

# BACHELOR OF ARTS

Studying Mathematics develops such skills as critical thinking, oral and written communication, arguing logically and rigorously, thinking abstractly, formulating and solving problems, analyzing data, analyzing mathematical models, quantitative and computer proficiency, and the ability to work in groups. Employers value these skills; consequently, Mathematics majors find themselves in demand by employers for careers in a wide spectrum of fields.

## About this Program

- **College:** Liberal Arts and Sciences (<http://catalog.ufl.edu/UGRD/colleges-schools/UGLAS/>)
- **Degrees:** Bachelor of Arts (p. 1) | Bachelor of Science ([http://catalog.ufl.edu/UGRD/colleges-schools/UGLAS/MAT\\_BA\\_BS/MAT\\_BS/](http://catalog.ufl.edu/UGRD/colleges-schools/UGLAS/MAT_BA_BS/MAT_BS/))
- **Credits for Degree:** 120
- **More Info**

*To graduate with this major, students must complete all university, college, and major requirements.*

## Department Information

Graduates from the Department of Mathematics might take a job that uses their math major in an area like statistics, biomathematics, operations research, actuarial science, mathematical modeling, cryptography, or mathematics education. Or they might continue into graduate school leading to a research career. Professional schools in business, law, and medicine appreciate mathematics majors because of the analytical and problem solving skills developed in the math courses. Website (<https://math.ufl.edu/>)

## CONTACT

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GAINESVILLE FL 32611

Map (<http://campusmap.ufl.edu/#/index/0655>)

## Curriculum

- Combination Degrees
- Mathematics
- Mathematics Minor

The Department of Mathematics offers two undergraduate degree programs in mathematics:

## Bachelor of Arts

Intended for students who wish to pursue a career in a mathematical field or to teach mathematics at the secondary-school level, but who do not currently contemplate graduate study in mathematics.

## Bachelor of Science

Intended for students who wish to pursue graduate study in mathematics as well as for other strong students with a deep interest in mathematics.

## Coursework for the Major

Students are required to take eight core courses, providing a broad base in mathematics, and four electives chosen from a list of approved courses. All but two of the core courses are the same for both degrees.

Students pursuing the B.A. degree have greater flexibility in their choice of electives, facilitating the possibility of a double-major with another scientific discipline.

A minimum of 39 credits of mathematics and mathematics-approved electives is required for each degree. All coursework for the major must be completed with minimum grades of C, with the exception of MAS 4105 for students in the B.S. specialization, which requires a minimum grade of B.

## Relevant Minors and/or Certificates

Mathematics majors are encouraged to consider taking a minor in computer science, industrial and systems engineering, physics, or statistics. The Department of Statistics offers a minor in actuarial science. In addition, the UFTeach program offers a minor in mathematics teaching.

More Info (<https://stat.ufl.edu/academics/undergraduate/minor-in-actuarial-science/>)

## UFTeach Program

There is a severe shortage of qualified high school mathematics teachers in Florida and nationwide. Students interested in entering this high-demand profession should see a departmental advisor about the UFTeach program. Mathematics majors in this program complete the requirements for the UFTeach minor in mathematics, as well as those for the B.A. or B.S. in mathematics. These students graduate with all the coursework and preparation the State of Florida requires for professional certification as a high school mathematics teacher.

More Info (<http://education.ufl.edu/uf-teach/>)

## Research

Research and scholarly opportunities are described on the mathematics website under Opportunities for Undergraduates.

More Info (<http://www.math.ufl.edu/mathematics-major/opportunities-for-undergraduates/>)

## Combination Degree Programs

Mathematics majors who complete the requirements for major by the end of the junior year are eligible for the combination-degree program. Students in this program take the graduate sequences MAA 5228 and MAA 5229 and MAS 5311 and MAS 5312 in their senior year. These 12 credits, which apply toward the undergraduate degree, will then also apply toward a master's degree in mathematics if the student is admitted to the graduate program. The student should successfully complete this degree with one full-time year of graduate school following receipt of a bachelor's degree.

