

MAJOR IN MATHEMATICS

The mathematics major allows students to choose from a broad range of offerings from the math department. After completing the required courses, students select three groups for further study and must complete 2 courses from each selected group, as well as two additional electives.

Students may also wish to consider one of the four concentrations offered by the department, or the major in computer and mathematical sciences.

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

In addition to the 20 units of common requirements for all Mathematics majors, students who do not choose one of the four available concentrations are required to complete 43-48 additional units for a total of 63-68 units. All courses must be completed with a grade equivalent of 2.00 or higher. MATH 490 or MATH 499, and minimum six additional upper (300-400) 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 369	INTRODUCTION TO ABSTRACT ALGEBRA	4
MATH 372	REAL ANALYSIS I	4
MATH 490 or MATH 499	SENIOR SEMINAR IN MATHEMATICS ² HONORS THESIS IN MATHEMATICS	3

Group Requirements

Select minimum three groups from the nine listed below (Algebra, Analysis, Applications, Discrete Math, Education Finance, Geometry/Topology, Numerics, and Statistics) and complete minimum two courses from each group. Algebra or Analysis must be chosen as one of the groups.

Electives

Select any two additional courses from the nine groups listed below. Maximum one elective course may be from the list of Application Electives in the Applications Group.

Total Units		43-48
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¹ COSC 175 is a prerequisite for COSC 236.

² MATH 499 is open to students completing the departmental honors program. MATH 490 or MATH 499 must be taken at Towson University.

Groups

Code	Title	Units
Algebra		
MATH 463	LINEAR ALGEBRA	3
MATH 465	NUMBER THEORY	3
MATH 467	ALGEBRAIC STRUCTURES	3
Analysis		
MATH 379	FOURIER ANALYSIS WITH APPLICATIONS	3
MATH 472	REAL ANALYSIS II	3
MATH 475	COMPLEX ANALYSIS	3
Applications		
MATH 374	DIFFERENTIAL EQUATIONS	3
MATH 377	MATHEMATICAL MODELS	3
Application Electives (maximum one course may be applied to major)		3-4
BIOL 309	GENETICS	
CHEM 345	PRINCIPLES OF PHYSICAL CHEMISTRY	
COSC 336	DATA STRUCTURES AND ALGORITHM ANALYSIS	
PHYS 307	INTRODUCTORY MATHEMATICAL PHYSICS	
PHYS 311	MODERN PHYSICS I	
PHYS 351	MECHANICS	
PHYS 354	ELECTRICITY AND MAGNETISM	
POSC 459	SIMULATION AND GAMES IN POLITICAL SCIENCE	
PSYC 314	RESEARCH METHODS IN PSYCHOLOGY	
Discrete Math		
MATH 314	INTRODUCTION TO CRYPTOGRAPHY	3
MATH 315	APPLIED COMBINATORICS	4
MATH 451	GRAPH THEORY	3
Education (courses have additional prerequisites and/or may require departmental permission to enroll)		
MATH 310	FUNCTIONS AND MODELING FOR SECONDARY SCHOOL TEACHERS	3
MATH 420	APPLICATIONS OF TECHNOLOGY FOR SECONDARY SCHOOL TEACHERS	3
MATH 423	TEACHING MATHEMATICS IN THE SECONDARY SCHOOLS	3
Finance		
MATH 312	THEORY OF INTEREST	4
MATH 485	MATHEMATICAL FINANCE	3
MATH 486	RISK MANAGEMENT AND FINANCIAL ENGINEERING	3
Geometry/Topology		
MATH 353	EUCLIDEAN AND NON-EUCLIDEAN GEOMETRIES	3
MATH 457	DIFFERENTIAL GEOMETRY	3
MATH 477	TOPOLOGY	3
Numerics		
MATH 435	NUMERICAL ANALYSIS I	3

MATH 437	OPERATIONS RESEARCH	3
MATH 439	COMPUTATIONAL PROBABILITY MODELS	3
Statistics		
MATH 332	MATHEMATICAL STATISTICS	3
MATH 337	APPLIED REGRESSION AND TIME SERIES PREDICTIVE MODELING	4
MATH 438	FUNDAMENTALS OF LONG-TERM ACTUARIAL MATHEMATICS	4

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 Suggested Four-Year Plan

Based on course availability and student needs and preferences, the selected sequences will probably vary from those presented below. Students should consult with their adviser to make the most appropriate elective choices.

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	3-4
Core 6	3 Core 8	3-4

Core 7	3-4 Core 9	3
	Core 10	3
	14-15	16-18
Junior		
Term 1	Units Term 2	Units
MATH 369	4 MATH 372	4
MATH First Group (Algebra or Analysis) Course	3 MATH First Group (Algebra or Analysis) Course	3
MATH Second Group Course	3-4 MATH Third Group Course	3-4
Core 11	3 Elective	3
Core 12	3 Core 13	3
	16-17	16-17
Senior		
Term 1	Units Term 2	Units
MATH Second Group Course	3-4 MATH 490 or 499	3
MATH Third Group Course	3-4 MATH Elective	3
Elective	3 Elective	3
Elective	3 Elective	3
Core 14	3 Elective	3
	15-17	15

Total Units 120-127

¹ COSC 175 is a prerequisite for COSC 236.

Learning Outcomes

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