ACTUARIAL MATHEMATICS

At the University of Michigan-Dearborn, the Actuarial Mathematics program is expertly crafted to integrate essential disciplines such as mathematics, statistics, computing, and finance. This program is strategically designed to guide students towards attaining the qualifications of an Associate of either the Society of Actuaries (SOA) or the Casualty Actuarial Society (CAS). It provides a thorough assortment of courses that serve a dual purpose: preparing students for various professional examinations and meeting the Validation by Educational Experience (VEE) requirements set by these actuarial organizations.

The program goes beyond basic coursework to adopt a progressive, practice-based learning (PBL) approach. This approach encompasses leading-edge subjects such as predictive analytics, statistical risk management, and machine learning. Such a curriculum ensures that students are thoroughly prepared to excel in the ever-changing and dynamic arena of actuarial science. Students are encouraged and assisted in obtaining real-life experience through internships. This comprehensive educational framework at UM Dearborn is dedicated to building a robust foundation in key areas crucial for a successful career in risk management, financial planning and actuarial sciences.

What does an actuary do?

An actuary is a professional who plays a critical role in the financial world, especially in situations where uncertainty and risk are involved. Take, for example, the process of pricing health insurance: unlike pharmaceutical companies who price their medications based on known research and production costs, insurers must estimate prices for potential, unpredictable future healthcare claims. Actuaries use their extensive knowledge of mathematics, statistics, economics, and market dynamics to accurately and ethically set health insurance policy costs. However, their expertise extends beyond this specific area. Actuaries are experts in assessing financial risks in various sectors, such as insurance, investments, pensions, and even environmental sustainability. They develop models to predict and manage future events, ensuring that companies remain stable and commitments are fulfilled under uncertain circumstances. Actuaries are financial safety net architects, crafting plans for any scenario.

Dearborn Discovery Core (General Education)

All students must satisfy the University's Dearborn Discovery Core requirements (http://catalog.umd.umich.edu/undergraduate/gen_ed_ddc/), in addition to the requirements for the major. Students must also complete all CASL Degree Requirements. (http://catalog.umd.umich.edu/undergraduate/college-arts-sciences-letters/)

Pre-Major Requirements

Not counted in the 41 credit hours required for the major.

Code	Title	Credit Hours
ACC 298	Financial Accounting	3
ECON 201	Prin: Macroeconomics	3
ECON 202	Prin: Microeconomics	3
MATH 115	Calculus I	4
MATH 116	Calculus II	4
MATH 227	Introduction to Linear Algebra	3

CIS 1501 is a recommended but not a required pre-major course.

Major Requirements

Code	Title	Credit Hours
Mathematics Core		**10**
MATH 325	Probability	
MATH 335	Mathematical Interest Theory	
MATH 425	Statistical Inference	
Applied Statistics and Computation Core		**17**
STAT 305	Introduction to Data Science for All	
STAT 325	Applied Statistics I	
STAT 327	Statistical Computing	
STAT 430	Applied Regression Analysis [1]	
STAT 431	Machine Learning and Computational Statistics	
Finance Core		**6**
FIN 401	Corporate Finance	
FIN 402	Advanced Corporate Finance	
Electives (Select 8-11 credits)		**8-11**
ECON 301	Intermediate Macroeconomics	
ECON 302	Intermediate Microeconomics	
ECON 355	Health Economics	
ECON 438	Beh Econ for Business & Policy	
ECON 4011	Monetary Economics [2]	
ECON 4015	Introduction to Econometrics [2]	
FIN 407	Investment Fundamentals	
FIN 411	Financial Planning	
FIN 412	Retirement Planning	
FIN 447	Derivative Markets	
MATH 215	Calculus III	
MATH 300	Math Lang Proof & Struct	
MATH 420	Stochastic Processes	
MATH 423	Applied Linear Algebra	
MATH 451	Advanced Calculus I	
MATH 472	Introduction to Numerical Analysis	
MATH 492	Introduction to Topology [2]	
MATH 499	Independent Studies in Math [3]	
MKT 352	Mktg Principles and Policies	
OB 354	Behavior in Organizations	
STAT 460	Time Series Analysis [2]	
Total Credit Hours		**41-44**

1. Recommended after taking Math 227.
2. Can be taken as a DDC capstone course.
3. Can only be taken for 3 credits.

Notes:

1. At least 20 of the 41 credit hours in the major must be elected at UM-Dearborn.

2. Students are strongly recommended to complete at least one Experiential Education experience, co-op or internship before graduation.
3. Students wishing to use graduate level courses (STAT 500+, MATH 500+) as a part of the 41 hours required for the major must submit a petition to obtain the approval of the Actuarial Studies faculty advisor prior to registering for the class.
4. Students not enrolled in the College of Business BBA Program cannot elect more than 30 upper-level (courses numbered 300 and above) credit hours offered by the College of Business.
5. A minimum 2.0 GPA in the major is required for graduation.

Learning Goals

1. Develop analytical and reasoning skills
2. Apply theories and models to measure and manage risk
3. Integrate disciplines to create a breadth of knowledge in mathematics and statistics as well as finance and economics
4. Prepare for three of the professional exams required to obtain Associate credentials from the Society of Actuaries. The three Professional Exams addressed by this program are: Probability (P), Financial Mathematics (FM),Investment Finances and Models (IFM)