

MATHEMATICS

Program Information

The Department of Mathematics offers the degrees of Doctor of Philosophy, Master of Science, and the Master of Arts in Teaching and Master of Science in Teaching, each with a major in mathematics. Complete descriptions of the minimum requirements for these degrees are provided in the Graduate Degrees (<http://catalog.ufl.edu/graduate/degrees/>) section of this catalog.

The Department has an accelerated bachelor's/master's program designed for superior undergraduate students who have the ability to pursue such a plan of study leading to the Master of Science degree. The main feature of the program is that up to 12 semester hours of approved graduate level mathematics courses may be used as dual credit for both the undergraduate and the graduate degree. All other requirements for both the bachelor's degree and the master's degree must be met. For admission requirements for this program, see the undergraduate coordinator.

There are opportunities for concentrated study in a number of specific areas of pure and applied mathematics at both the master's and doctoral levels. The faculty directs studies and research in algebra, number theory, analysis, geometry, topology, logic and set theory, differential equations, dynamical systems, probability theory, optimization, combinatorial theory, biomathematics, and imaging.

In addition to the requirements of the Graduate School, the minimum prerequisite for admission to the program of graduate studies in mathematics is the completion, with an average grade of B or better, of at least 24 credits of undergraduate mathematics, including a full year of calculus and three semesters of appropriate work beyond the calculus. The most appropriate courses for this purpose are advanced calculus, linear algebra and abstract algebra. Students lacking part of the requirements will be required to make up the deficiency early in their graduate work.

Prerequisites to individual courses should be determined before registration by consultation with the instructor concerned. Some of the courses listed are offered only as needed. Since times of offering courses are estimated a year in advance, certain changes may be made if needs are known by the Department.

Students pursuing the master's degree in mathematics must pass two comprehensive written examinations, one in algebra and one in analysis or prepare and provide an oral defense of a thesis on original research conducted under the supervision of a faculty adviser. Students pursuing the Master of Arts in Teaching or the Master of Science in Teaching degree must prepare a teaching portfolio and pass an oral examination. Each of these programs normally requires two years for completion.

The requirements for a doctoral degree include 36 hours of 6000-level course work in mathematics; no hours of teaching, colloquium, dissertation, or individual work will count toward this requirement. To become a candidate for the doctoral degree, the student must pass a comprehensive preliminary examination with written and oral components administered by the Department. The doctoral student must also pass a reading knowledge examination in one of the following foreign languages: French, German, or Russian. The dissertation is an important requirement for the doctoral degree in mathematics. The topic

for the dissertation may be chosen from a number of areas of current research in pure and applied mathematics.

Details concerning all requirements for graduate degrees in mathematics may be obtained by writing the Mathematics Department Graduate Selection Committee or consulting the Department website, <http://www.math.ufl.edu>.

Degrees Offered

Degrees Offered with a Major in Mathematics

- Doctor of Philosophy
 - without a concentration
 - concentration in Imaging Science and Technology
 - concentration in Quantitative Finance
- Master of Arts in Teaching
- Master of Science
- Master of Science in Teaching

Requirements for these degrees are given in the Graduate Degrees (<http://catalog.ufl.edu/graduate/degrees/>) section of this catalog.

