

# Mathematics

## College of Arts & Sciences

The Department of Mathematics grants the M.A., M.S., and Ph.D. degrees. There are no specific course prerequisites for admission; however, two semesters of advanced calculus, and at least one semester each of algebra and topology are suggested. Both the M.A. and M.S. degrees are 30-credit-hour programs, offered under either Plan A or Plan B.

The Master of Arts degree, featuring a core program that emphasizes mathematical structures, is designed for prospective community college teachers and for students contemplating studies at the Ph.D. level. The Master of Science degree, through an emphasis on the applications of mathematics and the acquisition of computational skills, focuses on careers in business, industry, and government.

The doctorate is a research degree granted on the basis of broad mathematical knowledge and exhibited creative ability. Course work leading to the doctorate is available in the areas of algebra, analysis applied mathematics, discrete mathematics, numerical analysis, partial differential equations, and topology. Each student must pass three comprehensive examinations in one of the six areas of algebra, analysis, discrete mathematics, numerical analysis, partial differential equations, and topology.

### Admission Requirements

The graduate programs in mathematics do not have formal admission requirements other than those of the Graduate School. Admission, however, is competitive. The admissions committee reviews transcripts, letters of recommendation, the candidate's personal statement, and GRE scores seeking evidence of mastery in proof-based mathematics (such as analysis, topology, and modern algebra), the ability to craft mathematical proofs, and general mathematical maturity.

### Degree Requirements

In order to be admitted to candidacy for the Ph.D. degree, a student must complete studies in a minor field (either inside or outside the department) and successfully complete three comprehensive examinations as described above. Subsequent work becomes highly specialized through seminars, independent study, and finally, work on a dissertation is an original contribution to the candidate's major field. The faculty has research expertise in algebraic topology, coding theory, ring theory, algebraic geometry, number theory, complex variables, rational approximation, operator theory, partial differential equations, mathematical physics, continuum mechanics, numerical analysis, algebraic combinatorics, and optimization.

The ability to communicate mathematics is an increasingly important professional qualification. The department requires all students to complete a teaching or research assignment during each semester of their enrollment in a graduate mathematics program. Students will be assigned to teach courses at the early undergraduate level. With the approval of the Director of Graduate Studies, a student may substitute an equivalent research effort for the teaching activity.

## Graduate Courses

MA 415G	Graph Theory (Same As CS 415G)	(3)
MA 416G	Principles Of Operations Research I (Same As CS 416G)	(3)
MA 417G	Principles Of Operations Research II (Same As STA 417G)	(3)
MA 432G	Methods Of Applied Mathematics I	(3)
MA 433G	Introduction To Complex Variables	(3)
MA 471G	Advanced Calculus I	(3)

MA 472G	Advanced Calculus II	(3)
MA 481G	Differential Equations	(3)
MA 483G	Introduction To Partial Differential Equations	(3)
MA 485G	Fourier Series And Boundary Value Problems (Same As ME 585)	(3)
MA 501	Seminar In Selected Topics	(3)
MA 502	Seminar In Selected Topics	(3)
MA 503	Combinatorics	(3)
MA 506	Methods Of Theoretical Physics I (Same As PHY 506)	(3)
MA 507	Methods Of Theoretical Physics II (Same As PHY 507)	(3)
MA 515	Mathematical Programming And Extensions (Same As STA 515)	(3)
MA 522	Matrix Theory And Numerical Linear Algebra I (Same As CS 522)	(3)
MA 527	Applied Mathematics In The Natural Sciences I (Same As ME 527)	(3)
MA 532	Ordinary Differential Equations	(3)
MA 533	Partial Differential Equations	(3)
MA 537	Numerical Analysis (Same As CS/EGR 537)	(3)
MA 551	Topology I	(3)
MA 561	Modern Algebra I	(3)
MA 565	Linear Algebra	(3)
MA 570	Multivariate Calculus	(3)
MA 575	Principles Of Analysis	(3)
MA 611	Independent Work In Mathematics	(3-9)
MA 613	Problems Seminar In Operations Research (Same As EE/STA 619)	(3)
MA 614	Enumerative Combinatorics	(3)
MA 616	Numerical Techniques For Nonlinear Optimization	(3)
MA 617	Markovian Decision Problems	(3)
MA 618	Combinatorics And Networks	(3)
MA 622	Matrix Theory And Numerical Linear Algebra II (Same As CS 622)	(3)
MA 625	Numerical Methods For Differential Equations	(3)
MA 628	Applied Mathematics In The Natural Sciences II	(3)
MA 630	Mathematical Foundations Of Stochastic Processes And Control Theory I	(3)
MA 633	Theory Of Partial Differential Equations	(3)
MA 641	Differential Geometry	(3)
MA 642	Differential Geometry	(3)
MA 651	Topology IS	(3)
MA 654	Algebraic Topology I	(3)
MA 655	Algebraic Topology II	(3)
MA 661	Modern Algebra II	(3)
MA 667	Group Theory	(3)
MA 671	Functions Of A Complex Variable I	(3)
MA 672	Functions Of A Complex Variable II	(3)
MA 676	Analysis I	(3)
MA 677	Analysis II	(3)
MA 681	Functional Analysis I	(3)
MA 682	Functional Analysis II	(3)
MA 714	Topics In Discrete Mathematics (Subtitle Required)	(3)
MA 715	Selected Topics In Optimization	(3)
MA 721	Selected Topics In Numerical Analysis	(3)
MA 732	Selected Topics In Differential And Integral Equations	(3)
MA 748	Master's Thesis Research	(0)
MA 749	Dissertation Research	(0)

MA 751	Selected Topics In Topology	(3)
MA 752	Selected Topics In Topology	(3)
MA 761	Homological Algebra	(3)
MA 764	Selected Topics In Algebra	(3)
MA 765	Selected Topics In Algebra	(3)
MA 768	Residence Credit For Master's Degree	(1-6)
MA 767	Dissertation Residency Credit	(2)
MA 769	Residence Credit For Doctor's Degree	(0-12)
MA 772	Selected Topics In The Theory Of Complex Variables	(3)
MA 773	Selected Topics In Analysis	(3)
MA 777	Mathematical Seminar	(3)
MA 778	Mathematical Seminar	(3)