Undergraduate Degree Programs – Mathematics

The Department of Mathematical Sciences offers a major leading to the degrees of Bachelor of Arts or Bachelor of Science in Mathematics. In the first years, all majors take the same core courses. Later in the program, students choose electives based on their interests and career goals. The Curriculum Guides posted in Catalyst and on the UC website show a typical semester-by-semester schedule for students in each degree program.

Overall, completion of the major requires:

- Overall GPA of 2.0 or better;
- GPA of 2.0 or better in all math courses;
- At least 42 MATH/STAT credits for BA, or 48 MATH/STAT credits for BS;
- Grade of C- or better in all courses used to fulfill the 42 or 48 credit requirement;
- Completion of coursework satisfying the requirements for the chosen degree and track (below).

Credits from 1000 and 2000-level courses outside of the core course requirements cannot be counted toward the 42/48 credits necessary for the major.

For the Bachelor of Science, a 6-credit sequence in another scientific discipline is also required.

Note: in the course lists below, all pre-requisites must be completed with a grade of C- or better.

Core Course Requirements – All Programs

All courses in this list are required for all math majors (BA or BS):

Course Number	Course Title	Pre-requisites	Typically Offered	Credit Hours
MATH 1060 or 1061	Calculus I	Placement test or MATH 1022, 1024, or 1026	Fall, Spring, Summer	4
MATH 1062	Calculus II	MATH 1061	Fall, Spring, Summer	4
MATH 2063	Multivariable Calculus	MATH 1062	Fall, Spring, Summer	4
MATH 2073 or 2074	Differential Equations or Dynamical Systems	MATH 1062	Fall, Spring, Summer	3
MATH 2076	Linear Algebra	MATH 1062	Fall, Spring, Summer	3

STAT 2037	Probability and Statistics I	MATH 1062	Fall, Spring, Summer	3
MATH 3001	Intro to Abstract Math	MATH 2076	Fall, Spring	3
MATH 3002	Intro to Analysis	MATH 2063 and MATH 3001	Fall, Spring	3
MATH 5001 or 5002	Math Capstone	Permission of Department	Fall, Spring	3

Table 1: Core Course Requirements

About the capstone requirement: All majors must complete a capstone that extends their mathematical knowledge beyond their coursework and/or synthesizes knowledge from multiple major courses. Students should plan to complete their capstone in their final semester of the program. There are two capstone options, Capstone Project (MATH 5001) and Capstone Seminar (MATH 5002).

- Capstone Project is for students who have a specific project in mind and a faculty member who has agreed to oversee their project. The student and professor work out the details of the capstone between themselves and the faculty mentor determines a grade.
- Capstone Seminar is an alternative for students who don't have a specific project or mentor in mind. The Seminar meets through the semester as a typical course does, and students work together through the process of completing their capstones.

To register for either capstone, contact the Undergraduate Program Director for permission (contact info at the end of this document).

Electives (BA or BS)

Students choose two courses from this list (called Option A in Catalyst):

Course Number	Course Title	Pre-requisites	Typically Offered	Credit Hours
MATH 3004	Intro Abstract Algebra	MATH 3001	Fall	3
MATH 3005	Intro Geometry	MATH 3001	Spring	3
MATH 3006	Mathematical Modelling	MATH 2063, MATH 2076, and MATH 2073 or 2074	Fall, Spring	3
MATH 5101	Advanced Calculus I	MATH 3001	Fall	4
MATH 5103	Abstract Linear Algebra	MATH 3001	Fall	3
MATH 5112	Applied Linear Algebra	MATH 2063 and MATH 2076	Fall	3

Table 2: Math Track Primary Electives ("Option A")

And additional Courses from this list - at least two for BA, at least three for BS. This list is called Option B in Catalyst:

Course Number	Course Title	Pre-requisites	Typically Offered	Credit Hours
MATH 3004	Intro to Abstract Algebra	MATH 3001	Fall	3
MATH 3005	Intro to Geometry	MATH 3001	Spring	3
MATH 3006	Mathematical Modelling	MATH 2063, MATH 2076, and MATH 2073 or 2074	Fall, Spring	3
STAT 3041	Data Science and Statistics	STAT 2037		3
MATH 4001	Special Topics	MATH 1062	Rarely	