Courses

Mathematics Courses

Code	Title	Credits
MAA 5104	Advanced Calculus for Engineers and Physical Scientists I	3
MAA 5105	Advanced Calculus for Engineers and Physical Scientists II	3
MAA 5228	Modern Analysis I	3
MAA 5229	Modern Analysis II	3
MAA 5404	Introduction to Complex Variables for Engineers and Physical Scientists	3
MAA 6406	Complex Analysis I	3
MAA 6407	Complex Analysis II	3
MAA 6616	Analysis I	3
MAA 6617	Analysis II	3
MAA 7526	Advanced Topics in Functional Analysis I	3
MAA 7527	Advanced Topics in Functional Analysis II	3
MAD 6206	Combinatorial Theory I	3
MAD 6207	Combinatorial Theory II	3
MAD 6406	Numerical Linear Algebra	3
MAD 6407	Numerical Analysis	3
MAD 7396	Topics in Combinatorial Theory I	3
MAD 7397	Topics in Combinatorial Theory II	3
MAE 6940	Supervised Teaching	1-5
MAE 6943	Internship in College Teaching	3
MAP 5304	Intermediate Differential Equations for Engineers and Physical Scientists	3
MAP 5345	Introduction to Partial Differential Equations	3
MAP 5489	Modeling in Mathematical Biology	3
MAP 6208	Numerical Optimization	3
MAP 6327	Applied Differential Equations I	3
MAP 6356	Partial Differential Equations I	3
MAP 6357	Partial Differential Equations II	3
MAP 6375	Numerical Partial Differential Equations	3
MAP 6376	Finite Element Method	3
MAP 6467	Stochastic Differential Equations and Filtering Theory I	3

MAP 6468	Stochastic Differential Equations and Filtering Theory II	3	MAD 6406	Numerical Linear Algebra	3
MAP 6472	Probability and Potential Theory I	3	MAD 6407	Numerical Analysis	3
MAP 6473	Probability and Potential Theory II	3	MAD 7396	Topics in Combinatorial Theory I	3
MAP 6487	Biomathematics Seminar I	3	MAD 7397	Topics in Combinatorial Theory II	3
MAP 6488	Biomathematics Seminar II	3	MAE 6940	Supervised Teaching	1-5
MAP 6505	Mathematical Methods of Physics and Engineering	3	MAE 6943	Internship in College Teaching	3
MAP 6506	Mathematical Methods of Physics and Engineering II	3	MAP 5304	Intermediate Differential Equations for Engineers and Physical Scientists	3
MAP 6941	Internship in Applied Mathematics	1-5	MAP 5345	Introduction to Partial Differential Equations	3
MAP 7436	Seminar in Applied Mathematics I	3	MAP 5489	Modeling in Mathematical Biology	3
MAP 7437	Seminar in Applied Mathematics II	3	MAP 6208	Numerical Optimization	3
MAS 5311	Introductory Algebra I	3	MAP 6327	Applied Differential Equations I	3
MAS 5312	Introductory Algebra II	3	MAP 6356	Partial Differential Equations I	3
MAS 6331	Algebra I	3	MAP 6357	Partial Differential Equations II	3
MAS 6332	Algebra II	3	MAP 6375	Numerical Partial Differential Equations	3
MAS 7215	Theory of Numbers I	3	MAP 6376	Finite Element Method	3
MAS 7216	Theory of Numbers II	3	MAP 6467	Stochastic Differential Equations and Filtering Theory I	3
MAS 7396	Advanced Topics in Algebra I	3	MAP 6468	Stochastic Differential Equations and Filtering Theory II	3
MAS 7397	Topics in Algebra II	3	MAP 6472	Probability and Potential Theory I	3
MAT 6905	Individual Work	3	MAP 6473	Probability and Potential Theory II	3
MAT 6910	Supervised Research	1-5	MAP 6487	Biomathematics Seminar I	3
MAT 6932	Special Topics in Mathematics	3	MAP 6488	Biomathematics Seminar II	3
MAT 6971	Research for Master's Thesis	1-15	MAP 6505	Mathematical Methods of Physics and Engineering	3
MAT 7979	Advanced Research	1-12	MAP 6506	Mathematical Methods of Physics and Engineering II	3
MAT 7980	Research for Doctoral Dissertation	1-15	MAP 6941	Internship in Applied Mathematics	1-5
MHF 5107	Introduction to Set Theory	3	MAP 7436	Seminar in Applied Mathematics I	3
MHF 5207	Foundations of Mathematics	3	MAP 7437	Seminar in Applied Mathematics II	3
MHF 6306	Mathematical Logic I	3	MAS 5311	Introductory Algebra I	3
MTG 5316	Introduction to Topology I	3	MAS 5312	Introductory Algebra II	3
MTG 5317	Introduction to Topology II	3	MAS 6331	Algebra I	3
MTG 5411	Introduction to Fractal Geometry	3	MAS 6332	Algebra II	3
MTG 5412	Introduction to Dynamical Systems and Chaos	3	MAS 7215	Theory of Numbers I	3
MTG 6256	Differential Geometry I	3	MAS 7216	Theory of Numbers II	3
MTG 6257	Differential Geometry II	3	MAS 7396	Advanced Topics in Algebra I	3
MTG 6346	Topology I	3	MAS 7397	Topics in Algebra II	3
MTG 6347	Topology II	3	MAT 6905	Individual Work	3
MTG 6401	Ergodic Theory and Dynamical Systems I	3	MAT 6910	Supervised Research	1-5
MTG 6402	Ergodic Theory and Dynamical Systems II	3	MAT 6932	Special Topics in Mathematics	3
MTG 7396	Advanced Topics in Topology I	3	MAT 6971	Research for Master's Thesis	1-15
			MAT 7979	Advanced Research	1-12
			MAT 7980	Research for Doctoral Dissertation	1-15
			MHF 5107	Introduction to Set Theory	3
			MHF 5207	Foundations of Mathematics	3
			MHF 6306	Mathematical Logic I	3
			MHF 6307	Mathematical Logic 2	3
			MTG 5316	Introduction to Topology I	3
			MTG 5317	Introduction to Topology II	3
			MTG 5411	Introduction to Fractal Geometry	3
			MTG 5412	Introduction to Dynamical Systems and Chaos	3
			MTG 6256	Differential Geometry I	3
			MTG 6257	Differential Geometry II	3
			MTG 6346	Topology I	3
			MTG 6347	Topology II	3
			MTG 6401	Ergodic Theory and Dynamical Systems I	3
			MTG 6402	Ergodic Theory and Dynamical Systems II	3

