Columbia Math Open House

Spring 2022
Majors and Concentration in Mathematics

- Major in Mathematics
- Major in Applied Mathematics
- Major in Computer Science - Mathematics
- Major in Economics - Mathematics
- Major in Mathematics - Statistics
- Concentration in Mathematics

Most majors require 13-15 points (including AP credit) in the Calculus and Linear Algebra sequence.

Concentration in Mathematics

Requirements:
- Requires at least 12 additional points from any of the courses offered by the department numbered 2000 or higher.
Major in Mathematics

Requires 40-42 points as follows:

13-15 points in Calculus and Linear Algebra

15 points in the following required courses

- Complex Analysis
- Differential Geometry
- Topology
- Knot Theory
- Differential Equations
- Analytic Number Theory
- Knot Theory

12 points in any combination of mathematics and cognate courses

- Undergraduate Seminars in Mathematics (UN3951-3952)
- Modern Algebra (GU4041-4042)
- Modern Analysis (GU4061-4062)

Cognate course:

- 2000 level (or higher) course that requires at least two semesters of calculus (physics, applied math, etc.)
- Subject matter is mathematics beyond an elementary level, e.g., Discrete Math (CS), Symbolic Logic (PHIL)

Optionally, a senior thesis
Major in Applied Mathematics

13-15 points in Calculus and Linear Algebra

One of the following three courses

- Analysis and Optimization (UN2500)
- Fourier Analysis (GU4032)
- Intro to Modern Analysis I (GU4061)

Two undergraduate seminars

- Problems in Applied Mathematics (APMA E4901-4903)

18 points in electives from a list of MATH and APMA courses

Other courses may be used with the approval of the Applied Mathematics Committee

Requires 38-40 points as follows:

Complex Variables
Applied Functional Analysis
Intro to Biophysical Modeling
Partial Differential Equations
Major in Computer Science - Mathematics

20 points in computer science

13-15 points in Calculus and Linear Algebra

3 points in an undergraduate seminar

3 points in the following required course

Intro to Modern Algebra I (GU4041)

Undergraduate Seminars in Mathematics I or II (UN3951 or UN3952)

Two 3-point electives in either computer science or mathematics

Complex Variables
Numerical Algorithms and Complexity
Analysis and Optimization
Differential Geometry
Intro to Modern Analysis I
Number Theory and Cryptography
Topology

Requires 45-47 points in computer science and mathematics as follows:
Economics - Mathematics

Major in Economics - Mathematics

Requires 52 or 56 points in economics, mathematics and statistics as follows:

- **29 points** in economics
- **3-6 points** in statistics (either sequence)
- **12-14 points** in Calculus and Linear Algebra
- **3 points** - analysis requirement
- **Three of the following courses**
  - Calculus 4 (UN1202) not mandatory
  - Intro to Probability and Statistics (GU4001)
  - Probability Theory (GU4203)
  - Statistical Inference (GU4204)
  - Ordinary Differential Equations (UN2030)
  - Any mathematics course at the 3000-level or higher
Major in Mathematics - Statistics

Requires 42-44 points in computer science, mathematics and statistics as follows:

- 3 points in computer science
- 15 points in statistics
  - Includes Calculus-Based Introduction to Statistics (STAT UN1201)
- 12-14 points in Calculus and Linear Algebra
  - Calculus 4 (UN1202) not mandatory
- 3 points - analysis requirement*
  - Analysis and Optimization (UN2500)
  - * with approval from the adviser for the Honors Math A & B sequence
- 9 points in electives
  - Three advanced courses in mathematics, statistics, applied mathematics, industrial engineering and operations research, computer science, or approved mathematical methods courses in a quantitative discipline. At least one elective must be a Mathematics Department course numbered 3000 or above.
Barnard Mathematics

Major in Mathematics

14-15 courses, similar to the requirements for the corresponding majors at Columbia.

Flexibility in choosing advanced mathematics and cognate courses, in consultation with their adviser (may require prior approval from the Chair).

The Undergraduate Seminar in Mathematics fulfills the Barnard capstone requirement and can be double counted as a major elective.

Major in Applied Mathematics

Major in Mathematics-Statistics

Major in Mathematics-Computer Science

Major in Economics and Mathematics


The Capstone Experience can be fulfilled by a significant thesis written under the supervision of faculty of any one of the three departments or by the Undergraduate Seminar in Mathematics.

Major in Mathematical Sciences

Minor in Mathematical Sciences

6 courses: at least two from Mathematics and one from each of Statistics and Computer Science. There should be a minimum of three courses in Statistics and Computer Science.
Resources & Opportunities

Undergraduate Workshops, Seminars, and Summer Research Programs

Columbia Math Undergraduate Summer Research (CMSUR). A 10-week paid summer research program, where participating students work closely with faculty members and graduate students in a small group setting.

Columbia Summer Research Experiences in Mathematical Modeling (CSUREMM). A 10-week paid summer program for undergraduate students interested in mathematical modeling and interdisciplinary research.

Directed Reading Program (DRP). Undergraduate students interested in independently reading mathematics outside of their official coursework are paired with graduate students for a semester.

Undergraduate Math Society Seminars. Weekly seminar talks, run year-round. The talks have the purpose of exposing members to different topics or areas of research in mathematics that they might not otherwise encounter in class. Everyone is welcome!

Proof Writing Workshop. A 4-week workshop, runs each term. A great opportunity for undergraduates to get more familiar with how to go about writing proofs.

Columbia Undergraduate Math Modelling Workshop (CUMMW). Consists of a series of lectures and tutorials and serves as preparation for the Mathematical Contest in Modelling (MCM) international competition.
Contacts

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