• **MATHEMATICS (MTH)**

The Department of Mathematics offers a diversity of courses designed not only to enable the student to pursue a profession in mathematics itself, but also to enhance the student’s competence in the fields of engineering, the physical sciences, and the life sciences. The department offers programs leading to the B.A., M.A., and Ph.D. degrees. The undergraduate program emphasizes the broad nature of modern mathematics and its close associations with the real world. The program is designed to prepare students for entry into graduate school or careers in industry or secondary education.

The Department of Mathematics consists of approximately 31 full-time faculty members, whose areas of interest include: algebra, applied mathematics, approximation theory, celestial mechanics, complex analysis, dynamical systems, functional analysis, graph theory, logic, number theory, ordinary differential equations, partial differential equations, potential theory, probability theory, real analysis, statistics, theoretical computer science, and topology.

**Requirements for the Major in Mathematics**

**Prerequisites (State Mandated Common Prerequisites)**

Students wishing to transfer to USF from a Florida Community College should complete the A.A. degree at the community college. Some courses required for the major may also meet General Education Requirements thereby transferring maximum hours to the university.

A student who transfers without an A.A. degree and has fewer than 60 semester hours of acceptable credit must meet the university’s entering freshman requirements including ACT or SAT test scores, GPA, and course requirements. The transfer student should also be aware of the immunization, foreign language, and continuous enrollment policies of the university.

Students should complete the following prerequisite courses listed below at the lower level prior to entering the university. If these courses are not taken at the community college, they must be completed before the degree is granted. Unless stated otherwise, a grade of "C" is the minimum acceptable grade.

- COP XXXX Computer Language Course
- MACX311 Calculus I
- MACX312 Calculus II
- MACX313 Calculus III

**MAJOR IN MATHEMATICS**

The courses taken to satisfy the requirements below will constitute the major program referred to in the general graduation requirements of the College of Arts and Sciences.

Majors are encouraged to consult the department's Undergraduate Advisor before every semester. The Undergraduate Advisor will recommend electives that are appropriate for the student's interests and goals.

Majors are encouraged to consider the Honors Program and the Accelerated BA/MA Program, which are outlined below.

1. **Mathematics Requirements** (Minimum 45 credit hours)

**Core Requirement.** Majors must complete the following five courses (20 credit hours):

- MAC 2311 Calculus I (4)
- MAC 2312 Calculus II (4)
- MAC 2313 Calculus III (4)
- MGF 3301 Bridge to Abstract Mathematics (4)
- MAS 3105 Linear Algebra (4)

**Analysis Requirement.** Majors must complete one of the following two courses (4 credit hours):

- MAA 4211 Intermediate Analysis I (4)
- MAS 4156 Vector Calculus (4)

Majors who complete both MAA 4211 and MAS 4156 may count one of these towards the Elective Requirement below.

**Elective Requirement.** Majors must complete seven courses from the following electives (Minimum 21 credit hours):

- COP 4313 Symbolic Computations in Mathematics (3)
- MAA 4211 Intermediate Analysis I (4)
- MAA 4212 Intermediate Analysis II (3)
- MAC 4002 Complex Variables (3)
- MAD 4401 Numerical Analysis (3)
- MAD 4504 Theory of Computation (3)
- MAD 5305 Introduction to Graph Theory (3)
- MAP 2302 Differential Equations (3)
- MAP 5345 Applied Partial Differential Equations (3)
- MAP 5407 Methods of Applied Mathematics (3)
- MAS 4156 Vector Calculus (4)
- MAS 4301 Elementary Abstract Algebra (3)
- MAS 5215 Number Theory (3)
- MAT 4970 Mathematics Senior Thesis (3)
- MHF 4403 Early History of Mathematics (3)
- MHF 4406 History of Modern Mathematics (3)
- MTG 4214 Modern Geometry (3)
- MTG 4302 Introduction to Topology (3)
- STA 4321 Essentials of Statistics (3)
- STA 4442 Introduction to Probability (3)

**Special Notes.** Majors who complete both MHF 4403 and MHF 4406 may count only one of these towards the Elective Requirement above.

