University of Pittsburgh | Dietrich School

Mathematics Major and Minor

www.Mathematics.Pitt.edu
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Mathematics has been described as the queen of the sciences. Mathematics is the language of quantitative information and structure. Quantitative information is acquired, classified, and processed according to mathematical models of physical phenomena with mathematical tools. There is a wide range of applications even of the most pure of mathematical disciplines. Cryptography is based on algebra, signal processing is based on Fourier analysis, and important applications from topology to physics exist as well. In our department, we offer unique research opportunities for undergraduates in mathematical biology, scientific computing, and financial mathematics as well as algebra, geometry, and analysis.

The Department of Mathematics offers bachelor degree programs in mathematics, applied mathematics, actuarial mathematics, and mathematical biology. We also offer a joint major in mathematics-economics. Each of the department's majors has its own philosophy and its own formal requirements. For additional information, visit the Department of Mathematics Web site.

Required courses for the Mathematics major

The mathematics major requires the completion of 41 credits in mathematics distributed as follows.

Calculus courses

MATH 0220 Analytic Geometry and Calculus 1
MATH 0230 Analytic Geometry and Calculus 2
MATH 0240 Analytic Geometry and Calculus 3

Introductory theoretical courses

MATH 0413 Introduction to Theoretical Mathematics (W-course)
MATH 0420 Introduction to Theory 1-Variable Calculus
MATH 0430 Introduction to Abstract Algebraic Systems

Professional Development

MATH 0500 Professional Development

Upper-level required courses

Required course
MATH 1270 Ordinary Differential Equations 1

One of the following
MATH 1180 Linear Algebra 1
MATH 1185 Honors Linear Algebra

One of the following
MATH 1020 Applied Elementary Number Theory
MATH 1025 Introduction to Mathematical Cryptography
MATH 1050 Combinatorial Mathematics
MATH 1250 Abstract Algebra
MATH 1310 Graph Theory

Upper-level elective courses; choose three of the following courses

MATH 1020 Applied Elementary Number Theory
MATH 1025 Introduction to Mathematical Cryptography
MATH 1050 Combinatorial Mathematics
MATH 1070 Numerical Mathematical Analysis
MATH 1080 Numerical Linear Algebra
MATH 1100 Linear Programming
MATH 1101 Introduction to Optimization
MATH 1110 Industrial Mathematics
MATH 1250 Abstract Algebra
MATH 1280 Ordinary Differential Equations 2
MATH 1290 Topics in Geometry
MATH 1310 Graph Theory
MATH 1350 Introduction to Differential Geometry
MATH 1360 Modeling in Applied Math 1
MATH 1370 Computational Neuroscience
MATH 1380 Mathematical Biology
MATH 1410 Introduction to Foundations of Mathematics
MATH 1470 Partial Differential Equations 1
MATH 1510 Probability
MATH 1530 Advanced Calculus 1
MATH 1540 Advanced Calculus 2
MATH 1550 Vector Analysis and Applications
MATH 1560 Complex Variables and Applications
MATH 1570 Transform Methods in Applied Math
MATH 1700 Introduction to Topology
MATH 1800 Advanced Topics in Mathematics
MATH 2XXX, 3XXX any 3-credit graduate level course
STAT 1631 Intermediate Mathematical Statistics 1
STAT 1632 Intermediate Mathematical Statistics 2

Physics course

PHYS 0174 Basic Physics for Science and Engineering 1

Programming course; choose one
CS 0007 Introduction to Computer Programming
CS 0008 Introduction to Computer Programming with Python
CS 0010 Introduction to Computing for Systems Engineers
CS 0011 Introduction to Computing for Scientists
CS 0012 Introduction to Computing for the Humanities
CS 0401 Intermediate Programming Using Java

Recommended courses
Students interested in graduate study in mathematics are advised to take MATH 1530 and MATH 1540. Those interested in pursuing secondary education certification in mathematics are required to take MATH 1020, MATH 1230, and MATH 1290. MATH 1230 does not count toward the major.

Grade requirements
A grade of C or better is required in each course that is to count toward the major. A minimum GPA of 2.0 in departmental courses is required for graduation.

Satisfactory/No Credit option
Only MATH 0500 may be taken on an S/NC basis. All other courses must be taken on a letter grade basis.

Writing (W) requirement
Students must complete at least one W-course in the major. MATH 0413 satisfies this requirement.

Honors major requirements
Honors in mathematics is granted if the student:

- Completes these courses with a grade of B or better:
  - MATH 1250 Abstract Algebra
  - MATH 1530 Advanced Calculus 1
  - MATH 1540 Advanced Calculus 2
  - One 2000 level MATH course as an upper level elective;
- Completes an honors thesis under the direction of a member of the mathematics faculty or earns a grade of B or higher in a second 2000 level mathematics course in lieu of the honors thesis; and
- Completes all other requirements for the major.

Advising
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Checklist for the Mathematics major

Calculus courses
_____ MATH 0220
_____ MATH 0230 / MATH 0235 (UHC)
_____ MATH 0240
Note: MATH 0235 (UHC) can replace both MATH 0220 and MATH 0230.

Introductory theoretical courses
_____ MATH 0413
_____ MATH 0420
_____ MATH 0430
Note: Students who successfully complete MATH 0450 (UHC) are exempted from MATH 0420.

Upper-Level Required Courses

One of the following
_____ MATH 1180
_____ MATH 1185 (UHC)

Required course
_____ MATH 1270

One of the following
_____ MATH 1020
_____ MATH 1025
_____ MATH 1050
_____ MATH 1250
_____ MATH 1310

Professional Development
_____ MATH 0500

Upper-level elective courses
Three courses from the list on the front of this sheet
_____ MATH _____ _____ STAT _____
_____ MATH _____ _____ STAT _____
_____ MATH _____

Physics course
_____ PHYS 0174

Programming course; choose one
_____ CS 0007
_____ CS 0008
_____ CS 0010
_____ CS 0011
_____ CS 0012
_____ CS 0401

Checklist for the Mathematics minor

At least nine credits in MATH courses numbered 0250 or higher
_____ MATH _____ (0250 or higher)
_____ MATH _____ (0250 or higher)
_____ MATH _____ (0250 or higher)

At least six credits in MATH courses numbered 1000 or higher
_____ MATH _____ (1000 or higher)
_____ MATH _____ (1000 or higher)

- Students may not count MATH 0400 toward the minor.
- Students may not count both MATH 0280 and MATH 1180 toward the minor.
- Students may not count both MATH 0290 and MATH 1270 toward the minor.

Grade requirements
A letter grade of C or higher is required in each course for completion of this minor. Students may not take any course for the minor on an S/NC basis.

Note: Students must apply for any official minor they will complete or have completed at the time they apply for graduation.