

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

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358 LITTLE HALL

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 Science

The Bachelor of Science (B.S.) 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.

Coursework

| Code | Title | Credits |
|---|--|---------|
| Required Coursework for Both Degrees | | |
| Select one: | | |
| MAC 2312 | Analytic Geometry and Calculus 2 | 4 |
| MAC 2512 | Calculus 2 for Advanced Placement Students | |
| 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 |
| MHF 3202 | Sets and Logic | 3 |
| MAS 4105 | Linear Algebra 1 | 4 |
| MAS 4301 | Abstract Algebra 1 | 3 |
| Additional Required Coursework for B.S. | | |
| MAA 4211 | Advanced Calculus 1 | 6 |
| & MAA 4212 | and Advanced Calculus 2 ¹ | |
| 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 Students must earn a minimum grade of B in MAS 4105 before taking MAA 4211.

The mathematics major is expected to take the following upper-division core courses at UF: Linear Algebra, Abstract Algebra, 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.S.

Students who want to pursue graduate study in a Ph.D. 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.

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 minimum grade of B and 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 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

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 |
|-----------------------------|--|---------|
| Semester One | | |
| MAC 2311 | Analytic Geometry and Calculus 1 (Critical Tracking ; State Core Gen Ed Mathematics) | 4 |
| Quest 1 (Gen Ed Humanities) | | 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 |
| Gen Ed Biological or Physical Sciences (area not taken in semester 1) | 3 |
| 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 |
| Elective | 3 |

Credits 16

Semester Three

| | |
|--|---|
| MAC 2313 Analytic Geometry and Calculus 3 (Critical Tracking ; Gen Ed Mathematics) | 4 |
| MHF 3202 Sets and Logic (Critical Tracking) | 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

Semester Four

| | |
|---|---|
| MAP 2302 Elementary Differential Equations (Gen Ed Mathematics) | 3 |
| MAS 4105 Linear Algebra 1 (Critical Tracking) | 4 |
| Gen Ed Composition; Writing Requirement | 3 |
| Gen Ed Biological or Physical Sciences | 3 |
| Gen Ed Social and Behavioral Sciences | 3 |

Credits 16

Semester Five

| | |
|---|-----|
| MAA 4211 Advanced Calculus 1 (Critical Tracking) | 3 |
| MAS 4301 Abstract Algebra 1 | 3 |
| Elective (3000 level or higher, not in major) | 3 |
| Foreign language | 4-5 |

Credits 13-14

Semester Six

| | |
|---|-----|
| MAA 4212 Advanced Calculus 2 | 3 |
| Mathematics elective (Critical Tracking) | 3 |
| Foreign language | 3-5 |
| Elective (3000 level or higher, not in major) | 3-4 |
| Elective | 3 |

Credits 15-18

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 foreign language if 4-3-3 option | 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

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 |
|----------------------------|---------|---------|---------|---------|
| 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
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