## Bachelor of Arts

The Bachelor of Arts is intended for students who wish to pursue a career in a mathematical field or to teach mathematics at the secondary-school level, but who do not currently contemplate graduate study in mathematics.

## Coursework

Code	Title	Credits
<b>Required Coursework for Both Degrees</b>		
MAC 2312 or MAC 3473	Analytic Geometry and Calculus 2 Honors Calculus 2	4
MAC 2313 or MAC 3474	Analytic Geometry and Calculus 3 Honors Calculus 3	4

MAP 2302	Elementary Differential Equations	3
MHF 3202	Sets and Logic	3
MAS 4105	Linear Algebra 1	4
MAS 4301	Abstract Algebra 1	3
<b>Additional Required Coursework for B.A.</b>		
Select one sequence:		6
MAA 4102 & MAA 4103	Introduction to Advanced Calculus for Engineers and Physical Scientists 1 and Introduction to Advanced Calculus for Engineers and Physical Scientists 2	
MAA 4211 & MAA 4212	Advanced Calculus 1 and Advanced Calculus 2	
Select four electives, 12 credits minimum, from the approved electives; at least one must be a course offered by the Department of Mathematics at the 4000 level or above		12
Total Credits		39

The mathematics major is expected to take the following upper-division core courses at UF: Linear Algebra, Abstract Algebra, Advanced Calculus 1 and 2, and either Advanced Calculus 1 and 2 or Advanced Calculus for Engineers and Physical Sciences 1 and 2. A combination of MAA 4211 and MAA 4103 is permissible for students in the B.A. track.

These courses are common to all math majors and most clearly define the experience of the mathematics major at UF.

### Recommended Coursework for Both Degrees

All math majors are encouraged to meet the college distribution requirement in the physical sciences with the sequence PHY 2048/PHY 2049 or the sequence PHY 2060/PHY 2061. Math majors should also take no mathematics course at the 3000 level or below that is not on the lists of core courses or approved electives, except with advisor approval. Students who want to pursue careers in applied mathematics are urged to take STA 4321/STA 4322 and learn a scientific programming language.

### Recommended Coursework for B.A.

B.A. students can use their elective choices creatively. By choosing courses in statistics, computer science, physics, and industrial engineering from the list below, math B.A. majors can enhance their career prospects in applied math, data analysis, information technology and operations research.

Math majors who plan to teach secondary-school mathematics should investigate the UFTeach program (<http://education.ufl.edu/uf-teach/>) and they should include MTG 3212, MAA 4402 and STA 4321 among their electives.

### Critical Tracking

Critical Tracking records each student's progress in courses that are required for progress toward each major. Please note the critical-tracking requirements below on a per-semester basis.

**For degree requirements outside of the major, refer to CLAS Degree Requirements: Structure of a CLAS Degree.**

Equivalent critical-tracking courses as determined by the State of Florida Common Course Prerequisites (<http://www.flvc.org/cpp/displayRecord.jsp?cip=270101&track=01>) may be used for transfer students.

## Semester 1

- Complete MAC 2311
- 2.0 UF GPA required

## Semester 2

- Complete MAC 2312
- 2.0 UF GPA required

## Semester 3

- Complete MAC 2313
- 2.0 UF GPA required

## Semester 4

- Complete MHF 3202 with a 2.5 GPA required for all critical-tracking courses
- 2.0 UF GPA required

## Semester 5

- Complete MAS 4105 with a 2.5 GPA required for all critical-tracking courses
- 2.0 UF GPA required

## Semester 6

- Complete at least 1 3000/4000 mathematics elective
- 2.0 UF GPA required

## Semester 7

- Complete MAA 4102
- Complete at least 2 3000/4000 mathematics electives
- 2.0 UF GPA required

## Semester 8

- Complete all remaining mathematics major requirements
- 2.0 UF GPA required

### Model Semester Plan

The semester plans below are sample programs; they may be adjusted to reflect background and goals. Students should consult a department advisor in 358 Little Hall early to plan their programs.

