APPLIED MATHEMATICS MAJOR (B.S.)

Description

This degree prepares students for careers in science, engineering, and industry by giving students broad exposure to both theoretical and computational models of physical systems in the physical, natural, and social sciences.

Graduation Requirements

In all courses used to satisfy the requirements for its major programs, the Department of Mathematics and Statistics requires that a student earn a grade of C- or better and have an overall grade-point average of at least 2.00 in these courses.

Requirements

Code	Title	Credits
Required MATH Courses		
MATH 425	Calculus I	4
MATH 426	Calculus II	4
MATH 445	Mathematics and Applications with MATLAB	4
or IAM 550	Introduction to Engineering Computing	
MATH 527	Differential Equations with Linear Algebra [1]	4
MATH 528	Multidimensional Calculus [1]	4
MATH 531	Mathematical Proof	4
MATH 545	Introduction to Linear Algebra [2]	4
or MATH 645	Linear Algebra for Applications	
MATH 644	Statistics for Engineers and Scientists	4
MATH 647	Complex Analysis for Applications	4
or MATH 788	Complex Analysis	
MATH 745	Foundations of Applied Mathematics I	4
MATH 753	Introduction to Numerical Methods I	4
MATH 757	Mathematical Optimization for Applications	4
Capstone: Select one of the following		
MATH 797	Senior Seminar	4
MATH 798	Senior Project	4
MATH 799	Senior Thesis	2 or 4
Select TWO of the following electives		
MATH 746	Foundations of Applied Mathematics II	4
MATH 747	Introduction to Nonlinear Dynamics and Chaos	4
MATH 767	One-Dimensional Real Analysis	4
One approved CEPS course at the 700-level, selected in consultation with the academic advisor		4
Other Required Courses		
PHYS 407	General Physics I	4
PHYS 408	General Physics II	4
CS 414 & CS 417	From Problems to Algorithms to Programs and From Programs to Computer Science	8
or CS 415 & CS 416	Introduction to Computer Science I and Introduction to Computer Science II	
Total Credits		**90-92**

1 The full Linearity sequence, MATH 525 & MATH 526, may be used to replace the MATH 527, MATH 528, and MATH 545 / MATH 645 requirements.

2 MATH 525 may be used as a replacement for the MATH 545 or MATH 645 requirement.

Degree Plan

Course	Title	Credits
First Year		
Fall		
MATH 425	Calculus I	4
CS 414 or CS 415	From Problems to Algorithms to Programs or Introduction to Computer Science I	4
Discovery Course		4
Inquiry Course		4
MATH 400	Freshman Seminar	1
	Credits	**17**
Spring		
MATH 426	Calculus II	4
CS 417 or CS 416	From Programs to Computer Science or Introduction to Computer Science II	4
ENGL 401	First-Year Writing	4
Discovery Course		4
	Credits	**16**
Second Year		
Fall		
MATH 445 or IAM 550	Mathematics and Applications with MATLAB or Introduction to Engineering Computing	4
MATH 527	Differential Equations with Linear Algebra	4
PHYS 407	General Physics I	4
Discovery Course		4
	Credits	**16**
Spring		
MATH 528	Multidimensional Calculus	4
MATH 531	Mathematical Proof	4
PHYS 408	General Physics II	4
Discovery Course		4
	Credits	**16**
Third Year		
Fall		
MATH 545 or MATH 645	Introduction to Linear Algebra or Linear Algebra for Applications	4
MATH 644	Statistics for Engineers and Scientists	4
MATH 753	Introduction to Numerical Methods I	4
Discovery Course		4
	Credits	**16**
Spring		
MATH 757	Mathematical Optimization for Applications	4
CEPS 700-level elective		4
Discovery Course		4
Elective		4
	Credits	**16**
Fourth Year		
Fall		
MATH 745	Foundations of Applied Mathematics I	4

Writing Intensive Course		4
Elective		4
Elective		4
	Credits	**16**
Spring		
MATH 647 or MATH 788	Complex Analysis for Applications or Complex Analysis	4
Capstone:		4
MATH 797 or MATH 798 or MATH 799	Senior Seminar or Senior Project or Senior Thesis	
Writing Intensive Course		4
Elective		4
	Credits	**16**
	Total Credits	**129**

Student Learning Outcomes

- Students recognize common mathematical notations and operations used in mathematics, science and engineering.
- Students can recognize and classify a variety of mathematical models including differential equations, linear and nonlinear systems of algebraic equations, and common probability distributions.
- Students have developed a working knowledge (including notation, terminology, foundational principles of the discipline, and standard mathematical models within the discipline) in at least one discipline outside of mathematics.
- Students are able to extract useful knowledge, both quantitative and qualitative, from mathematical models and can apply that knowledge to the relevant discipline.