

# MATHEMATICS, BS

Students in mathematics have a wide variety of interests. They generally have strong logical, analytical, and computational skills.

## Admission into the Major

Students are expected to formally declare a major no later than the fourth semester of full-time enrollment (or at 61 semester hours for transfer students). Students may declare a major by completing the Change of Major/Minor Application online under the Student tab of myBama.

## Special Opportunities

Mathematics majors can complete a second major in computer science, electrical engineering, economics, or finance, among others. On-campus employment as a math tutor in the Mathematics Technology Learning Center or as a grader in the Department of Mathematics is available to qualified undergraduate mathematics majors. Research experiences are possible for advanced undergraduate students (<http://undergraduateresearch.ua.edu/>). The University of Alabama also has a chapter of Pi Mu Epsilon, a national mathematics honor society. The Department of Mathematics participates in the Accelerated Masters Program, allowing highly motivated students to pursue closely integrated undergraduate and graduate programs that may lead to the simultaneous completion of requirements for both master's and bachelor's degrees. Students usually apply for admission prior to the junior or senior year. For more information about the Accelerated Masters Program, visit [graduate.ua.edu](http://graduate.ua.edu) or consult the University of Alabama Graduate Catalog.

## Major in Mathematics Requirements

Students earning the bachelor of science (BS) degree with a major in mathematics must complete all University, College and Departmental degree requirements. These include the general education requirements, the following major requirements, all requirements for an approved minor and other sufficient credits to total a minimum of 120 applicable semester hours.

Code and Title	Hours
<b>Core Courses</b>	
MATH 125 or Calculus I	4
MATH 145 Honors Calculus I	
MATH 126 or Calculus II	4
MATH 146 Honors Calculus II	
MATH 227 or Calculus III	4
MATH 247 Honors Calculus III	
MATH 237 Introduction to Linear Algebra	3
MATH 238 Appld Diff Equations I	3
<b>Students must complete one of the following sequences.</b>	<b>6</b>
MATH 403 Algebra: Secondary Teachers & MATH 404 and Geometry: Secondary Teachers	
MATH 410 Numerical Linear Algebra & MATH 411 and Numerical Analysis I	
MATH 420 Linear Optimization Theory & MATH 421 and Non-Linear Optimization Theory	
MATH 343 Appl Diff Equations II & MATH 441 and Boundary Value Problems	
MATH 355 Theory Of Probability & MATH 451 and Math Stats W/Applictn I	

MATH 470 Prin Modern Algebra I & MATH 471 and Prin Modern Algebra II

MATH 486 Real Analysis I & MATH 487 and Intro to Real Analysis II

### Electives

Select 12 additional hours of MATH electives at or above 300.	12
Credit Hours Subtotal:	36

### Ancillary Courses

Grades in ancillary courses are not computed into the major GPA. The major in mathematics for all tracks requires the successful completion of one of the following courses outside the major:

Select one of the following:	2-6
CS 100 CS I for Majors	
CS 110 Honors CS I for Majors	
CS 104 Computer Science Principles	
CS 223 Intro to Python Programming	
AEM 249 Algorithm Devl Implementation	
EC 413 Econ Forecasting & Analysis & FI 389 and Financial Analysis & Modeling	
RRS 101 RRS Freshman I	
MIS 221 Business Programming I	
ST 440 Stat Prog & Comp with R	

**Total Hours 38-42**

## Grade Point Average

A 2.0 grade point average in the major is required for completion of the degree. Please see the Grades and Grade Points section of this catalog for an explanation on grade point average calculations.

## Upper-level Residency

A minimum of 12 hours of 300- or 400-level courses in the major must be earned on this campus.

## Required Minor

The mathematics major requires the completion of a minor or a second major.

## Additional Major Requirements

Students are responsible for ensuring that they have met all University, College, major and minor requirements. However, each student must meet with an adviser in the major department for academic planning and to be approved for registration each semester. College advisers are also available for additional assistance with minor, College and University requirements.