MAT 4930, Selected Topics in Mathematics, or 5000-level mathematics courses may be taken as electives, with the approval of the Undergraduate Advisor.

One or two courses from another department which are of high mathematical content may also be taken as electives, with the approval of the Undergraduate Advisor and the Chairman.

Majors wishing to take a course in statistics should first take STA 4442 and then STA 4321.

Majors wishing to continue towards a graduate degree in mathematics should take MAS 4301 and MAA 4211. (See also the sections on the Honors Program and the Accelerated BA/MA Program below.)

2. **Mathematics-related Courses** (Min. 6 credit hours)

Majors must take two courses in science or engineering which are required courses for the majors within those departments. The two courses need not be in the same department. Science courses must include laboratories and be offered by the Departments of Biology, Chemistry, Geology, or Physics.

**HONORS PROGRAM IN MATHEMATICS**

The program is designed for students who wish to obtain a B.A. degree that will indicate unusual strength in the field of mathematics. Successful completion of the program will be prominently displayed on the student’s diploma and will be recorded on the official USF transcript of the student’s work.

Students are eligible for admission to the program when they

1. have completed MAS 4301, Elementary Abstract Algebra,
2. have at least a 3.0 grade point average for all college courses, and
3. have at least a 3.5 grade point average for mathematics courses.
Applications are submitted to the Undergraduate Committee of the Department of Mathematics.

The requirements for a B.A. degree in mathematics with honors are as follows:
1. completion of the requirements of the major in mathematics,
2. completion of MAA 4211, Intermediate Analysis I,
3. completion of MAT 4970, Mathematics Senior Thesis,
4. completion of eight mathematics courses at or above the 4000-level,
5. at least a 3.0 average for all college courses, and
6. at least a 3.5 average for mathematics courses.

ACCELERATED BA/MA PROGRAM
This program is designed for superior students having a solid background in high school mathematics and the ability to handle a fast paced, challenging program leading to a BA and MA degree in mathematics in four to five years.

The program meets all the requirements for the BA degree, but requires the student to take those graduate level courses required for the MA degree during the last two years in the program. Up to 20 hours of graduate courses may be counted towards the MA degree as well as the BA degree, but not towards the undergraduate major (that is, as free electives).

For admission to the program, a student must
1. have completed at least 30 hours of college credit including 8 hours of 3000-level or above mathematics courses,
2. have at least a 3.0 grade point average for all college courses, and
3. have at least a 3.5 grade point average for all mathematics courses taken at the 3000-level or above.

To apply for admission, send a letter to the Chair of the Department of Mathematics stating your qualifications and desire to enter the program. An important benefit of this program is that a student is eligible to apply for a graduate teaching assistantship once he or she has completed the undergraduate mathematics major courses. To plan your program, see the Undergraduate Advisor in Mathematics.

Requirements for the Minor in Mathematics
The minor in mathematics is open to all students. Students with majors in the sciences, engineering, business, and the social sciences are particularly encouraged to pursue the minor. A student wishing to receive a minor in mathematics must meet the following course requirements (minimum of 26 credit hours):

1. Required Courses (20 credit hours)
   Either
   - MAC 2311 Calculus I (4)
   - MAC 2312 Calculus II (4)
   - MAC 2313 Calculus III (4)
   Or
   - MAC 2281 Engineering Calculus I (4)
   - MAC 2282 Engineering Calculus II (4)
   - MAC 2283 Engineering Calculus III (4)
   Also, both of the following:
   - MGF 3301 Bridge to Abstract Mathematics (4)
   - MAS 3105 Linear Algebra (4)

2. Elective Courses (Min. 6 credit hours)
   Any 2 mathematics courses that are required or elective for the major in mathematics.

TEACHER EDUCATION PROGRAMS
For information concerning the degree programs for secondary school teachers, see the description given in the College of Education, Department of Secondary Education.