BACHELOR OF SCIENCE

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 (http://catalog.ufl.edu/UGRD/colleges-schools/UGLAS/MAT_BA_BS/MAT_BA/) | Bachelor of Science (p. 1)
- **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

Email (undergraduatecoordinator@math.ufl.edu) | 352.294.2350

358 LITTLE HALL
GAINESVILLE FL 32611
Map (http://campusmap.ufl.edu/#/index/0655)

Curriculum

- Combination Degrees
- Mathematics
- Mathematics Minor

The Bachelor of Science | BS is intended for students who wish to pursue graduate study in mathematics as well as for other strong students with a deep interest in mathematics.

Requirements 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.

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.

The mathematics major is expected to take the following upper-division core courses at UF: Linear Algebra, Abstract Algebra, Real Analysis and Advanced Calculus 1 (or Introduction to Real Analysis 1), and Real Analysis and Advanced Calculus 2 (or Introduction to Real Analysis 2). The sequence MAA 4211 (https://catalog.ufl.edu/search/?P=MAA%204211) and MAA 4212 (https://catalog.ufl.edu/search/?P=MAA%204212) is strongly recommended for students who wish to pursue graduate study in mathematics or a closely related discipline.

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

Code	Title	Credits
Required Foundation Coursework		
MAC 2312	Analytic Geometry and Calculus 2	4
or MAC 3473	Honors Calculus 2	
MAC 2313	Analytic Geometry and Calculus 3	4
or MAC 3474	Honors Calculus 3	
MAP 2302	Elementary Differential Equations	3
Required Major Coursework		
Mathematics BS Core Courses		
MHF 3202	Reasoning and Proof in Mathematics	3
MAS 4105	Linear Algebra 1	4

MAS 4301	Abstract Algebra 1	3
Select one sequence:		6
MAA 4102 & MAA 4103	Introduction to Real Analysis 1 and Introduction to Real Analysis 2	
MAA 4102 & MAA 4402	Introduction to Real Analysis 1 and Functions of a Complex Variable [1]	
MAA 4211 & MAA 4103	Real Analysis and Advanced Calculus 1 and Introduction to Real Analysis 2 [2]	
MAA 4211 & MAA 4212	Real Analysis and Advanced Calculus 1 and Real Analysis and Advanced Calculus 2 [2]	
MAA 4211 & MAA 4402	Real Analysis and Advanced Calculus 1 and Functions of a Complex Variable [1, 2]	
Mathematics BS Major Electives		
Select four electives, 12 credits minimum, from the approved electives; at least three must be a course offered by the Department of Mathematics at the 4000 level or above		12
Total Credits		**39**

1 If this option is selected, MAA 4402 or MAA 5404 cannot be used to satisfy the mathematics elective requirement.
2 Students must earn a minimum grade of B in MAS 4105 before taking MAA 4211.

Recommended Coursework

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.

Students who want to pursue graduate study in a PhD program in mathematics should complete MAS 4301 and MAA 4211/MAA 4212 by the end of their junior year. They should include MAS 5311 and MAA 4226 among their electives, and they are encouraged to take more than four electives.

Graduate tuition fees will apply for MAS 5311.

Relevant Minors and 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 BA or BS 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 (https://catalog.ufl.edu/search/?P=MAA%205228) and MAA 5229 (https://catalog.ufl.edu/search/?P=MAA%205229) and MAS 5311 (https://catalog.ufl.edu/search/?P=MAS%205311) and MAS 5312 (https://catalog.ufl.edu/search/?P=MAS%205312) 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.
More Info (https://math.ufl.edu/mathematics-major/combined-degree/)

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 (https://cpm.flvc.org/advance-search/) 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 4211 or MAA 4102 or MAA 4226
- 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

Students are expected to complete the Writing, Civic Literacy, summer enrollment, and Quest requirements while in the process of taking the courses below. Students are also expected to complete the General Education International (GE-N) requirements concurrently with another General Education requirement (typically, GE-C, H, or S) as part of the CLAS Basic Distribution requirements. One of the two general education mathematics courses must be a pure math course.

