APPLIED MATHEMATICS - MINOR

A minor is offered in applied mathematics. Declaration of a minor is open to any student enrolled at CU Boulder, regardless of college or school.

The minor in applied mathematics was developed to provide in-depth training in mathematical techniques and computational methods well beyond the training usually received by science and engineering majors. The minor currently offers three tracks: general emphasis, scientific computing and mathematical software, or probability and statistics. The goals of each track are to introduce students to more advanced mathematical techniques and problem-solving strategies. Such skills are becoming increasingly important for students who expect to participate in areas requiring analysis or modeling of real world situations.

The department also offers a minor in statistics (https://catalog.colorado.edu/undergraduate/colleges-schools/programs-study/applied-mathematics/statistics-minor/) which was developed to provide in-depth training in statistical methods and techniques well beyond the training usually received by science and engineering majors. The ability to understand, visualize and analyze data is becoming an increasingly important skill in many disparate fields. This minor offers undergraduate students from any major the opportunity to develop their statistical knowledge.

Requirements

Prerequisites

Prerequisites for the applied math minor are two semesters of calculus and computing experience, as provided by APPM 1650, CSCI 1300, CSCI 2275 or CHEN 1310.

Residency

A minimum of 20 credits at the 2000 level and above is required. At least three APPM or STAT courses, two of which must be at the 3000 level or above, need to be taken on the Boulder campus. No more than 9 credits may be applied from transfer work; of those, no more than 6 credits may be 3000 level or above.

Minimum Grades

A cumulative GPA of 2.00 or better is required in the courses that are used to satisfy the requirements for this minor. Each individual course that is counted towards these degree requirements must be passed with a grade of C- or better.

Required Courses and Credits

Code	Title	Credit Hours
Course Requirements		**20**
APPM 2350	Calculus 3 for Engineers	4
or MATH 2400	Calculus 3	
APPM 2360	Introduction to Differential Equations with Linear Algebra	4
APPM 3310	Matrix Methods and Applications	3
Choose one area of emphasis:		
General Emphasis:		
Choose two of the following three courses:		
APPM 4350	Methods in Applied Mathematics: Fourier Series and Boundary Value Problems	
APPM 4360	Methods in Applied Mathematics: Complex Variables and Applications	
APPM 4600	Numerical Methods and Scientific Computing	
One 3-credit upper division APPM or STAT course at the 3000 or 4000 level		
Scientific Computation Emphasis:		
APPM 3050	Scientific Computing in Matlab [1]	
or APPM 3650	Algorithms and Data Structures in Python	
APPM 4600 & APPM 4610	Numerical Methods and Scientific Computing and Numerical Differential Equations	
Probability and Statistics Emphasis: [2]		
APPM 3570	Applied Probability	3
One of the following sequences:		
STAT 4000 & STAT 4010	Statistical Methods and Application I and Statistical Methods and Applications II	
APPM 4560 & STAT 4520	Markov Processes, Queues, and Monte Carlo Simulations and Introduction to Mathematical Statistics	

[1] APPM 3050 is not appropriate for junior or senior aerospace engineering sciences majors. These students should substitute another upper division applied math course.

[2] A student cannot earn a minor in statistics (https://catalog.colorado.edu/undergraduate/colleges-schools/arts-sciences/programs-study/applied-mathematics/statistics-minor/) and a minor in applied mathematics with probability and statistics emphasis.

Plan(s) of Study

Year One

Fall Semester		Credit Hours
APPM 1350	Calculus 1 for Engineers	4
APPM 1650 or CSCI 1300 or CSCI 2275 or ASEN 1320	Python for Math and Data Science Applications or Computer Science 1: Starting Computing or Programming and Data Structures or Aerospace Computing and Engineering Applications	3
	Credit Hours	**7**

Spring Semester		
APPM 1360	Calculus 2 for Engineers	4
	Credit Hours	**4**

Year Two

Fall Semester		
APPM 2350	Calculus 3 for Engineers	4
	Credit Hours	**4**

Spring Semester

APPM 2360	Introduction to Differential Equations with Linear Algebra	4
	Credit Hours	**4**

Year Three

Fall Semester

APPM 3310	Matrix Methods and Applications	3
	Credit Hours	**3**

Spring Semester

One of the following for 3 credit hours:		3
General Emphasis:		
APPM 4600 or APPM 4360	Numerical Methods and Scientific Computing or Methods in Applied Mathematics: Complex Variables and Applications	
Scientific Computing Emphasis		
APPM 3050 or APPM 3650	Scientific Computing in Matlab [1] or Algorithms and Data Structures in Python	
Probability and Statistics Emphasis		
APPM 3570 or STAT 3100	Applied Probability or Applied Probability	
	Credit Hours	**3**

Year Four

Fall Semester

Course based on Minor Track:		3
General Emphasis		
APPM 4350	Methods in Applied Mathematics: Fourier Series and Boundary Value Problems	
Scientific Computation Emphasis		
APPM 4600	Numerical Methods and Scientific Computing	
Probability and Statistics (Choose ONE)		
STAT 4000	Statistical Methods and Application I	
STAT 4520	Introduction to Mathematical Statistics	
	Credit Hours	**3**

Spring Semester

Course based on Minor Track		3
General Emphasis		
ONE 3-credit APPM or STAT course at the 3000 or 4000 level		
Scientific Computation		
APPM 4610	Numerical Differential Equations	3
Probability and Statistics		
If STAT 4000 was taken in the Fall:		
STAT 4010	Statistical Methods and Applications II	
If STAT 4520 was taken in Fall:		
STAT 4100	Markov Processes, Queues, and Monte Carlo Simulations	
	Credit Hours	**6**
	Total Credit Hours	**34**