

STATISTICS, MS

Graduate School Policies and Procedures (<http://catalog.ucdenver.edu/cu-denver/graduate/graduate-school-policies-procedures/>) apply to this program.

Please click here to see Mathematical and Statistical Sciences department information.

Introduction

The explosive growth in data collection over the past 10 years is unlikely to slow any time soon. This has created a dramatic increase in demand for individuals who can understand how to make decisions and predictions in the context of uncertainty through use of experimental design, statistical methods and programming, especially in the context of large data sets. This need spans many fields such as national security applications (including real-time monitoring of internet trends), environmental applications of climate modeling over space and time, medical and genomic applications that use electronic medical records to correlate demographics, genetic data and clinical outcomes over millions of individuals, and manufacturing with real-time monitoring of features over a variety of processes to both troubleshoot and optimize manufacturing.

Our MS in Statistics offers a general degree in statistics.

Students are exposed to a variety of coursework and have the opportunity to participate in real-world research and consulting through our innovative Statistical Consulting. Whatever specialization students choose, graduates with statistics degree will be prepared for a multitude of careers.

These program requirements are subject to periodic revision by the academic department, and the College of Liberal Arts and Sciences reserves the right to make exceptions and substitutions as judged necessary in individual cases. Therefore, the College strongly urges students to consult regularly with their program advisor and CLAS advisor to confirm the best plans of study before finalizing them.

Program Requirements

Students must present 30 hours of course work (which are broken into 4 components as detailed below) and maintain a 3.0 GPA or above for the MS degree. At least 24 of these hours must consist of graduate level (numbered 5000 or higher) courses with the MATH prefix. The remaining 6 hours must be either MATH courses numbered 5000 or above or approved courses outside the department numbered 4000 or above.

All students must complete a written project and pass a final oral exam. The project is developed as a student-centered independent research component within MATH 5960 Master's Project unless the student has chosen the thesis option. For students choosing the thesis option, 4 to 6 hours (of the 30 required hours) may be devoted to the writing of a thesis through MATH 5950 Master's Thesis. By graduate school rules, Master's students, whether enrolled full-time or part-time, must complete all degree requirements within 7 years of matriculation.

1. Students must complete a minimum of 30 MATH credit hours.
2. Students must complete a minimum of 24 graduate (5000-level or higher) credit hours.
3. Students must earn a minimum grade of B- (2.7) in all courses taken at CU Denver and must achieve a minimum cumulative GPA of 3.0. All

graded attempts in required and elective courses are calculated in the program GPA. Students cannot complete program or ancillary course requirements as pass/fail.

4. Students must complete 21 credit hours with CU Denver faculty.

Program Restrictions, Allowances and Recommendations

1. The remaining 6 hours must be either MATH courses numbered 5000 or above or approved courses outside the department numbered 4000 or above.
2. Up to 9 semester hours of prior course work may be transferred in (subject to approval); these must be at the 5000 level or above with a B- or better grade. Courses already applied toward another degree (graduate or undergraduate) cannot be used toward the MS degree in Statistics.
3. The following MATH courses will **not** count toward a graduate degree: MATH 5010 History of Mathematics, MATH 5012 An Advanced Perspective on Number and Operation-MATH 5015 Capstone Course for Secondary Teachers, MATH 5017 Topics in Mathematics for Teachers, MATH 5198 Mathematics for Bioscientists, and MATH 5830 Applied Statistics.

Course Requirements for the MS Degree in Statistics

The MS degree in Statistics consists of 4 components:

1. core courses,
2. statistics electives,
3. other electives, and
4. MATH 5960 Master's Project or MATH 5950 Master's Thesis.

Core Courses

Code	Title	Hours
<i>Take the following</i>		12
MATH 5310	Probability	3
MATH 5320	Statistical Inference	3
MATH 5387	Applied Regression Analysis	3
MATH 6330	Workshop in Statistical Consulting	3

Statistics Electives

Code	Title	Hours
<i>Take nine hours of statistics electives are required. A running list is given below. Additional courses can be substituted given prior approval by the student's advisor and the Director of the Program in Statistics.</i>		9
MATH 5394	Experimental Designs	3
MATH 5792	Probabilistic Modeling	3
MATH 6101	Uncertainty Quantification	3
MATH 6380	Stochastic Processes	3
MATH 6384	Spatial Data Analysis	3
MATH 6388	Statistical and Machine Learning	3
MATH 7384	Mathematical Probability	3
MATH 7386	Monte Carlo Methods	3

MATH 7393	Bayesian Statistics	3
MATH 7826	Topics in Probability and Statistics	3

Additional MATH Electives

Code	Title	Hours
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Take six hours from any graduate level MATH course that can be used for an MS or Ph.D. degree in Applied Mathematics can be used as an Other Elective. While these courses could be additional statistics-focused courses, the added flexibility allows students to direct their coursework into other areas of mathematics and/or science.