College of Liberal Arts and Sciences allows students additional flexibility in its Distribution Requirements. Students may count a maximum of 6 credits TOTAL from the CLAS Distribution course lists towards Humanities, Social and Behavioral Sciences, or Biological and Physical Sciences, with no more than 3 credits of Humanities, 3 credits of Social and Behavioral Sciences, or 6 credits of Biological or Physical Sciences.

The full list of major-specific requirements for this major can be found on the Overview tab. College of Liberal Arts and Sciences degree requirements can be found on the college's degree requirements page (https://catalog.ufl.edu/UGRD/colleges-schools/UGLAS/#degreerequirementstext).

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
Semester One		
MAC 2311	Analytic Geometry and Calculus 1 (**Critical Tracking**; State Core Gen Ed Mathematics)	4
Quest 1		3
State Core Gen Ed Biological or Physical Sciences (http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext)		3
State Core Gen Ed Social and Behavioral Sciences (http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext)		3
	Credits	**13**
Semester Two		
MAC 2312	Analytic Geometry and Calculus 2 (**Critical Tracking**; Gen Ed Mathematics)	4
Quest 2		3
Gen Ed Biological or Physical Sciences (area **not** taken in semester 1)		3
Natural Science Laboratory [1]		1
State Core Gen Ed Composition (http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext); Writing Requirement		3
State Core Gen Ed Humanities (http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext)		3
	Credits	**17**
Semester Three		
MAC 2313	Analytic Geometry and Calculus 3 (**Critical Tracking**; Gen Ed Mathematics)	4
MHF 3202	Reasoning and Proof in Mathematics (**Critical Tracking**)	3
Gen Ed Biological Sciences		3
Gen Ed Humanities		3
Gen Ed Social and Behavioral Sciences		3
	Credits	**16**
Semester Four		
MAP 2302	Elementary Differential Equations (Gen Ed Mathematics)	3
MAS 4105	Linear Algebra 1 (**Critical Tracking**)	4
Gen Ed Physical Sciences		3
Gen Ed Composition; Writing Requirement		3
Gen Ed Social and Behavioral Sciences		3
	Credits	**16**
Semester Five		
MAA 4211	Real Analysis and Advanced Calculus 1 (**Critical Tracking**)	3
MAS 4301	Abstract Algebra 1	3
CLAS Foreign Language Proficiency Requirement [2]		4-5
Electives (3000 level or higher, not in major)		3
	Credits	**13-14**
Semester Six		
MAA 4212	Real Analysis and Advanced Calculus 2	3
Mathematics elective (**Critical Tracking**)		3
CLAS Foreign Language Proficiency Requirement [2]		3-5
Elective (3000 level or higher, not in major)		3
Gen Ed Humanities		3
	Credits	**15-17**
Semester Seven		
MAA 4226	Introduction to Modern Analysis 1 (or another math elective; **Critical Tracking**)	3
MAS 5311	Introductory Algebra I (or another math elective)	3
Elective (or CLAS Foreign Language Proficiency Requirement if 4-3-3 option) [2]		3
Electives (3000 level or higher, not in major)		6
	Credits	**15**
Semester Eight		
MAA 4227	Introduction to Modern Analysis 2 (or another math elective)	3
Mathematics elective (**Critical Tracking**)		3
Elective (inside or outside major)		3
Electives (3000 level or higher, not in major)		6
	Credits	**15**
	Total Credits	**120**

1 Degree Requirements (https://catalog.ufl.edu/UGRD/colleges-schools/UGLAS/#degreerequirementstext)

[2] CLAS Foreign Language Proficiency Requirement (https://catalog.ufl.edu/UGRD/colleges-schools/UGLAS/#degreerequirementstext)

Approved Electives

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 4301	Graph Theory	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 4115	Linear Algebra for Data Science	3
MAS 4203	Introduction to Number Theory	3
MAS 4302	Abstract Algebra 2	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	
EEL 3112	Circuits 2	
EEL 3135	Introduction to Signals and Systems	
EEL 3850	Data Science for ECE	
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	
PHZ 4710	Introduction to Biological Physics	
STA 4210	Regression Analysis	
STA 4211	Design of Experiments	
STA 4241	Statistical Learning in R	
STA 4273	Statistical Computing in R	
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 their responses to certain examination questions in upper-division courses that are required for their 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
Bachelor of Arts				
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
Bachelor of Science				
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