

Actuarial Science, M.S.

FOX SCHOOL OF BUSINESS AND MANAGEMENT (<https://www.fox.temple.edu>)

Learn more about the Master of Science in Actuarial Science (<https://www.temple.edu/academics/degree-programs/actuarial-science-ms-bu-as-ms>).

About the Program

The Fox School of Business and Management has a longstanding tradition of preparing our students with the power to lead within the world of business. Actuaries specialize in the evaluation of insurance and financial risks and distinguish themselves through a combination of analytical skills, business acumen, and professionalism. Temple's Actuarial Science M.S. program prepares students for a successful career in the field through its rigorous coursework and exceptional opportunities for professional development. Our curriculum covers multiple professional actuarial exams and can be tailored to students' interests and background. We are recognized as a Center of Actuarial Excellence (CAE) by the Society of Actuaries and as a Global Center of Insurance Excellence (GCIE) by the International Insurance Society.

Time Limit for Degree Completion: 6 years

Campus Location: Main

Full-Time/Part-Time Status: The degree program can be completed on a full- or part-time basis.

Affiliation(s): Research is supported by Fox School of Business and Management's Advanta Center for Research in Financial Institutions, Center for Healthcare Research and Management, Innovation and Entrepreneurship Institute, and Institute of Global Management Studies. Research interests of the Fox School faculty are also supported by numerous centers and institutes throughout Temple University.

Accreditation: All Fox School of Business and Management graduate programs are accredited by the Association to Advance Collegiate Schools of Business (AACSB International).

Job Prospects: Actuaries hold positions of responsibility with consulting firms, government insurance programs, government regulatory organizations, insurance companies, and investment banks.

Non-Matriculated Student Policy: Students with an undergraduate GPA of 3.0 or higher may be allowed to take classes under non-matriculated status. Non-matriculated students may take a maximum of 9 credits. Any additional courses require the student to be matriculated in a program.

Financing Opportunities: Citizens and permanent residents of the United States are considered domestic students and are typically eligible for federal student loans as well as alternative loans through private lenders. The Fox School grants 5% tuition scholarships to alumni who are admitted to the program. The program also offers merit- and need-based scholarships to eligible admitted students. Students are further encouraged to pursue scholarship funds from organizations to which they belong, such as athletic organizations, clubs, employers, ethnic groups, fraternal organizations, religious organizations, rotary clubs, unions, veteran groups, and the like.

Admission Requirements and Deadlines

Application Deadline:

Fall:

- December 15 – Early Decision Deadline
- March 1 – Scholarship Deadline and International Deadline
- June 30 – Final Deadline

Spring:

- August 1 – Scholarship Deadline and International Deadline
- November 1 – Final Deadline

Applications are reviewed as they are received and can sometimes be considered after the deadline.

APPLY ONLINE (<https://fox.secure.force.com/SiteLogin>) to this Fox graduate program at <https://fox.secure.force.com/SiteLogin/>.

Letters of Reference:

Number Required: 2

From Whom: Professional references from an immediate supervisor, current or past, are preferred. Academic references are acceptable.

Bachelor's Degree in Discipline/Related Discipline: A baccalaureate degree is required.

Statement of Goals: In 500 words or less, answer the following questions:

- What past experience prepared or motivated you to pursue this degree?
- How do you expect to change over the course of the program?
- What personal and professional values and skills do you hope to acquire beyond the academic content?
- How will obtaining the degree help you achieve your career goals?

Standardized Test Scores:

GRE/GMAT: Required. Scores for the GRE typically fall within the following percentile ranges: 50 to 99 Verbal; 80 to 99 Quantitative.

Applicants who earned their baccalaureate degree from an institution where the language of instruction was other than English, with the exception of those who subsequently earned a master's degree at a U.S. institution, must report scores for a standardized test of English that meet these minimums:

- TOEFL iBT: 100
- IELTS Academic: 7.0
- PTE Academic: 68

Resume: Current resume required.

