chemistry, the mathematics requirements are MATH 150 or MATH 151, MATH 221, MATH 250, MATH 251, MATH 305 and five additional mathematics courses numbered above 300, including at least three courses above 400, and including two of the three areas of algebra, analysis, probability and statistics. A School of Mathematical and Statistical Science advisor must approve the courses.

Students majoring in business may obtain a second major in Mathematics. The requirements are MATH 150 or MATH 151, MATH 221, MATH 250, MATH 251, and five approved mathematics courses at the 300-400 level, of which at least four are at the 400-level. Recommended courses for this program include MATH 471, MATH 472, MATH 475, MATH 483, MATH 484.

Option in Statistics

A student majoring in Mathematics in the School of Mathematical and Statistical Science may choose to concentrate in statistics.

For this option, the 300- and 400-level course requirements include: MATH 302; either MATH 417 or MATH 421; either MATH 305 or MATH 472; one of MATH 352, MATH 450, or MATH 455; MATH 480; MATH 483; at least two of MATH 473, MATH 481, MATH 484, MATH 485 and one additional approved upper division Mathematics course.

Bachelor of Science (B.S.) in Mathematics (School of Mathematical and Statistical Sciences) Degree Requirements

Degree Requirements	Credit Hours
University Core Curriculum Requirements	39
School of Mathematical and Statistical Science Academic Requirements	12
Biological Sciences: six hours (not University Core Curriculum courses) (Three hours included in the UCC Life Science hours)	3
Mathematics: completed with the major Physical Sciences: six hours (not University Core Curriculum courses) (Three hours included in the UCC Life Science hours)	3
Supportive Skills: a two-semester sequence in a foreign language, or three years of one foreign language in high school with no grade lower than C	6
Requirements for Major in Mathematics	42
MATH 150 or MATH 151, MATH 221, MATH 250, MATH 251 (Three hours included in UCC mathematics hours)	11
CS 202 or approved substitute	4
MATH 302	3
At least one course from each of the following groups	12
(One group may be waived for students with a minor in CS) Group A: Algebra/Discrete Math/Linear Algebra: MATH 319, MATH 349, MATH 419, MATH 421 Group B: Analysis: MATH 352, MATH 450, MATH 455 At least two, from different groups, of the following: Group C: Applied Math/Numerical Analysis: MATH 305, MATH 471, MATH 472, MATH 475 Group D: Probability/Statistics: MATH 380, MATH 480, MATH 483 Group E: Geometry: MATH 335, MATH 433	
Four additional courses in mathematics numbered above MATH 299 (excluding MATH 300I, MATH 311A, MATH 311B, MATH 321, MATH 322, MATH 388, MATH 389, MATH 411, MATH 412)	12

Degree Requirements	Credit Hours
A minimum of five 400-level math courses must be taken. Each student's program must be approved by a mathematics department advisor. Courses taken Pass/Fail will not count toward the major.	
Electives	27
Total	120

The student must work with the Advisement Office to ensure that SIU'S 42 Senior-Hours requirement is met by appropriate choices of core, college, major and elective coursework.

Actuarial Mathematics Specialization

Students pursuing the Bachelor of Science degree with a major in mathematics in the School of Mathematical and Statistical Science may choose to specialize in Actuarial Mathematics. Actuaries put a price on risk, and Actuaries are often ranked as a top ten job with high pay. The Actuarial program at Southern Illinois University provides course work in Mathematics to prepare students for work as Actuaries. Students become Actuaries by taking two Validation by Educational Experience (VEE) course sequences and by passing professional examinations given by the Society of Actuaries (SOA, see www.soa.org) and Casualty Actuarial Society (CAS, see www.casact.org). The professional exams cover probability, financial mathematics for investments including interest theory and financial derivatives, life contingencies: mathematics for life insurance, and loss models. More information about Actuaries and the professional exams can be found at www.beanactuary.com.

Freshmen admitted to the program should have at least a 24 Math ACT score. Students can also enroll as Math majors and transfer to the Actuarial program after receiving a C or higher in Math 250. The program offers preparation for four Actuarial exams and for the two VEE course sequences. Students are required to complete two VEE course sequences are encouraged to pass Exam P/1 and FM/2.

B.S. Mathematics - Actuarial Mathematics Specialization Degree Requirements

Degree Requirements	Credit Hours
University Core Curriculum Requirements	39
To include MATH 150 or MATH 151, ECON 240, MATH 300I and FL.	
College of Science Academic Requirements	12
Biological Sciences: six hours (not University Core Curriculum courses) (Three hours included in the UCC Life Science hours)	3
Mathematics: completed with the major Physical Sciences: six hours (not University Core Curriculum courses) (Three hours included in the UCC Life Science hours)	3

Degree Requirements	Credit Hours
Supportive Skills: a two-semester sequence in a foreign language, or three years of one foreign language in high school with no grade lower than C	6
Requirements for Actuarial Specialization	47
(MATH 150), MATH 221, MATH 250, MATH 251 (Three hours included in UCC mathematics hours)	11
CS 202 or approved substitute	4
MATH 302 and MATH 483	7
At least one course from each of the following groups	9
Group A: Algebra/Discrete Math/Linear Algebra: MATH 319, MATH 349, MATH 421	
Group B: Analysis: MATH 352, MATH 450, MATH 455	
Group C: Applied Math/Numerical Analysis: MATH 305, MATH 471, MATH 472, MATH 475	
MATH 400, MATH 474, and MATH 484	10
Either MATH 401 and MATH 402 or MATH 403 and MATH 404	6
Additional courses required for VEE examinations:	
ECON 240 (if not already included in Core) and ECON 241	6
FIN 330 and FIN 361	6
Accounting courses required as prerequisites for FIN 330	
ACCT 220, ACCT 230	9
Electives if needed to make a total of 120 hours	4-7
Total	120

Data Science Specialization

Students pursuing the Bachelor of Science degree with a major in mathematics in the School of Mathematical and Statistical Science may choose to specialize in Data Science. Data scientists are among the most sought-after professionals in America, with the advent of ubiquitous data sources on all

aspects of life. Business, industry, non-profits, and governments at all levels are being transformed by large data sets and their analysis.