Mathematics Departmental Courses

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MAA 6617	Analysis II	3
MAA 7526	Advanced Topics in Functional Analysis I	3
MAA 7527	Advanced Topics in Functional Analysis II	3
MAD 6206	Combinatorial Theory I	3
MAD 6207	Combinatorial Theory II	3

MTG 7396	Advanced Topics in Topology I	3
MTG 7397	Advanced Topics in Topology II	3

Student Learning Outcomes

mathematics (PHD)

SLO 1 Knowledge

Describes and explains advanced knowledge of at least one chosen specialty and conducts research in it.

SLO 2 Skills

Communicates mathematical thinking through clear and compelling arguments to faculty, peers and others.

SLO 3 Professional Behavior

Teaches mathematical courses in a professional manner, assessing the appropriate level of presentation for the students, creating an atmosphere conducive to learning, and supporting student-teacher interactions for active learning

Mathematics (MAT)

SLO 1 Knowledge

Demonstrates content knowledge relevant to mathematics teaching

SLO 2 Skills

Communicates mathematics effectively through prior organization of material, effective use of the blackboard or other presentation media, compelling choice of illustrative examples, and emphasis on methods of solving problems rather than on presenting solutions

SLO 3 Professional Behavior

Prepares for lessons; arrives on time; conducts themselves appropriately

Mathematics (MS)

SLO 1 Knowledge

Depth: Either solves problems in two areas from algebra/analysis/applied/topology or conducts research in mathematics at the master's level

SLO 2 Skills

Writes extended mathematical prose to the precision required by the discipline and supports mathematical arguments with logical reasoning

SLO 3 Professional Behavior

Teaches mathematical courses in a professional manner, assessing the appropriate level of presentation for the students, creating an atmosphere conducive to learning, and supporting student-teacher interactions for active learning

Mathematics (MST)

SLO 1 Knowledge

Describes and explains content knowledge relevant to mathematics and teaching

SLO 2 Skills

Communicates mathematics effectively through prior organization of material, effective use of the blackboard or other presentation media, compelling choice of illustrative examples, and emphasis on methods of solving problems rather than on presenting solutions

SLO 3 Professional Behavior

Prepares for lessons; arrives on time; conducts themselves appropriately