Transfer Credit: Upper-level graduate credits from an AACSB-accredited graduate business program, but not previously applied to a conferred degree, may be transferred into the M.S. program. The credits must be part of the required degree program at Temple University. To be transferred, the grade must be a "B" or better. The Admissions Committee makes recommendations for transferring credits to the department chair. The maximum number of credits a student may transfer is 6.

Program Requirements

General Program Requirements:

Number of Credits Required Beyond the Baccalaureate: 30

Required Courses:

Code	Title	Credit Hours
Core Courses		
AS 5101	Theory of Interest	3
AS 5102	Actuarial Modeling I	3
AS 5104	Actuarial Modeling III	3
AS 5107	Advanced Theory of Interest	3
AS 5108	Actuarial Analytics	3
RMI 5101	Managing Human Capital	3
RMI 5104	The Role of Property and Casualty Insurance Sector in Enterprise Risk Management	3
Electives		9
Select three from the following:		
ACCT 5001	Accounting for Managerial and Investment Analysis and Planning	
AS 5103	Actuarial Modeling II	
AS 5105	Actuarial Economics	
AS 5106	Actuarial Corporate Finance	
ECON 8001	Microeconomic Analysis	
ECON 8002	Macroeconomic Analysis	
ECON 8009	Econometrics I	
ECON 8129	Time Series Econometrics	
ECON 8139	Panel Data Econometrics	
MKTG 5001	Marketing Management/Strategy	
RMI 5051	Managing Risk	
STAT 5602	Visualization: The Art of Numbers and the Psychology of Persuasion	
STAT 5603	Statistical Learning and Data Mining	
STAT 5607	Advanced Business Analytics	
STAT 8101	Stochastic Processes	

STAT 8108	Applied Multivariate Analysis I
STAT 8114	Survival Analysis I
STAT 8115	Nonparametric Methods
Total Credit Hours	

30

Culminating Events: Successful completion of coursework is required to earn the M.S. degree in Actuarial Science.

Contacts

Program Web Address:

<https://www.temple.edu/academics/degree-programs/actuarial-science-ms-bu-as-ms>

Department Information:

Fox School of Business and Management
 1801 Liacouras Walk
 701 Alter Hall (006-22)
 Philadelphia, PA 19122
foxinfo@temple.edu
 215-204-5890
 215-204-7678
 Fax: 215-204-1632

Submission Address for Application Materials:

<https://fox.secure.force.com/SiteLogin/>

Department Contacts:

Academic Co-Directors:

Thorsten Moenig
moenig@temple.edu
 215-204-2805

Tianxiang Shi
tianxiang.shi@temple.edu
 215-204-6192

Specialized Master's Programs Coordinator:

Rachel Carr
 Associate Director for Specialized Master's Programs
foxms@temple.edu
 215-204-7678

Courses

AS 5101. Theory of Interest. 3 Credit Hours.

In this course, simple, compound and effective interest functions are analyzed and used in the calculation of present value and future values of various investments. Annuities, loan amortization and bonds are discussed and techniques for computing their values at various dates are explored.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

AS 5102. Actuarial Modeling I. 3 Credit Hours.

This course introduces the discrete and continuous random variables measuring the future lifetime of a person. Among the topics covered are calculation of the mean, variance and probability functions for these random variables, introduction of a present value random variable measuring the present value of a life insurance and annuity benefit, calculation of premiums for life insurance and annuities using interest rates and calculation of reserves for insurance companies, examining future liabilities and inflow.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites:

AS 5101|Minimum Grade of B-|May be taken concurrently.

AS 5103. Actuarial Modeling II. 3 Credit Hours.

This course introduces multiple life functions that require the use of joint probability functions and the calculation of marginal probability distributions. Additional topics include the calculation of mean and variance for these joint random variables and multiple decrement theory. Various topics from Loss Models are also discussed including computation of mixed distributions through compounding of frequency distributions with severity distributions and the calculation of premiums for insurance policies with deductibles, limits and coinsurance.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites:

AS 5102|Minimum Grade of B-|May not be taken concurrently.

AS 5104. Actuarial Modeling III. 3 Credit Hours.

Estimation and fitting of survival, frequency and severity, and compound distribution loss models; credibility methods.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

AS 5105. Actuarial Economics. 3 Credit Hours.

