ACTUARIAL SCIENCE AND PREDICTIVE ANALYTICS M.S.

Degree: Master of Science
https://www.towson.edu/fcsm/departments/mathematics/grad/actuarial-science-predictive-analytics/

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The Master of Science in Actuarial Science and Predictive Analytics (ASPA) will prepare students to succeed in a market landscape that has greatly adopted risk management practices and data analytics. The program combines theory, practice and predictive modeling, providing students with critical analytical tools that will enable them to have the right skills to succeed in the marketplace and continue to be industry leaders. The program reflects Towson University's mission, vision and strategic plan and it is designed to:

- Build an interdisciplinary foundation in actuarial science with emerging technology, predictive modeling and curricular content that encourages "thinking critically and meaningfully."
- Provide select, high quality programs in professional fields where there is evidence both of need and of corresponding institutional strength. The Master of Science degree in Actuarial Science and Predictive Analytics will produce graduates who can meet the challenges of the actuarial profession today, prepare for the opportunities of tomorrow, and ultimately "enrich the culture, society, economy and environment of Maryland, the region, and beyond."
- Provide the most current and advanced skill sets and knowledge in the Actuarial Science professional career that align with national trends and span the areas of STEM, business, and finance education.
- Engage students in Maryland, serving communities' needs and providing our students with varied internship and service learning opportunities through industry relationships, networking opportunities, a capstone and professional practices course and a recommended internship.
- Empower students to achieve their career goals and "enrich the culture, society, economy and environment of Maryland, the region, and beyond" through a careful curricular plan that targets a student's academic growth while seeking required experiences needed to support career outcomes.

Both full-time and part-time students are encouraged to enroll in the program. Core courses are usually offered in the evening, for the convenience of part-time students.

Accelerated Bachelor's-Master's Program

Students may also earn an M.S. in Science in Actuarial Science and Predictive Analytics through the Department of Mathematics' accelerated bachelor's and master's program. This program allows students to complete their undergraduate and graduate degrees in a shorter time frame.

Please see the Undergraduate Catalog for information on the accelerated bachelor's-master's program.

Requirements

Admission Requirements

Application deadlines and a full listing of materials required for admission can be found on the website.

Prerequisite Course Work

The applicant's undergraduate training must have included at least one course in calculus, calculus-based probability, mathematical statistics, and linear algebra, and three courses in calculus. Students with any deficiency in their mathematical background may be admitted conditionally if they are willing to correct such deficiency.

Degree Requirements

The student is required to successfully complete at least 10 courses (Students may need to take more than 10 courses if prerequisites are not met) and **pass at least two Society of Actuaries professional exams (before or during graduate study)**.

The 10-course (a minimum of 30 units) requirement is indicated below:

1. At least four courses from List A
2. At least four courses from List B
3. At least two courses from either List A or List B
4. At most three 500-level courses from List A and List B will count toward the degree

List A

Code	Title	Units
List A - Choose Four Courses		
MATH 512	THEORY OF INTEREST	
MATH 538	FUNDAMENTALS OF LONG-TERM ACTUARIAL MATHEMATICS	
MATH 541	FUNDAMENTALS OF SHORT-TERM ACTUARIAL MATHEMATICS	
MATH 542	ADVANCED SHORT-TERM ACTUARIAL MATHEMATICS	
MATH 548	ADVANCED LONG-TERM ACTUARIAL MATHEMATICS	
MATH 585	MATHEMATICAL FINANCE	
MATH 586	RISK MANAGEMENT AND FINANCIAL ENGINEERING	
MATH 639	LOSS MODELS	
MATH 641	ENTERPRISE RISK MANAGEMENT	
MATH 642	CREDIBILITY AND SIMULATION	
MATH 643	COMPUTATIONAL METHODS OF MATHEMATICAL FINANCE	
MATH 644	MATHEMATICS OF FINANCIAL DERIVATIVES	
MATH 688	TOPICS IN ACTUARIAL SCIENCE AND RISK MANAGEMENT	
List B - Choose Four Courses		
MATH 533	APPLIED REGRESSION AND TIME SERIES PREDICTIVE MODELING	
MATH 547	STATISTICS FOR RISK MODELING	
MATH 601	INTRODUCTION TO STATISTICAL COMPUTING AND DATA SCIENCE	

MATH 631	TOPICS IN PROBABILITY	
MATH 632	COMPUTATIONAL STOCHASTIC MODELING	
MATH 634	TIME SERIES ANALYSIS AND FORECASTING	
MATH 638	APPLIED MULTIVARIATE STATISTICAL ANALYSIS	
MATH 640	BAYESIAN STATISTICS	
MATH 647	PREDICTIVE ANALYTICS	
MATH 688	TOPICS IN ACTUARIAL SCIENCE AND RISK MANAGEMENT	
Total Units		**Minimum of 30 Units**

Learning Outcomes

Master of Science in Actuarial Science and Predictive Analytics program is to prepare students with a foundational understanding in predictive analytics to ensure students stay current in the evolving actuarial profession, prepare them for tomorrow's challenges and "continues to meet the needs of employers and other users of actuarial services."[1] At the completion of the program, students are expected to demonstrate the following student learning outcomes:

1. Assess and elucidate the theoretical and historical foundations of actuarial science and predictive analytics.
2. Choose and defend the choice of mathematical models and technologies to conduct predictive analyses, financial evaluations and risk management assessments.
3. Compare and contrast the principles and procedures of various methodologies to implement practical and technical aspects of actuarial science and predictive analytics.
4. Design and conduct a financial project, analyze the findings, and convey the results through professional oral and written reports and graphics that reflect actuarial science standards.

[1] Society of Actuaries: Plain Talk: Curriculum Review