B.S. Mathematics - Data Science Specialization Degree Requirements

Degree Requirements	Credit Hours
University Core Curriculum Requirements	39
College of Science Academic Requirements	12
Requirements for Math Major with Data Science Specialization	61
MATH 150, MATH 221, MATH 250, MATH 251	11
(Three hours included in UCC mathematics)	
CS 202	4
MATH 302, MATH 349, MATH 421, MATH 483, and MATH 492	16
At least one course from each of the following groups	6
Group B: Analysis: MATH 352, MATH 450, MATH 455	
Group C: Applied Math/Numerical Analysis: MATH 305, MATH 471, MATH 472, MATH 475	
At least two of MATH 473, MATH 474, MATH 480, MATH 484, MATH 485, MATH 486	6
Eighteen additional hours selected from the following technical electives, at least twelve hours of which are at the 400-level. The courses counted toward this requirement must be approved by the mathematics program	

Technical Elective options are:

CS 220 Programming with Data Structures
 CS 330 Intro Design and Analysis of Algorithms
 CS 430 Database Systems
 CS 434 Learning From Data
 CS 438 Bioinformatics
 ECE 476 Information Theory
 GEOG 401 Geographic Information Systems
 GEOG 404 Spatial Analysis
 GEOG 406 Intro to Remote Sensing
 GEOG 408 Advanced Remote Sensing
 GEOG 417 GIS Programming
 GEOG 420 Advanced GIS Studies
 GEOG 458 Applied GIS

Degree Requirements	Credit Hours
IMAE 386 Total Quality IMAE 465 Lean Manufacturing IMAE 470A Six Sigma Green Belt IMAE 470B Six Sigma Green Belt II IMAE 480 Six Sigma Black Belt ITEC 334 Data base Design and Processing ITEC 370 Database Programming SQL ITEC 373 Data Science - Python ITEC 374 Data Analytics with R ITEC 470 Adv Database Concepts ITEC 471 Data Analytics - SQL ITEC 472 Machine Learning with R ITEC 473 Advanced DB Programming ITEC 474 Data Warehousing PLB 471 Intro to Systems Biology	
Electives, if needed to make a total of 120 hours	8
Total	120

Bachelor of Science (B.S.) in Mathematics (School of Education)

Admission into the Teacher Education Program requires a 2.5 average in MATH 150 or MATH 151, MATH 221, MATH 250; and MATH 251 or MATH 305 in addition to School of Education requirements for admission to the TEP.

Retention in the Teacher Education Program and approval for student teaching requires a 2.75 average in the major and departmental approval.

Mathematics majors are required to meet with a school advisor for approval of their courses prior to registering each semester.

B.S. Mathematics (School of Education) Degree Requirements

Degree Requirements	Credit Hours
University Core Curriculum Requirements to include ENGL 101 & ENGL 102, PSYC 102, MATH 300I, EDUC 311, EDUC 314	39
Requirements for major in Mathematics	46
Content Courses	40
MATH 150 or MATH 151, MATH 221, MATH 250, and MATH 251 or MATH 305 (Three hours included in UCC mathematics hours)	11
CS 202 or approved substitute	4
MATH 302, MATH 319, MATH 335, MATH 349, MATH 352, MATH 433, MATH 483	19

Degree Requirements	Credit Hours
At least two additional approved 400-level mathematics courses excluding MATH 411, MATH 412	6
Methods Course, MATH 311A, MATH 311B	6
Professional Education and Licensure Requirements	24
EDUC 301, EDUC 302, EDUC 303, EDUC 308, EDUC 313, EDUC 319, EDUC 401A Other requirements for licensure CI 360	3
Electives to make 120 hours	8
Total	120

Mathematics Minor

A non-teaching minor consists of MATH 150 or MATH 151 and 12 hours of mathematics courses at the 200 level or above, including at least three hours at the 400 level (excluding MATH 220, MATH 257, MATH 282, MATH 300I, MATH 311A, MATH 311B, MATH 321, MATH 322, MATH 388, MATH 389, MATH 411, MATH 412). All courses used for the minor must be completed with a grade of C or better. The 400-level mathematics courses must be taken at SIU Carbondale.

The departmental advisor must approve the student's minor program.

Additional Educator Endorsements in Mathematics

Students pursuing a teaching license in another discipline and interested in adding an endorsement in Mathematics should see a School of Mathematical and Statistical Science advisor to obtain a list of specific requirements.

Honors

MATH 395 and MATH 495 are used for individual honors work for upper level undergraduates in mathematics. Concurrent participation in the University Honors Program is encouraged.

Placement

In addition to having taken the prerequisite mathematics courses, students are required to present a satisfactory placement score as a condition for registration in mathematics courses. Contact the School of Mathematical and Statistical Science for current information regarding placement.

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Catalog Year Statement:

Students starting their collegiate training during the period of time covered by this catalog (see bottom of this page) are subject to the curricular requirements as specified herein. The requirements herein will extend for a seven calendar-year period from the date of entry for baccalaureate programs and three years for associate programs. Should the University change the course requirements contained herein

subsequently, students are assured that necessary adjustments will be made so that no additional time is required of them.