

MATHEMATICS, BA

More Information: <https://mathstats.case.edu/undergraduate-programs/why/frequently-asked-questions/>

Degree: Bachelor of Arts (BA)

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.

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 demonstrate 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.

Teacher Licensure

Case Western Reserve University offers licensure programs in music education and art education as degree programs in each of those departments. Additionally, CWRU's Teacher Education Program offers a licensure track for students who wish to pursue a teaching career in their content area in grades 7-12 Adolescent to Young Adult. Licensure areas are: English Language Arts (English major), Integrated Social Studies (history major), Integrated Mathematics (math major), Life Science (biology major), Physical Science (chemistry major), or Physical Science (physics major). A Multi-Age license in grades PreK-12 is available in French, Spanish or Latin. Students must fulfill the degree requirements for their primary major and declare Teacher Education as a second major.

The Teacher Education major consists of 36 hours in education, including a student teaching semester. The program places students in mentored teaching situations at every stage of their training, capitalizing on the relationships the university has built with area schools.

For the subject area requirements for teacher licensure, please visit the program page for Teacher Education, BA.

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 BA degree in Mathematics requires at least 38 credit hours of mathematics and 3 credit hours of computer programming or scientific computing. The specific requirements are as follows:

Code	Title	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	
Technical electives ^{a, b}		9
Computing Requirement:		
ENGR 131	Elementary Computer Programming ^c	3
or MATH 330	Introduction to Scientific Computing	
Total Hours		41

- a No more than one of the three technical electives can be from outside the department.
- b Technical electives are predefined for students pursuing Teacher Licensure.
- c Or other approved computer science course.

Code	Title	Hours
Technical Electives for Teacher Licensure:		
MATH 303	Elementary Number Theory	3
MATH 304	Discrete Mathematics	3
STAT 312	Basic Statistics for Engineering and Science	3