

MATHEMATICS (MS, PHD)

The Department of Mathematics offers two degrees in Mathematics, Master of Science (M.S.) and Doctor of Philosophy (Ph.D.). The M.S. degree can be pursued with a concentration in Actuarial Science.

The M.S. degree provides general training in mathematics suitable as preparation for a Ph.D. program or for a career in education or industry. The M.S. degree with concentration in Actuarial Science is more narrowly focused to prepare students for careers as practicing actuaries in the insurance, pension, financial or consulting industries. The specific requirements, in addition to the Graduate School requirements, for each degree and concentration are listed below.

Master of Science

Non-thesis students must either pass two written preliminary examinations at the level of a master's from a list of examination topics approved by the department, or pass an oral examination. Thesis M.S. students may choose the thesis option and write a master's thesis under the direction of a member of the Graduate Faculty in Mathematics.

Master of Science with Concentration in Actuarial Science

Students must pass at least five core courses from among:

Course	Title	Credits
MATH 5620	Financial Mathematics I	3
MATH 5630	Long-Term Actuarial Mathematics I	4
MATH 5631	Long-Term Actuarial Mathematics II	4
MATH 5637	Statistics for Actuarial Modeling	4
MATH 5638	Predictive Analytics for Actuaries	3
MATH 5639	Actuarial Loss Models	3
MATH 5640	Short-Term Insurance Ratemaking	3
MATH 5641	Short-Term Insurance Reserving	3
MATH 5650	Financial Mathematics II	4
MATH 5660	Advanced Financial Mathematics	3
MATH 5661	Yield Curve Models	3

The remaining coursework must come from a list of elective courses approved by the department. In addition, the student must either pass two written preliminary examinations at the level of a master's from a list of examination topics approved by the department or pass two actuarial examinations given by the Society of Actuaries or the Casualty Actuarial Society. The actuarial examinations may be passed prior to admission.

Doctor of Philosophy

In addition to the Graduate School requirements (including the foreign language or related area requirement), the Ph.D. requires that the student pass three preliminary examinations at the Ph.D. level from a list of examination topics approved by the department. A student typically takes the associated preliminary course before the examination, but this is not required. In addition, the student must pass two core courses with a grade of "B" or better. The chosen core courses must be different from the graduate courses associated with the three preliminary examinations passed by the student. The list of core courses depends on the student's research focus.

Pure Math Focus

Course	Title	Credits
MATH 5111	Measure and Integration	3
MATH 5120	Complex Function Theory I	3
MATH 5160	Probability Theory and Stochastic Processes I	3
MATH 5210	Abstract Algebra I	3
MATH 5211	Abstract Algebra II	3
MATH 5260	Mathematical Logic I	3
MATH 5310	Introduction to Geometry and Topology I	3
MATH 5360	Differential Geometry	3
Total Credits		24

Applied Math Focus

Course	Title	Credits
MATH 5111	Measure and Integration	3
MATH 5120	Complex Function Theory I	3
MATH 5160	Probability Theory and Stochastic Processes I	3
MATH 5310	Introduction to Geometry and Topology I	3
MATH 5410	Introduction to Applied Mathematics I	3
MATH 5440	Partial Differential Equations	3
MATH 5510	Numerical Analysis and Approximation Theory I	3
MATH 5520	Finite Element Solution Methods I	3
Total Credits		24

Actuarial Science Focus

Course	Title	Credits
MATH 5111	Measure and Integration	3
MATH 5120	Complex Function Theory I	3
MATH 5161	Probability Theory and Stochastic Processes II	3
MATH 5210	Abstract Algebra I	3
MATH 5211	Abstract Algebra II	3
MATH 5310	Introduction to Geometry and Topology I	3
MATH 5360	Differential Geometry	3
MATH 5410	Introduction to Applied Mathematics I	3
MATH 5440	Partial Differential Equations	3
MATH 5510	Numerical Analysis and Approximation Theory I	3
MATH 5520	Finite Element Solution Methods I	3
Total Credits		33

Students do not need to satisfy the Graduate School foreign language/related area requirement.