Students are expected to complete the writing requirement while in the process of taking the courses below. Students are also expected to complete the general education international (GE-N) and diversity (GE-D) requirements concurrently with another general education requirement (typically, GE-C, H, or S).

To remain on track, students must complete the appropriate critical-tracking courses, which appear in bold. These courses must be completed by the terms as listed above in the Critical Tracking criteria.

*This semester plan represents an example progression through the major. Actual courses and course order may be different depending on the student's academic record and scheduling availability of courses. Prerequisites still apply.*

Course	Title	Credits
<b>Semester One</b>		
MAC 2311	Analytic Geometry and Calculus 1 ( <b>Critical Tracking</b> ; State Core Gen Ed Mathematics)	4
Quest 1 (Gen Ed Humanities)		3
State Core Gen Ed Biological or Physical Sciences ( <a href="http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext">http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext</a> )		3
State Core Gen Ed Social and Behavioral Sciences ( <a href="http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext">http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext</a> )		3
Credits		13
<b>Semester Two</b>		
MAC 2312	Analytic Geometry and Calculus 2 ( <b>Critical Tracking</b> ; Gen Ed Mathematics)	4
Gen Ed Biological or Physical Sciences (area <b>not</b> taken in semester 1)		3
State Core Gen Ed Composition ( <a href="http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext">http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext</a> ); Writing Requirement		3
Elective		3
State Core Gen Ed Humanities ( <a href="http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext">http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext</a> )		3
Credits		16
<b>Semester Three</b>		
MAC 2313	Analytic Geometry and Calculus 3 ( <b>Critical Tracking</b> ; Gen Ed Mathematics)	4
MHF 3202	Sets and Logic ( <b>Critical Tracking</b> )	3
Gen Ed Humanities		3
Gen Ed Physical Sciences		3
Science laboratory (Gen Ed Physical or Biological Sciences)		1
Gen Ed Social and Behavioral Sciences		3
Credits		17
<b>Semester Four</b>		
MAP 2302	Elementary Differential Equations (Gen Ed Mathematics)	3
MAS 4105	Linear Algebra 1 ( <b>Critical Tracking</b> )	4
Gen Ed Composition; Writing Requirement		3
Gen Ed Biological Sciences		3
Gen Ed Social and Behavioral Sciences		3
Credits		16
<b>Semester Five</b>		
MAS 4301	Abstract Algebra 1	3
Mathematics elective		3
Elective (3000 level or higher, not in major)		3
Foreign language course		4-5
Credits		13-14
<b>Semester Six</b>		
Mathematics elective ( <b>Critical Tracking</b> )		3
Foreign language course		3-5
Electives (3000 level or higher, not in major)		6
Elective		3
Credits		15-17
<b>Semester Seven</b>		
MAA 4102	Introduction to Advanced Calculus for Engineers and Physical Scientists 1 ( <b>Critical Tracking</b> )	3
Mathematics elective ( <b>Critical Tracking</b> )		3
Elective or foreign language if 4-3-3 option		3
Electives (3000 level or higher, not in major)		6
Credits		15

<b>Semester Eight</b>		
MAA 4103	Introduction to Advanced Calculus for Engineers and Physical Scientists 2	3
Mathematics elective ( <b>Critical Tracking</b> )		3
Electives (3000 level or higher, not in major)		6
Elective		3
Credits		15
Total Credits		120

