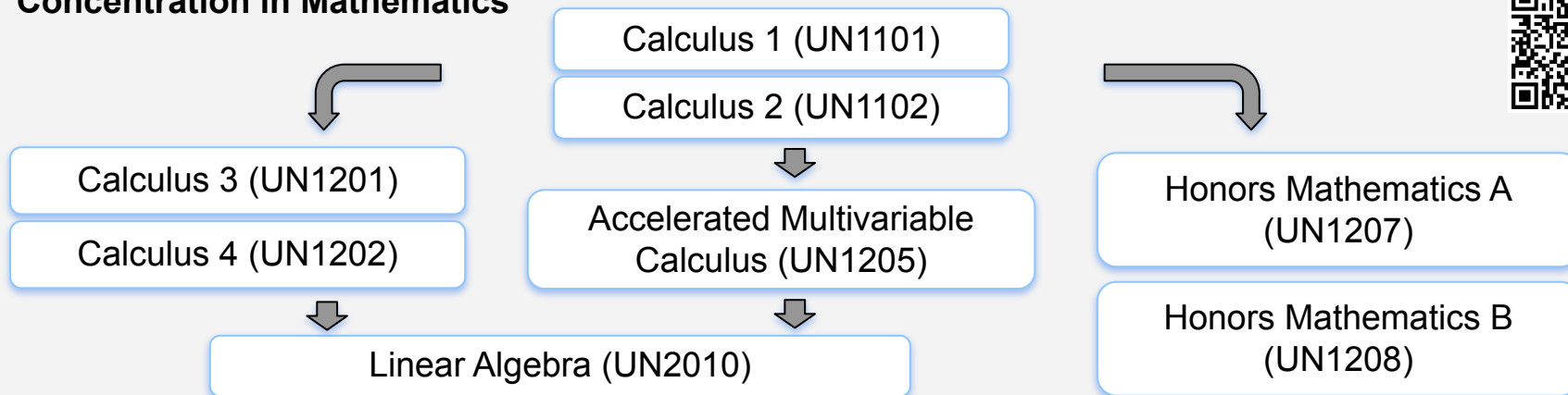# Columbia Math Open House

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.

Calculus 1 (UN1101)

Calculus 2 (UN1102)

Calculus 3 (UN1201)

Calculus 4 (UN1202)

Accelerated Multivariable Calculus (UN1205)

Honors Mathematics A (UN1207)

Honors Mathematics B (UN1208)

Linear Algebra (UN2010)

Concentration in Mathematics

Requires at least *12 additional points* from any of the courses offered by the department numbered 2000 or higher.

COLUMBIA UNIVERSITY
IN THE CITY OF NEW YORK

Major in Mathematics

Major in Mathematics — Requires *40-42 points* as follows:

13-15 points in Calculus and Linear Algebra

+ *15 points* in the following required courses

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

+ *12 points* in any combination of mathematics and cognate courses

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

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

Applied Mathematics

Major in Applied Mathematics

Requires *38-40 points* as follows:

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

Complex Variables

Partial Differential Equations

Applied Functional Analysis

Intro to Biophysical Modeling ...

COLUMBIA UNIVERSITY
IN THE CITY OF NEW YORK

Computer Science - Mathematics

Major in Computer Science - Mathematics

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

20 points in computer science

➕ *13-15 points* in Calculus and Linear Algebra

➕ *3 points* in an undergraduate seminar

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

➕ *3 points* in the following required course

Intro to Modern Algebra I (GU4041)

➕ *Two 3-point* electives in either computer science or mathematics

Complex Variables

Analysis and Optimization

Numerical Algorithms and Complexity

Number Theory and Cryptography

Differential Geometry

Topology

Intro to Modern Analysis I

…

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)

Intro to Probability and Statistics (GU4001)

Probability Theory (GU4203)
Statistical Inference (GU4204)

➕ *12-14 points* in Calculus and Linear Algebra

Calculus 4 (UN1202) not mandatory

➕ *3 points* - analysis requirement

Analysis and Optimization (UN2500)

➕ *Three* of the following courses

Calculus 4 (UN1202)

Ordinary Differential Equations (UN2030)

Any mathematics course at the 3000-level or higher

Mathematics - Statistics

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

Major in Applied Mathematics

Major in Mathematics-Statistics

Major in Mathematics-Computer Science

Major in Economics and 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 Mathematical Sciences

14 courses: six from Mathematics, five from a combination of Statistics and Computer Science, and three electives from a combination of Mathematics, Statistics, Computer Science.

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.

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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