This course develops the conceptual framework of microeconomics and macroeconomics with some applications in actuarial science. It offers the VEE credit for Economics as required by the Society of Actuary. Topics in microeconomics include interaction between supply and demand, consumer behavior, production choices, different types of competition, factor markets, and market failure. Topics in macroeconomics include business cycles, inflation, unemployment, monetary and fiscal policy, balance of payments, international economics, and economic growth.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

AS 5106. Actuarial Corporate Finance. 3 Credit Hours.

This course introduces students to the fundamental principles of accounting, corporate finance, and financial derivatives, from an actuarial perspective. It offers students VEE credit for accounting and finance, as required by the actuarial societies. It also covers the corporate finance material of actuarial Exam IFM. The course covers basic accounting principles and regulations, financial statements, investment decision making, the risk-return tradeoff, capital structure, long-term financing, investment risk, and an introduction to both financial and real options.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Co-requisites: AS 5101.

Repeatability: This course may not be repeated for additional credits.

AS 5107. Advanced Theory of Interest. 3 Credit Hours.

This course develops the theoretical basis of certain actuarial models and the application of those models to insurance and other financial risks. It prepares students for SOA Exam MFE or CAS Exam 3F. Topics covered in this course include Vasicek and Cox-Ingersoll-Ross bond price models, Black-Derman-Toy binomial model, Black-Scholes option-pricing model, exotic options, Itô's lemma in the one-dimensional case. Simulation of lognormal stock prices and variance reduction techniques will be discussed and delta-hedging in risk management will be demonstrated.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

College Restrictions: Must be enrolled in one of the following Colleges: Business & Mngmnt, Fox School.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites:

AS 5101|Minimum Grade of B-|May not be taken concurrently.

AS 5108. Actuarial Analytics. 3 Credit Hours.

The course introduces students to linear regression models and time series analysis, with a focus on applying these tools to actuarial business decisions in an insurance or consulting environment. Statistical analyses have quickly become part of the modern actuary's day-to-day responsibilities as they help improve solutions to traditional actuarial problems such as estimating mortality, setting loss reserves, predicting policyholder behavior, and establishing classification ratemaking schemes. In addition, actuaries have started to use predictive modeling techniques to improve insurance operations and business processes that have traditionally relied largely on the managers' judgement. The course aims to prepare students for and beyond the data analytics needs of entry level actuarial positions. Since programming skills are vital to conduct statistical analyses - and are thus highly valued by the insurance industry - they are also a focus of this course. In particular, students will learn two of the most common statistical languages used by actuaries: SAS and R. No prior knowledge of these languages is required. Students will be introduced to both languages and will apply them throughout the course to various real-world insurance and financial data sets. Furthermore, the course will feature hands-on guest lectures by alumni of the Temple actuarial science program who will present students with examples of their work with data analytics.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

AS 5170. Special Topics. 3 Credit Hours.

Special Topics. Content varies.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may be repeated for additional credit.

AS 5180. Special Topics. 3 Credit Hours.

Special Topics. Content varies.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may be repeated for additional credit.

AS 5182. Independent Study. 1 to 6 Credit Hour.

Special study in a particular aspect of actuarial science under faculty supervision. Maximum of six hours may be counted toward degree requirements.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may be repeated for additional credit.

AS 5190. Special Topics in Actuarial Science. 3 Credit Hours.

Special Topics - Actuarial Science. Content varies.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may be repeated for additional credit.

AS 5196. Casualty Contingencies. 3 Credit Hours.

This highly participative course is designed to broaden perspectives on the business environment in which actuaries work. In addition to analyzing the issues behind daily events, several continuing issues will be analyzed including insurance pricing cycles, regulatory developments, the role of the actuary as an educator, advisor, objective information source and problem solver insurance company financial rating and solvency issues, accounting fraud and questionable financial transactions, insurance and the financial markets managing insurance operations, professional ethics, and the impact of current developments in underwriting, and reinsurance on the actuarial function.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

AS 5282. Independent Study. 1 to 3 Credit Hour.

Independent Study. Focus to be determined by instructor and student.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may be repeated for additional credit.