

# MAJOR IN MATHEMATICS - ACTUARIAL SCIENCE AND RISK MANAGEMENT CONCENTRATION

## Admission Admission

Students who are interested in the Actuarial Science & Risk Management concentration must complete an application for admission to the program. Admission to Towson University does not guarantee admission to the concentration. The application may be obtained from the Mathematics Office or downloaded from this website.

To be admitted to the concentration, students are required to meet the following two requirements:

- a. Students must have a grade point average of at least 3.0 in mathematics.
- b. Students must also meet one of the following requirements:
  - i. Completed MATH 273/MATH 283 and MATH 274 with a grade of at least B in both on the first attempt.
  - ii. Received a score of 4 or 5 in AP Calculus AB or BC.
  - iii. Received a passing score on at least one Society of Actuaries (SOA) exam.

Math majors intending to pursue the concentration in Actuarial Science & Risk Management will remain in their current concentration until they are admitted, but will be advised by the Actuarial Science faculty. Students are encouraged to communicate with their faculty adviser regularly to evaluate their progress toward admission.

Students who have not met the admission requirements will not be able to enroll in MATH 438 and MATH 485. Students who take a course listed above before being admitted to the concentration will be disenrolled from the course.

Note: Students not satisfying any of the requirements may petition the Director of Actuarial Science & Risk Management to be admitted into the concentration.

## Requirements

This is a screened program.

### Mathematics Major Requirements

All Mathematics majors must take the following required courses.

Code	Title	Units
<b>Required Courses</b>		
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
<b>Total Units</b>		<b>20</b>

### Actuarial Science and Risk Management Concentration Requirements

The Society of Actuaries has recognized Towson University as a Center of Actuarial Excellence (CAE). There are eight criteria for this designation, including curriculum, faculty composition, graduate quality, connection to industry, and research/scholarship. This concentration will prepare students for the required professional exams to be taken after graduation.

In addition to the 20 units of common requirements for all Mathematics majors, the Actuarial Science and Risk Management concentration requires 63-64 units for a total of 83-84 units. All courses must be completed with a grade equivalent of 2.00 or higher. MATH 498 and minimum six additional upper-level courses in the major must be taken at Towson University.

Code	Title	Units
<b>Required Courses</b>		
ACCT 201	PRINCIPLES OF FINANCIAL ACCOUNTING	3
ACCT 202	PRINCIPLES OF MANAGERIAL ACCOUNTING	3
COSC 236	INTRODUCTION TO COMPUTER SCIENCE I <sup>1</sup>	4
ECON 201	MICROECONOMIC PRINCIPLES	3
ECON 202	MACROECONOMIC PRINCIPLES	3
ENGL 317	WRITING FOR BUSINESS AND INDUSTRY (Core 9)	3
FIN 331	PRINCIPLES OF FINANCIAL MANAGEMENT	3
MATH 312	THEORY OF INTEREST	4
MATH 331	PROBABILITY	4
MATH 332	MATHEMATICAL STATISTICS	3
MATH 337	APPLIED REGRESSION AND TIME SERIES PREDICTIVE MODELING	4
MATH 438	FUNDAMENTALS OF LONG-TERM ACTUARIAL MATHEMATICS	4
MATH 439	COMPUTATIONAL PROBABILITY MODELS	3
MATH 441	FUNDAMENTALS OF SHORT-TERM ACTUARIAL MATHEMATICS	3
MATH 442	ADVANCED SHORT-TERM ACTUARIAL MATHEMATICS	3
MATH 447	STATISTICS FOR RISK MODELING	3
MATH 448	ADVANCED LONG-TERM ACTUARIAL MATHEMATICS	3
MATH 485	MATHEMATICAL FINANCE	3
MATH 498	SENIOR SEMINAR: ACTUARIAL SCIENCE AND RISK MANAGEMENT <sup>2</sup>	3
<b>Mathematics Elective</b>		
Select one of the following:		3-4
MATH 369	INTRODUCTION TO ABSTRACT ALGEBRA	
MATH 372	REAL ANALYSIS I	
MATH 463	LINEAR ALGEBRA	
<b>Total Units</b>		<b>65-66</b>

<sup>1</sup> COSC 175 is a prerequisite for COSC 236.