MATH 4008	Intro to Probability	MATH 2063 and STAT 2037	Fall, Spring	3
MATH 4009	Financial Math for Actuarial Sciences	STAT 2037	Fall, Spring	3
MATH 4011	Intro to Number Theory	MATH 3004	Spring	3
MATH 4012	Differential Geometry and Topology	MATH 2063 and MATH 2076	Spring	3
MATH 4047	Individual Work	Permission of undergrad director	Fall, Spring, Summer	1 - 4
MATH 5101	Advanced Calculus I	MATH 3001	Fall	4
MATH 5102	Advanced Calculus II	MATH 5101	Spring	4
MATH 5103	Abstract Linear Algebra	MATH 3001	Fall	3
MATH 5104	Group Theory	MATH 3004	Spring	3
MATH 5105	Intro to Complex Analysis	MATH 2063 and MATH 2073 or 2074	Fall	3
MATH 5106	Numerical Analysis	MATH 2063, MATH 2076, and MATH 2073 or 2074	Fall	3
MATH 5107	Partial Differential Equations and Fourier Analysis	MATH 2063, MATH 2076, and MATH 2073 or 2074	Spring	3
MATH 5108	Applied Probability and Stochastic Processes	STAT 2037	Fall	3
MATH 5110	Probabilistic Aspects of Financial Modelling	MATH 2063, MATH 2076, and STAT 2037	Spring[i]	3
MATH 5111	Computational Financial Mathematics	MATH 2063, MATH 2076, MATH 2073 or 2074, and STAT 2037	Fall[i]	3
MATH 5112	Applied Linear Algebra	MATH 2063 and MATH 2076	Fall	3
MATH 5115	Mathematical Programing	MATH 2063, MATH 2076, and MATH 2073 or 2074	Spring[i]	3
MATH 5151	Applied Ordinary Differential Equations	MATH 2063, MATH 2076, and MATH 2073 or 2074	Fall[i]	3

Table 3: Math Track Secondary Electives ("Option B")

For the BS, students can take a fourth elective from above Option B list or one course from this Actuarial/Stats list (which includes STAT courses at 3000-, 4000-, and 5000-level not listed above, Option SA in Catalyst):

Course Number	Course Title	Pre-requisites	Typically Offered	Credit Hours
STAT 3038	Probability and Statistics II	STAT 2037	Fall, Spring	3
STAT 4021	Special Topics	Permission of Instructor	Rarely	
STAT 4121	Mathematical Statistics I	MATH 2063, MATH 2076, and STAT 2037	Fall	3
STAT 5122	Mathematical Statistics II	STAT 4121 or STAT 5121	Spring	3
STAT 4131	Regression Analysis and Statistical Learning	STAT 3038	Fall	3

STAT 5132	Design and Analysis of Experiments	STAT 4131 or STAT 5131	Spring	3
STAT 5141	Time Series	STAT 3038 or STAT 5132	Fall[i]	3
STAT 5142	Survival Analysis and Logistic Regression	STAT 5131	Spring[i]	3
STAT 5143	Applied Bayesian Analysis	STAT 5121	Spring[i]	3
STAT 5144	Nonparametric Statistics	STAT 5121	Fall[i]	3
STAT 5145	Statistical Computing with SAS and S-plus	STAT 3038	Irregularly	3
STAT 5151	Statistical Consulting	Permission of instructor	Fall, Spring[i]	3
STAT 5171	Statistics and Machine Learning	STAT 5121 and STAT 5131	Spring	3

Table 4: BS-Math Additional Electives ("Option SA")

Advice to Majors

- Students should complete MATH 1062 as early as possible. It is required for almost all other courses in the major.
- Students should also take MATH 3001 as early as possible as is it a pre-requisite for many advanced mathematics courses.
- Students are encouraged to learn a programming language.
- Students pursuing a career in actuarial sciences should take the P and F/M actuarial exams during their time in this program.
- There are several scholarship funds open only to math majors. There is a call for applications every year, usually early spring semester. Please apply!

Contact

For more information, contact our Undergraduate Program Director:

> Dr Abigail Bishop, Assistant Professor Educator
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[i] This course may not be offered every year