MAJOR IN MATHEMATICS - APPLIED MATHEMATICS CONCENTRATION

Requirements

Mathematics Major Requirements

All Mathematics majors must take the following required courses.

Code	Title	Units
Required Courses		
MATH 265	ELEMENTARY LINEAR ALGEBRA	4
MATH 267	INTRODUCTION TO ABSTRACT MATHEMATICS	4
MATH 273	CALCULUS I	4
MATH 274	CALCULUS II	4
MATH 275	CALCULUS III	4
Total Units		**20**

Applied Mathematics Concentration Requirements

In addition to the 20 units of common requirements for all Mathematics majors, the Applied Mathematics concentration requires 46-49 units for a total of 66-69 units. All courses must be completed with a grade equivalent of 2.00 or higher. MATH 490 and minimum six additional upper-level courses in the major must be taken at Towson University.

Code	Title	Units
Required Courses		
COSC 236	INTRODUCTION TO COMPUTER SCIENCE I [1]	4
MATH 331	PROBABILITY	4
MATH 332	MATHEMATICAL STATISTICS	3
MATH 369	INTRODUCTION TO ABSTRACT ALGEBRA	4
MATH 372	REAL ANALYSIS I	4
MATH 374	DIFFERENTIAL EQUATIONS	3
MATH 377	MATHEMATICAL MODELS [2]	3
or MATH 439	COMPUTATIONAL PROBABILITY MODELS	
MATH 435	NUMERICAL ANALYSIS I	3
MATH 472	REAL ANALYSIS II [3]	3
or MATH 475	COMPLEX ANALYSIS	
MATH 490	SENIOR SEMINAR IN MATHEMATICS [4]	3
Upper-Level Mathematics Electives		
Select two of the following:		6-7
MATH 315	APPLIED COMBINATORICS	
MATH 337	APPLIED REGRESSION AND TIME SERIES PREDICTIVE MODELING	
MATH 377	MATHEMATICAL MODELS	
MATH 379	FOURIER ANALYSIS WITH APPLICATIONS	
MATH 437	OPERATIONS RESEARCH	
MATH 439	COMPUTATIONAL PROBABILITY MODELS	
MATH 451	GRAPH THEORY	
MATH 457	DIFFERENTIAL GEOMETRY	
MATH 463	LINEAR ALGEBRA	
MATH 472	REAL ANALYSIS II	
MATH 475	COMPLEX ANALYSIS	
Application Electives		
Select two of the following:		6-8
BIOL 309	GENETICS	
COSC 310	SPECIAL TOPICS: ADVANCED PROGRAMMING	
COSC 336	DATA STRUCTURES AND ALGORITHM ANALYSIS	
COSC 417	INTRODUCTION TO THE THEORY OF COMPUTING	
COSC 459	COMPUTER SIMULATION & MODELING	
COSC 461	ARTIFICIAL INTELLIGENCE	
COSC 471	COMPUTER GRAPHICS	
COSC 483	DESIGN & ANALYSIS ALGORITHMS	
ECON 451	INTRODUCTION TO MATHEMATICAL ECONOMICS	
MATH 314	INTRODUCTION TO CRYPTOGRAPHY	
MATH 438	FUNDAMENTALS OF LONG-TERM ACTUARIAL MATHEMATICS	
MATH 485	MATHEMATICAL FINANCE	
MATH 486	RISK MANAGEMENT AND FINANCIAL ENGINEERING	
PHYS 241	GENERAL PHYSICS I CALCULUS-BASED	
PHYS 242	GENERAL PHYSICS II CALCULUS-BASED	
PHYS 307	INTRODUCTORY MATHEMATICAL PHYSICS	
POSC 459	SIMULATION AND GAMES IN POLITICAL SCIENCE	
PSYC 314	RESEARCH METHODS IN PSYCHOLOGY	
Total Units		**46-49**

[1] COSC 175 is a prerequisite for COSC 236.

[2] Only one of MATH 377 or MATH 439 is required. Whichever course is not selected may be taken as an Upper-Level Mathematics Elective.

[3] Only one of MATH 475 or MATH 472 is required. Whichever course is not selected may be taken as an Upper-Level Mathematics Elective.

[4] MATH 490 must be taken at Towson University.

Departmental Honors Program

The Department of Mathematics offers a departmental honors program for students who demonstrate exemplary abilities in mathematics. The program provides students with an opportunity to work closely with faculty mentors in an individual program of research, directed readings and independent study.

Graduation with departmental honors requires a minimum overall cumulative GPA of 3.33, and successful completion of a two-course research sequence and an honors thesis in mathematics (MATH 499). Departmental honors will be posted to the transcript shortly after the bachelor's degree is conferred.

Code	Title	Units
Required Coursework for Departmental Honors in Mathematics		
Research Sequence, Select one of the following:		6
MATH 491 & MATH 492	READINGS IN MATHEMATICS and RESEARCH IN MATHEMATICS	

MATH 493 & MATH 494	READINGS IN MATH EDUCATION and INDEPENDENT STUDY: RESEARCH IN MATHEMATICS EDUCATION	
MATH 495 & MATH 496	APPLIED MATHEMATICS LABORATORY I and APPLIED MATHEMATICS LABORATORY II	
Thesis Requirement		
MATH 499	HONORS THESIS IN MATHEMATICS	1
Total Units		**7**

Four-Year Plan of Study

Sample Four-Year Plan

The selected course sequence below is an example of the simplest path to degree completion. Based on course schedules, student needs, and student choice, individual plans may vary. Students should consult with their adviser to make the most appropriate elective choices and to ensure that they have completed the required number of units (120) to graduate.

Freshman

Term 1	Units	Term 2	Units
MATH 273 (Core 3)	4	COSC 236[1]	4
Core 1 (or Core 2)	3	MATH 265	4
Core 4	3	MATH 274	4
Core 5	3	Core 2 (or Core 1)	3
	13		**15**

Sophomore

Term 1	Units	Term 2	Units
MATH 267	4	MATH 331	4
MATH 275	4	MATH Elective	3
Core 7 (Recommended: PHYS 241)	4	Core 8 (Recommended: PHYS 242)	4
Core 6	3	Core 9	3
Elective	1	Core 10	3
	16		**17**

Junior

Term 1	Units	Term 2	Units
MATH 369	4	MATH 332	3
MATH 374	3	MATH 377 or 439	3
MATH Elective	3	MATH Elective	3
Core 11	3	MATH Elective	3
Core 12	3	Core 13	3
	16		**15**

Senior

Term 1	Units	Term 2	Units
MATH 372	4	MATH 472 or 475	3
MATH 435	3	MATH 490 or 499	3
MATH or general Elective	3	MATH or general Elective	3
Core 14	3	Elective	3
Elective	3		
	16		**12**

Total Units 120

[1] COSC 175 is a prerequisite for COSC 236.

Learning Outcomes

1. Demonstrate knowledge of the properties of numbers and sets.
2. Demonstrate skills and knowledge of appropriate technology used in solving mathematical problems.
3. Demonstrate skills and knowledge of the basic concepts of calculus.
4. Demonstrate skills and knowledge of linear and abstract algebra.
5. Demonstrate skills and knowledge of basic probability and/or statistics.