The following courses will not count toward the M.S. in Statistics: MATH 5010, MATH 5012-5015, MATH 5017, MATH 5198, MATH 5250 and MATH 5830.

MATH 5027	Topics in Applied Mathematics	3
MATH 5070	Applied Analysis	3
MATH 5110	Theory of Numbers	3
MATH 5135	Functions of a Complex Variable	3
MATH 5337	Intro to Statistical and Machine Learning	3
MATH 5350	Mathematical Theory of Interest	3
MATH 5351	Actuarial Models	3
MATH 5388	Machine Learning Methods	3
MATH 5390	Game Theory	3
MATH 5394	Experimental Designs	3
MATH 5410	Modern Cryptology	3
MATH 5432	Computational Graph Theory	3
MATH 5446	Theory of Automata	3
MATH 5490	Network Flows	3
MATH 5576	Mathematical Foundations of Artificial Intelligence I	3
MATH 5593	Linear Programming	3
MATH 5610	Computational Biology	3
MATH 5660	Numerical Analysis I	3
MATH 5661	Numerical Analysis II	3
MATH 5674	Parallel Computing and Architectures	3
MATH 5718	Applied Linear Algebra	3
MATH 5733	Partial Differential Equations	3
MATH 5779	Math Clinic	3
MATH 5791	Continuous Modeling	3
MATH 5792	Probabilistic Modeling	3
MATH 5793	Discrete Math Modeling	3
MATH 5794	Optimization Modeling	3
MATH 6023	Topics in Discrete Math	3
MATH 6101	Uncertainty Quantification	3
MATH 6131	Real Analysis	3
MATH 6360	Exploratory Data Analysis	3
MATH 6376	Statistical Computing	3
MATH 6380	Stochastic Processes	3
MATH 6384	Spatial Data Analysis	3
MATH 6388	Statistical and Machine Learning	3
MATH 6395	Multivariate Methods	3
MATH 6398	Calculus of Variations and Optimal Control	3
MATH 6404	Applied Graph Theory	3
MATH 6595	Nonlinear Programming	3

MATH 6653	Introduction to Finite Element Methods	3
MATH 6735	Continuum Mechanics	3
MATH 6840	Independent Study	1-3
MATH 6960	Research Methods in Mathematics and Statistics	3
MATH 7101	Topology	3
MATH 7132	Functional Analysis	3
MATH 7376	Statistical Computing	3
MATH 7381	Mathematical Statistics I	3
MATH 7382	Mathematical Statistics II	3
MATH 7384	Mathematical Probability	3
MATH 7385	Stochastic Differential Equations	3
MATH 7386	Monte Carlo Methods	3
MATH 7393	Bayesian Statistics	3
MATH 7397	Nonparametric Statistics	3
MATH 7405	Advanced Graph Theory	3
MATH 7409	Applied Combinatorics	3
MATH 7410	Combinatorial Structures	3
MATH 7413	Modern Algebra I	3
MATH 7414	Modern Algebra II	3
MATH 7419	Mathematical Coding Theory	3
MATH 7421	Projective Geometry	3
MATH 7593	Advanced Linear Programming	3
MATH 7594	Integer Programming	3
MATH 7595	Advanced Nonlinear Programming	3
MATH 7663	Finite Difference Methods for Partial Differential Equations	3
MATH 7665	Numerical Linear Algebra	3
MATH 7667	Introduction to Approximation Theory	3
MATH 7821	Topics in Projective Geometry	3
MATH 7822	Topics in Linear Algebra	3
MATH 7823	Topics in Discrete Math	3
MATH 7824	Topics in Computational Mathematics	3
MATH 7825	Topics in Optimization	3
MATH 7826	Topics in Probability and Statistics	3
MATH 7827	Topics in Applied Mathematics	3
MATH 7921	Readings in Mathematics	1
MATH 7922	Rdgs:Math Fndts-Cmptr Sc	1
MATH 7923	Readings: Discrete Mathematics	1
MATH 7924	Rdgs:Comp Mathematics	1
MATH 7925	Readings: Optimization	1
MATH 7926	Rdgs:Applied Prob/Stats	1
MATH 7927	Rdgs:Comp/Math Biology	1
MATH 8660	Mathematical Foundations of Finite Element Methods	3
MATH 8664	Iterative Methods in Numerical Linear Algebra	3

Capstone: Masters Project or Thesis

Students are required to complete a Master's Thesis or Project as part of the degree. Students must take 3 credits of Math 5950 (Master's Thesis) or Math 5960 (Master's Project) while completing the project.

Code	Title	Hours
<i>Take a minimum of three credits of the following</i>		3
MATH 5960	Master's Project	3
or MATH 5950	Master's Thesis	

To learn more about the Student Learning Outcomes for this program, please visit our website (<https://clas.ucdenver.edu/mathematical-and-statistical-sciences/ms-applied-mathematics-program-goals-objectives/>).