MAJOR IN MATHEMATICS - ACTUARIAL SCIENCE AND RISK MANAGEMENT CONCENTRATION

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 (https://www.towson.edu/fcsm/departments/mathematics/undergrad/math/actuarial).

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

1. Students must have a grade point average of at least 3.0 in mathematics.
2. Students must also meet one of the following requirements:
   a. Completed MATH 273/MATH 283 and MATH 274/MATH 284 with a grade of at least B in both on the first attempt.
   b. Received a score of 4 or 5 in AP Calculus AB or BC.
   c. 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 in 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.

Mathematics Major Requirements

All Mathematics majors must take the following required courses in addition to the requirements specified by their chosen concentration:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 265</td>
<td>ELEMENTARY LINEAR ALGEBRA</td>
<td>4</td>
</tr>
<tr>
<td>MATH 267</td>
<td>INTRODUCTION TO ABSTRACT MATHEMATICS</td>
<td>4</td>
</tr>
<tr>
<td>MATH 273</td>
<td>CALCULUS I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 274</td>
<td>CALCULUS II</td>
<td>4</td>
</tr>
<tr>
<td>MATH 275</td>
<td>CALCULUS III</td>
<td>4</td>
</tr>
<tr>
<td>Total Units</td>
<td></td>
<td>20</td>
</tr>
</tbody>
</table>

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 are designated on the graduate’s transcript and diploma upon successful completion of MATH 499.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Sequence, Select one of the following:</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>MATH 491</td>
<td>READINGS IN MATHEMATICS and RESEARCH IN MATHEMATICS</td>
<td></td>
</tr>
<tr>
<td>MATH 493</td>
<td>READINGS IN MATH EDUCATION and INDEPENDENT STUDY: RESEARCH IN MATHEMATICS EDUCATION</td>
<td></td>
</tr>
<tr>
<td>MATH 495 &amp; MATH 496</td>
<td>APPLIED MATHEMATICS LABORATORY I and APPLIED MATHEMATICS LABORATORY II</td>
<td></td>
</tr>
</tbody>
</table>

Thesis Requirement

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 499</td>
<td>HONORS THESIS IN MATHEMATICS</td>
<td>1</td>
</tr>
<tr>
<td>Total Units</td>
<td></td>
<td>7</td>
</tr>
</tbody>
</table>

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 62-63 units for a total of 82-83 units. All courses must be completed with a grade equivalent of 2.00 or higher.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 201 or ACCT 211</td>
<td>PRINCIPLES OF FINANCIAL ACCOUNTING or HONORS ACCOUNTING PRINCIPLES I</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 202 or ACCT 212</td>
<td>PRINCIPLES OF MANAGERIAL ACCOUNTING or HONORS ACCOUNTING PRINCIPLES II</td>
<td>3</td>
</tr>
<tr>
<td>COSC 236</td>
<td>INTRODUCTION TO COMPUTER SCIENCE I</td>
<td>4</td>
</tr>
<tr>
<td>ECON 201</td>
<td>MICROECONOMIC PRINCIPLES</td>
<td>3</td>
</tr>
<tr>
<td>ECON 202</td>
<td>MACROECONOMIC PRINCIPLES</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 317</td>
<td>WRITING FOR BUSINESS AND INDUSTRY (Core 9)</td>
<td>3</td>
</tr>
<tr>
<td>FIN 331</td>
<td>PRINCIPLES OF FINANCIAL MANAGEMENT</td>
<td>3</td>
</tr>
</tbody>
</table>
Major in Mathematics - Actuarial Science and Risk Management Concentration

MATH 312  THEORY OF INTEREST  4
MATH 331  PROBABILITY  4
MATH 332  MATHEMATICAL STATISTICS  3
MATH 337  APPLIED REGRESSION AND TIME SERIES  4
MATH 438  LONG-TERM ACTUARIAL MODELS I  3
MATH 439  COMPUTATIONAL PROBABILITY MODELS  3
MATH 442  SHORT-TERM ACTUARIAL MODELS  4
MATH 448  LONG-TERM ACTUARIAL MODELS II  3
MATH 485  MATHEMATICAL FINANCE  3
MATH 486  RISK MANAGEMENT AND FINANCIAL ENGINEERING  3
MATH 498  SENIOR SEMINAR: ACTUARIAL SCIENCE AND RISK MANAGEMENT  3

Mathematics Elective, Select one of the following:  3-4
MATH 369  INTRODUCTION TO ABSTRACT ALGEBRA
MATH 463  LINEAR ALGEBRA
MATH 473  INTRODUCTORY REAL ANALYSIS

Total Units  62-63

1. COSC 175 is a prerequisite for COSC 236.
2. 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 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.

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  4  ACCT 201  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

Sophomore
Term 1  Units Term 2  Units
ACCT 202  3  ECON 201 (Core 6)  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)

Junior
Term 1  Units Term 2  Units
ECON 202  3  ENGL 317 (Core 9)  3
MATH 332  3  FIN 331  3
MATH 369, 463, or 473  4  MATH 439  3
MATH 390  3  MATH 448  4  3
MATH 438  3  Core 12  3
(Students are advised to prepare for and take the SOA Exam LTAM at the end of the Spring Term)

Senior
Term 1  Units Term 2  Units
MATH 337  4  MATH 486  6
MATH 442  4  MATH 498  3
Core 11  3  Core 14  3
(Students are advised to prepare for and take the SOA Exam IFM at the end of either the Fall or Spring Term)  (Students are advised to prepare for and take the SOA Exam STAM at the end of the Spring Term)

Total Units  121
1. VEE for Accounting and Finance
2. VEE for Economic
3. VEE for Mathematical Statistics
4. Exam LTAM
5. Seminar
6. Exam IFM
7. Exam SRM & Exam PA
8. Exam STAM
9. COSC 175 is a prerequisite for COSC 236.

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.