MATHEMATICS, BS

More Information: https://mathstats.case.edu/why/frequently-asked-questions/
Degree: Bachelor of Science (BS)
Major: Mathematics

Program Overview

All undergraduate degrees in the department are based on a four-course sequence in calculus and differential equations and have a computational component. The mathematics and applied mathematics degrees all require further mathematics courses in analysis and algebra. The statistics degrees all require a further statistics core. The applied mathematics program has a four-course professional core requirement to promote the understanding of how mathematics is applied in other fields. There are additional requirements particular to each degree program, including technical electives in the major. Each degree program requires a minimum of 120 credit hours.

The bachelor of science in mathematics differs from the bachelor of arts by requiring more hours in the major (although the same total hours for the degree). The extra requirements consist of additional mathematics technical electives as well as coursework in the sciences.

Learning Outcomes

- Students will be able to know fundamental concepts of linear algebra: Vector spaces, linear operators and matrices, four fundamental subspaces, matrix factorizations, and the solution theory of linear systems.
- Students will be able to correctly analyze the solvability of linear problems in practice, and is able to solve linear systems.
- Students will be able to know the fundamental concepts of calculus and classical mathematical analysis: Metric spaces, limits and convergence, continuity, and differential and integral calculus.
- Students will be able to demonstrates the capability of rigorous abstract thinking, and is able to set up a rigorous mathematical proof.
- Students will be able to know the fundamentals of abstract algebra: groups, rings, fields.
- Students will be able to know and is able to work effectively with the elements of abstract algebra, and use them effectively in proofs and calculations.
- Students will be able to express a given problem in mathematical terms, and/or finds the appropriate set of mathematical tools to tackle the problem, and/or is able to select and implement an algorithm that leads to the solution of the problem.
- Students will be able to communicate effectively the results to a non-expert in mathematics, and is able to put the work in the proper context.

Undergraduate Policies

For undergraduate policies and procedures, please review the Undergraduate Academics section of the General Bulletin.

Accelerated Master's Programs

Undergraduate students may participate in accelerated programs toward graduate or professional degrees. For more information and details of the policies and procedures related to accelerated studies, please visit the Undergraduate Academics section of the General Bulletin.

Program Requirements

Students seeking to complete this major and degree program must meet the general requirements for bachelor's degrees and the Unified General Education Requirements. Students completing this program as a secondary major while completing another undergraduate degree program do not need to satisfy the school-specific requirements associated with this major.

The BS degree in Mathematics requires at least 50 credit hours of mathematics courses and at least 17 credit hours in basic science. The specific requirements are as follows:

Code	Title	Credit Hours
Mathematics Requirements:		
MATH 121	Calculus for Science and Engineering I	4
MATH 122	Calculus for Science and Engineering II	4
or MATH 124	Calculus II	
MATH 223	Calculus for Science and Engineering III	3
or MATH 227	Calculus III	
MATH 224	Elementary Differential Equations	3
or MATH 228	Differential Equations	
MATH 307	Linear Algebra	3
MATH 308	Introduction to Abstract Algebra	3
MATH 321	Fundamentals of Analysis I	3
MATH 322	Fundamentals of Analysis II	3
MATH 324	Introduction to Complex Analysis	3
or MATH 425	Complex Analysis I	
MATH 330	Introduction to Scientific Computing	3
Technical Electives [a]		18
Non-mathematics Requirements:		
PHYS 121	General Physics I - Mechanics	4
PHYS 122	General Physics II - Electricity and Magnetism	4
PHYS 221	Introduction to Modern Physics	3
Choose one of the following sequences:		*6-8*
ASTR 101 & ASTR 103	Introduction to the Sun and Its Planets and Introduction to the Stars, Galaxies, and the Universe	
CHEM 105 & CHEM 106	Principles of Chemistry I and Principles of Chemistry II	
CHEM 111 & ENGR 145	Principles of Chemistry for Engineers and Chemistry of Materials	
EEPS 110 & EEPS 115	Physical Geology and Introduction to Oceanography	
EEPS 110 & EEPS 210	Physical Geology and Earth History: Time, Tectonics, Climate, and Life	
Total Credit Hours		**67-69**

a   Any 300-level MATH or STAT course that is not otherwise a degree requirement will count towards the technical elective requirement.

Up to 9 credit hours, with departmental approval, may be from outside MATH or STAT.