## Optional Major Concentrations

Students who wish to enhance their knowledge in a particular area of study within the mathematical sciences may elect to organize their coursework around the four concentrations listed below. Though not required, these concentrations allow the student to develop an area of specialization within the major and would be part of their required upper division sequence and/or electives listed in the major.

## Applied Mathematics Concentration

Code and Title	Hours
MATH 355 Theory Of Probability	3
MATH 485 Intro Complex Variables	3
Complete one of the following sequences:	6
MATH 343 Appl Diff Equations II & MATH 44 and Boundary Value Problems	
MATH 410 Numerical Linear Algebra & MATH 41 and Numerical Analysis I	
MATH 420 Linear Optimization Theory & MATH 42 and Non-Linear Optimization Theory	
<b>Total Hours</b>	<b>12</b>

## Pure Mathematics Concentration

Code and Title	Hours
MATH 470 Prin Modern Algebra I	3
MATH 486 Real Analysis I	3
Choose one from the following:	3
MATH 460 Intro Differential Geom	
MATH 465 Intro General Topology	
Choose one from the following:	3
MATH 371 Advanced Linear Algebra	
MATH 471 Prin Modern Algebra II	
MATH 487 Intro to Real Analysis II	
<b>Total Hours</b>	<b>12</b>

## Mathematics Education Concentration

*This concentration is open to all students and should be followed by those planning to enter the teaching profession in the future. Please note that this concentration does not lead to teacher certification. Students interested in earning teacher certification must be admitted through the College of Education. For more information, visit [here](#).*

Code and Title	Hours
MATH 355 Theory Of Probability	3
MATH 403 or Algebra: Secondary Teachers	3
MATH 503 Algebra: Secondary Teachers	
MATH 405 or Geometry: Secondary Teachers	3
MATH 505 Geometry: Secondary Teachers	
MATH 409 or Data Analysis: Sec Teachers	3
MATH 509 Data Analysis: Sec Teachers	
<b>Total Hours</b>	<b>12</b>

## Mathematical Statistics and Optimization Concentration

Code and Title	Hours
<b>Choose four from the following</b>	<b>12</b>
MATH 420 Linear Optimization Theory	
MATH 421 Non-Linear Optimization Theory	
MATH 451 Math Stats W/Applictn I	
MATH 452 Math Stats W/Applictn II	
MATH 457 Stochastic Processes I	
ST 452 Applied Regression Analysis	
<b>Total Hours</b>	<b>12</b>

Any complex system can be modeled and analyzed using mathematics, which means that mathematics is a fundamental tool in essentially all

careers. The ability to understand such systems has never been more important given the explosion in the availability of data in recent years, and the crucial need to make informed decisions from such data. A degree in mathematics provides an excellent opportunity to develop these skills. Moreover, careers in mathematics consistently rank highly in terms of satisfaction, income, and job prospects in national surveys.

## Types of Jobs Accepted

A strong foundation in mathematics allows students to excel in many different industries including:

- Finance
- Education
- Actuarial science
- Statistics, data science, artificial intelligence, and machine learning
- Mathematical biology and chemistry
- Petrology and geological science
- Operations research and management sciences
- Cybersecurity and cryptography
- Medicine
- Law, and many more.

A common denominator in all of these fields is the need for quantitative reasoning, creativity, and critical thinking.

## Jobs of Experienced Alumni

Graduates with a Major in Mathematics have started their careers in a number of different types of jobs and industries.

Those wanting to go into the business world work for companies in finance, actuarial science, computer programming, data analysis, engineering, banking, insurance, economics, and many other fields. These students often participate in an internship during their time at The University of Alabama and pair their major in mathematics with a second major in a different field.

Students desiring to work in the field of education have become teachers at all levels of education and many have gone on to earn their doctorates in mathematics at some of the best graduate schools in the United States.

There have also been many students who have applied their major in mathematics to work in various government agencies. Some students have gone on to work for intelligence agencies, such as the National Security Agency, while others work as data analysts for many other agencies.

Several other students have used a major in mathematics as an entry into Medical or Law school.

Learn more about opportunities in this field at the Career Center