## Approved Electives

### Approved Electives for Both Degrees | Except as Noted

Code	Title	Credits
MAA 4226	Introduction to Modern Analysis 1	3
MAA 4227	Introduction to Modern Analysis 2	3
MAA 4402	Functions of a Complex Variable	3
MAD 3107	Discrete Mathematics	3
MAD 4203	Introduction to Combinatorics 1	3
MAD 4204	Introduction to Combinatorics 2	3
MAD 4401	Introduction to Numerical Analysis	3
MAP 4305	Differential Equations for Engineers and Physical Scientists	3
MAP 4341	Elements of Partial Differential Equations	3
MAP 4413	Fourier Analysis	3
MAP 4484	Modeling in Mathematical Biology	3
MAP 4102	Probability Theory and Stochastic Processes 2	3
MAS 4124	Introduction to Numerical Linear Algebra	3
MAS 4203	Introduction to Number Theory	3
MAT 4930	Special Topics in Mathematics (only if approved by undergraduate coordinator)	1-3
MHF 4102	Elements of Set Theory	3
MHF 4203	Foundations of Mathematics	3
MTG 3212	Geometry	3
MTG 4302	Elements of Topology 1	3
MTG 4303	Elements of Topology 2	3
Any course offered by the mathematics department at the 5000 level or above and any of the following courses offered outside the mathematics department:		
CDA 3101	Introduction to Computer Organization	
COP 3530	Data Structures and Algorithm	
COP 4600	Operating Systems	
ESI 3312	Operations Research 1	
ESI 4313	Operations Research 2	
PHY 3063	Enriched Modern Physics	
PHY 3221	Mechanics 1	
PHY 3323	Electromagnetism 1	
PHY 3513	Thermal Physics 1	
PHY 4222	Mechanics 2	
PHY 4324	Electromagnetism 2	
PHY 4424	Optics 1	
PHY 4523	Statistical Physics	
PHY 4604	Introductory Quantum Mechanics 1	
PHY 4605	Introductory Quantum Mechanics 2	
STA 4210	Regression Analysis	
STA 4211	Design of Experiments	
STA 4321	Introduction to Probability	
STA 4322	Introduction to Statistics Theory	
STA 4853	Introduction to Time Series and Forecasting	

## Academic Learning Compact

The major in mathematics enables students to develop proficiency in calculus, differential equations, advanced calculus, linear algebra and abstract algebra, and expose them to several other mathematical areas beyond these core fields. Students will learn to read and to construct mathematical proofs, to reason in abstract mathematical systems and to use mathematical models. Students will also acquire the ability to read new mathematics and to formulate mathematical models and arguments.

## Before Graduating Students Must

- Be evaluated on your responses to certain examination questions in upper-division courses that are required for your degree.
- Complete requirements for the baccalaureate degree, as determined by faculty.

## Students in the Major Will Learn to

### Student Learning Outcomes (SLOs)

#### Content

1. Bachelor of Arts: Explain conceptual and computational competency in core mathematics: calculus, differential equations, real analysis, linear algebra and abstract algebra.

Bachelor of Science: Explain conceptual and computational competency in core mathematics: calculus, differential equations, advanced calculus, linear algebra and abstract algebra.

#### Critical Thinking

2. Identify correct mathematical arguments in abstract mathematical systems.
3. Develop and analyze mathematical models of scientific problems.

#### Communication

4. Develop and write correct mathematical arguments.

## Curriculum Map

*I = Introduced; R = Reinforced; A = Assessed*

Courses	SLO 1	SLO 2	SLO 3	SLO 4
<b>Bachelor of Arts</b>				
MAA 4102	I, R, A	I, R, A	I, R, A	I, R, A
MAA 4103	I, R, A	I, R, A	I, R, A	I, R, A
MAS 4105	I, R, A	I, R, A	I, R, A	I, R, A
MAS 4301	I, R, A	I, R, A	I, R, A	I, R, A
<b>Bachelor of Science</b>				
MAS 4105	I, R, A	I, R, A	I, R, A	I, R, A
MAA 4211	I, R, A	I, R, A	I, R, A	I, R, A
MAA 4212	I, R, A	I, R, A	I, R, A	I, R, A
MAS 4301	I, R, A	I, R, A	I, R, A	I, R, A

## Assessment Types

- Exams