<sup>2</sup> MATH 498 must be taken at Towson University.

### Continuation Policy

To continue in the Actuarial Science and Risk Management concentration, students need to receive a minimum "B" grade in MATH 331 or maintain a total minimum grade point average of 3.00 in the required courses for the concentration.

Students who fail to meet the criteria for continuation will be removed from the concentration. Students will not be allowed to enroll in MATH 438 and MATH 485 until they achieve a total minimum GPA of 3.00 in the required courses for the concentration or receive a minimum "B" grade in MATH 331. Students who enroll in MATH 438 or MATH 485 before meeting the criteria for continuation will be removed from the course(s).

**NOTE:** Students are required to take MATH 498. One of the prerequisites to enroll in this course is to pass at least one SOA exam.

### Transfer and Second Degree Students

Transfer students and those seeking a second baccalaureate degree need to meet the same requirements of the concentration as described above.

### 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
<b>Required Coursework for Departmental Honors in Mathematics</b>		
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
<b>Total Units</b>		<b>7</b>

## 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
COSC 236 <sup>9</sup>	4 ACCT 201 <sup>1</sup>	3
MATH 273 (Core 3)	4 COMM 131 (Core 5)	3
Core 1 (or Core 2)	3 MATH 265	4
Core 4	3 MATH 274	4
Core 10	3 Core 1 (or Core 2)	3
		<b>17</b>

Sophomore		
Term 1	Units Term 2	Units
ACCT 202 <sup>1</sup>	3 ECON 201 (Core 6) <sup>2</sup>	3
MATH 275	4 MATH 267	4
MATH 312 (Exam FM)	4 MATH 331 (Exam P)	4
Core 7	4 Core 8	4
(Students are advised to prepare for and take the SOA/CAS Exam FM at the end of the Fall Term)	(Students are advised to prepare for and take the SOA/CAS Exam P at the end of the Spring Term)	
		<b>15</b>

Junior		
Term 1	Units Term 2	Units
ECON 202 <sup>2</sup>	3 ENGL 317 (Core 9)	3
MATH 332 <sup>3</sup>	3 FIN 331 <sup>1</sup>	3
MATH 438 <sup>4</sup>	4 MATH 439	3
MATH 441 <sup>8</sup>	3 MATH 442 <sup>11</sup>	3
(Students are advised to prepare for and take SOA Exam FAM at the end of the Fall or Spring Term)	Core 12	3
		(Students are advised to prepare for and take the SOA Exam ASTAM at the end of the Spring Term)
		<b>13</b>

Senior		
Term 1	Units Term 2	Units
MATH 337 <sup>7</sup>	4 MATH 447 <sup>7</sup>	3
MATH 369, 372, or 463	3-4 MATH 448 <sup>10</sup>	3
MATH 485 <sup>6</sup>	3 MATH 498	3
Core 11	3 Core 13	3
(Students are advised to prepare for and take CAS Exam 3F at the end of either the Fall or Spring Term)	Core 14	3
		(Students are advised to prepare for and take the SOA/CAS Exam STAM or SRM at the end of the Spring Term)
		<b>13-14</b>

**Total Units 120-121**

<sup>1</sup> VEE for Accounting and Finance  
<sup>2</sup> VEE for Economic

- 3 VEE for Mathematical Statistics
- 4 Exam FAM-L
- 5 Seminar
- 6 Exam IFM and 3F
- 7 Exam SRM & Exam PA
- 8 Exam FAM-S STAM
- 9 COSC 175 is a prerequisite for COSC 236.
- 10 Exam ALTAM
- 11 Exam ASTAM

## Learning Outcomes

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