Pitt | Kenneth P. Dietrich School of Arts and Sciences

Applied Mathematics Major

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 have arisen from topology to physics. Our department offers unique research opportunities for undergraduates in mathematical biology, scientific computing, and finance mathematics as well as algebra, geometry, and analysis.

The Department of Mathematics offers an ample selection of courses leading to a Bachelor of Science degree in mathematics, applied mathematics, and actuarial mathematics as well as various courses for non-majors. We also offer the possibility of joint majors in mathematics-economics and mathematics-philosophy (see separate sheets for joint majors). 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 Applied Mathematics major

The Applied Mathematics major requires the completion of 40 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
MATH 0420 Introduction to Theory 1-Variable Calculus

Upper-level required courses
MATH 1180 Linear Algebra 1 or 1185 Honors
MATH 1270 Ordinary Differential Equations 1 or 1275 Honors

One of the following numerical math courses
MATH 1070 Numerical Mathematical Analysis
MATH 1080 Numerical Linear Algebra
MATH 1100 Linear Programming
MATH 1101 Introduction to Optimization
MATH 1110 Industrial Mathematics

One of the following applied analysis courses
MATH 1550 Vector Analysis and Applications
MATH 1560 Complex Variables and Applications
MATH 1570 Transform Methods in Applied Math

One of the following differential equations courses or an additional Numerical Math or Applied Analysis course
MATH 1280 Ordinary Differential Equations 2
MATH 1470 Partial Differential Equations 1
MATH 1480 Partial Differential Equations 2

One of the following
MATH 1110 Industrial Mathematics
MATH 1360 Modeling in Applied Math 1
MATH 1370 Computational Neuroscience
MATH 1380 Mathematical Biology

Physics courses
PHYS 0174 Basic Physics for Science and Engineering 1
PHYS 0175 Basic Physics for Science and Engineering 2

One Computer Science course
CS 0007 Introduction to Computer Programming in Java
CS 0008 Introduction to Computer Programming in Python
CS 0132 Programming in C
CS 0401 Intermediate Programming using Java

One Statistics course
MATH 1510 Mathematical Theory of Probability
STAT 1000 Introduction to Applied Statistics
STAT 1100 Statistics and Probability for Business Mgmt.
STAT 1151 Introduction to Probability

Recommended courses: Students interested in graduate study are strongly advised to take MATH 1530 and MATH 1540. These courses may be substituted for the Applied Analysis course and the Differential Equations course respectively. Students interested in pursuing secondary education certification in mathematics should take MATH 0430, MATH 1020, MATH 1230, and MATH 1290 in addition to the courses required for the major. These courses are required for secondary education certification in Pennsylvania and by the School of Education for admission to the MAT program in Mathematics Secondary Education.

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: No course that counts toward the major can be taken on an S/NC basis.

Writing (W) requirement: Students must complete at least one W-course in the major.

Related area: A minimum of 12 credits is required in any one of the Dietrich School departments listed on the right side of this sheet chosen in consultation with the major advisor.

Honors major requirements

Honors in Applied Mathematics is granted if the student:

1. Completes all other requirements for the major.

2. Completes the following courses with a grade of B or better:
   a. MATH 1470
   b. MATH 1530
   c. MATH 1540
   d. a 2000 level course in lieu of a 1000 level elective

3. Completes an honors thesis under the direction of a member of the mathematics faculty or completes a 2000-level course in lieu of the honors thesis.

Note: The statistics requirement is waived for students seeking honors in Applied Mathematics.

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Checklist for the Applied Mathematics major

Calculus courses
_____ MATH 0220
_____ MATH 0230 / MATH 0235
_____ MATH 0240

Introductory theoretical courses
_____ MATH 0413 / MATH 0450 *
_____ MATH 0420

* Students who successfully complete MATH 0450 are exempted from taking MATH 0420.

Upper level required courses
_____ MATH 1180 / MATH 1185
_____ MATH 1270 / MATH 1275

One numerical math course
_____ MATH 1070
_____ MATH 1080
_____ MATH 1100
_____ MATH 1101
_____ MATH 1110

One applied analysis course
_____ MATH 1550
_____ MATH 1560
_____ MATH 1570
_____ MATH 1530

One differential equations course
_____ MATH 1280
_____ MATH 1470
_____ MATH 1480

One of the following
_____ MATH 1110
_____ MATH 1360
_____ MATH 1370
_____ MATH 1380

Physics courses
_____ PHYS 0174 / PHYS 0475
_____ PHYS 0175 / PHYS 0476

One Computer Science course
_____ CS 0007
_____ CS 0008
_____ CS 0132
_____ CS 0401

One Statistics course
_____ MATH 1510
_____ STAT 1000
_____ STAT 1100
_____ STAT 1151

Approved Related Area departments and courses

Requests to use course sequences not included in these lists can be made by petition to the Undergraduate Director.

Chemistry*
_ CHEM 0110 or CHEM 0710
_ CHEM 0120 or CHEM 0720
_ CHEM 0310 or CHEM 0730
_ CHEM 0320 or CHEM 0740
_ CHEM 0330
_ CHEM 0345
_ CHEM 1130
_ CHEM 1410
_ CHEM 1420
_ CHEM 1430
_ CHEM 1440
_ CHEM 1450

Computer Science*
_ CS 0008
_ CS 0132
_ CS 0401
_ CS 0441
_ CS 0445
_ CS 0447
_ CS 1501
_ CS 1510
_ CS 1515

Economics*
_ ECON 0100
_ ECON 0110
_ ECON 0280
_ ECON 1100
_ ECON 1110
_ ECON 1150
_ ECON 1180
_ ECON 1200

Physics*
_ PHYS 0174 or PHYS 0475
_ PHYS 0175 or PHYS 0476
_ PHYS 0477
_ PHYS 0481
_ PHYS 1321
_ PHYS 1351
_ PHYS 1372
_ PHYS 1331
_ PHYS 1341
_ PHYS 1361
_ PHYS 1370
_ PHYS 1371
_ PHYS 1373

Statistics*
_ STAT 1151 +
_ STAT 1152
_ STAT 1000-level
_ STAT 1000-level

Engineering
Any major in an area of engineering will satisfy the related area requirement. Any sequence of 12 credits in a coherent area of engineering can be submitted to the Department of Mathematics for consideration as well.

* These departments offer official minors.

+ This course cannot be used for both the statistics course for the major and for the related area requirement.