Progress Toward Completion of the Mathematics Major

Computer Science Concentration

Arts and Sciences students may be admitted to the math major after successfully completing a semester of multivariable calculus, a semester of linear algebra, and a 3- or 4-credit computer programming course. To apply, visit math.cornell.edu/major.

Student's Name   **Net ID**   **Faculty Advisor**

_____   _____   _____

Courses needed to complete the major

_____   initials   _____

_____   date   _____

Math majors must complete **9 courses** for the major, as described in items 1–3 below, with a **minimum grade of C–**. No course may be used to satisfy more than one requirement. MATH courses numbered between 4980 and 5999 do not count.

_____ At least two of the MATH courses taken must be at the 4000 level (or above).

1. Two Courses in Algebra. (___ transfer credit applied, see reverse)

_____ MATH 3320 - Introduction to Number Theory
_____ MATH 3340 - Abstract Algebra*
_____ MATH 3360 - Applicable Algebra*
_____ MATH 4310 - Linear Algebra*   **Discontinued:** _____ MATH 4315*
_____ MATH 4330 - Honors Linear Algebra*
_____ MATH 4340 - Honors Introduction to Algebra*
_____ MATH 4370 - Computational Algebra
_____ MATH 4500 - Matrix Groups
_____ MATH 4560 - Geometry of Discrete Groups

2. Two Courses in Analysis. (___ transfer credit applied, see reverse)

_____ MATH 3110 - Introduction to Analysis*
_____ MATH 3210 - Manifolds & Differential Forms   **Discontinued:** _____ MATH 3230*
_____ MATH 3270 - Introduction to Ordinary Differential Equations*
_____ MATH 4130 - Honors Intro Analysis I*
_____ MATH 4140 - Honors Intro Analysis II
_____ MATH 4180 - Complex Analysis*
_____ MATH 4200 - Differential Equations and Dynamical Systems*
_____ MATH 4210 - Nonlinear Dynamics and Chaos*
_____ MATH 4220 - Applied Complex Analysis*
_____ MATH 4250 - Numerical Analysis and Differential Equations [also CS 4210]
_____ MATH 4260 - Numerical Analysis: Linear & Nonlinear Problems [also CS 4220]
_____ MATH 4280 - Introduction to Partial Differential Equations*

*See course descriptions at math.cornell.edu/upper-level-courses for information on forbidden overlaps.

3. Concentration in Computer Science. (___ transfer credit applied, see below)

Five courses from (v) and (vi) below.

(v)   At least one MATH course numbered 3000 or above:

_____ _____

_____ _____

(vi) At least three CS courses with significant mathematical content.
_____ CS 3220 - Computational Mathematics for Computer Science
_____ CS 4110 - Programming Languages and Logics
_____ CS 4160 - Formal Verification
_____ CS 4210 - Numerical Analysis and Differential Equations [also MATH 4250]
_____ CS 4220 - Numerical Analysis: Linear and Nonlinear Problems [also MATH 4260]
_____ CS 4620 - Introduction to Computer Graphics
_____ CS 4670 - Introduction to Computer Vision
_____ CS 4700 - Foundations of Artificial Intelligence
_____ CS 4740 - Natural Language Processing [also COGST 4740, LING 4474]
_____ CS 4744 - Computational Linguistics I [also COGST 4240, LING 4424]
_____ CS 4775 - Computational Genetics and Genomics [also BTRY 4840]
_____ CS 4780 - Introduction to Machine Learning
_____ CS 4783 – Mathematical Foundations of Machine Learning
_____ CS 4786 - Machine Learning for Data Science
_____ CS 4787 - Principles of Large-Scale Machine Learning Systems
_____ CS 4789 - Introduction to Reinforcement Learning
_____ CS 4810 - Introduction to Theory of Computing
_____ CS 4812 - Quantum Information Processing [also PHYS 4481]
_____ CS 4814 - Introduction to Computational Complexity
_____ CS 4820 - Introduction to Analysis of Algorithms
_____ CS 4830 - Introduction to Cryptography
_____ CS 4850 - Mathematical Foundations for the Information Age
_____ CS 4852 - Networks II: Market Design [also ECON 3825, INFO 4220]
_____ CS 4860 - Applied Logic [also MATH 4860]
_____ _____ (approved by faculty advisor)

Note: There are also many CS graduate courses with significant mathematical content that may be used. Interested students should discuss these options with their math faculty advisor (after being admitted to the math major.)

Transfer Credit / Study Abroad Courses Applied to the Major

Course Number &Title	Institution	Requirement