Actuarial Science (AS)

Courses

AS 1501. Introduction to Actuarial Science. 3 Credit Hours.
In this course, probability theory and its application to insurance and risk management problems are discussed. Among the topics to be covered: counting techniques, conditional probability, Bayes' Theorem, discrete random variables, specific discrete distributions such as Binomial, Poisson, Negative Binomial and Uniform, moment generating functions and functions of two random variables. NOTE: Students need to earn a grade of C or better in this course to be eligible to register for all other required courses in the Actuarial Science major.

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:
MATH 1042|Minimum Grade of C-|May be taken concurrently
OR MATH 1942|Minimum Grade of C-|May be taken concurrently
OR MATH 2043 to 3080| Required Courses:1|Minimum Grade of C-|May be taken concurrently.

AS 1901. Honors Introduction to Actuarial Science. 3 Credit Hours.
Honors version of Actuarial Science 1501 (0001). NOTE: Students need to earn a grade of C or better in this course to be eligible to register for all other required courses in the Actuarial Science major.

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

Cohort Restrictions: Must be enrolled in one of the following Cohorts: SCHONORS, UHONORS, UHONORSTR

Course Attributes: HO

Repeatability: This course may not be repeated for additional credits

Pre-requisites:
MATH 1042|Minimum Grade of C-|May be taken concurrently
OR MATH 1942|Minimum Grade of C-|May be taken concurrently
OR MATH 2043 to 3080| Required Courses:1|Minimum Grade of C-|May be taken concurrently.

AS 2101. Actuarial Probability and Statistics. 3 Credit Hours.
This course covers the tools for quantitatively assessing risk as presented on Society of Actuaries Exam P/Casualty Actuarial Society Course 1. Topics include: general probability (set functions, basic axioms, independence); Bayes' Theorem; univariate probability distributions (probabilities, moments, variance, mode, percentiles, and transformations); multivariate probability distributions (joint, conditional, and marginal distributions—probabilities, moments, variance, and covariance); and basic asymptotic results. NOTE: This course replaces the Statistics 2101 (C021) or 2103 Business Foundation requirement for Actuarial Science majors.

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:
(MATH 2043|Minimum Grade of C|May not be taken concurrently
OR MA08 Y|May not be taken concurrently)
AND (AS 1501|Minimum Grade of C|May not be taken concurrently
OR AS 1901|Minimum Grade of C|May not be taken concurrently).

AS 2502. 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. NOTE: Students will need to earn a minimum grade of C in this course to be eligible to take Actuarial Science 3501.

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:
MATH 1042|Minimum Grade of C|May not be taken concurrently
OR MATH 1942|Minimum Grade of C|May not be taken concurrently
OR MATH 2043|Minimum Grade of C|May be taken concurrently
OR MA07 Y|May not be taken concurrently.
AS 2503. Corporate Finance for Actuarial Science. 3 Credit Hours.
This course develops the conceptual framework of corporate finance and financial derivative from an actuarial perspective. It prepares students for the Derivatives Markets material on Exam FM/2 and also offers VEE credit for Corporate Finance. Topics covered in this course include financial statements, asset valuation, capital budgeting, capital structure, the cost of capital and dividend policy. Financial derivatives, such as forwards, futures, swaps, and options, will be discussed in detail and their application in corporate risk management will be examined. NOTE: This course should be taken in place of Finance 3101 and has been approved by the Society of Actuaries/Casualty Actuarial Society for VEE - Corporate Finance. Completion of this course with a minimum grade of B- is required for VEE - Corporate Finance credit.

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:
(MATH 1042|Minimum Grade of C|May not be taken concurrently
OR MATH 1942|Minimum Grade of C|May not be taken concurrently
OR MATH 2043|Minimum Grade of C-|May be taken concurrently
OR MA07 Y|May not be taken concurrently)
AND (ACCT 2101|Minimum Grade of C|May not be taken concurrently
OR ACCT 2901|Minimum Grade of C|May not be taken concurrently
OR ACC1 Y|May not be taken concurrently)
AND (AS 2502|Minimum Grade of C|May not be taken concurrently).

AS 2504. 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.

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 2502|Minimum Grade of C|May not be taken concurrently
AND AS 2503|Minimum Grade of C|May not be taken concurrently).

AS 3501. 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. NOTE: A grade of C or better is required in this course to be eligible to take Actuarial Science 3502.

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 2502|Minimum Grade of C|May not be taken concurrently
AND AS 2503|Minimum Grade of C|May not be taken concurrently).

AS 3502. Actuarial Modeling II. 3 Credit Hours.
This course introduces the evaluation and calculation of reserves for various continuous and discrete policies. Multi-state models are presented, with applications in multiple decrement theory and multiple lives. The valuation of life insurance and annuities is then reexamined, allowing for interest rate and mortality adjustments. The profitability of insurance products is then discussed and calculated.

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 3501|Minimum Grade of C|May not be taken concurrently.

AS 3503. Actuarial Modeling III. 3 Credit Hours.
Estimation and fitting of survival, frequency and severity, and compound distribution loss models; credibility methods.

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:
STAT 2512|Minimum Grade of C|May not be taken concurrently.

AS 3580. Special Topics: Actuarial Science. 3 Credit Hours.
Special topics in current developments in the field of Actuarial Science and exam preparation.

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

Repeatability: This course may be repeated for additional credit.
AS 3582. Independent Study. 1 to 6 Credit Hour.
Readings and/or research paper under the supervision of a faculty member.

College Restrictions: Must be enrolled in one of the following Colleges: Business & Mngmnt, Fox School
Repeatability: This course may be repeated for additional credit.

AS 3596. 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. NOTE: This is the writing-intensive course for Actuarial Science majors. Students must earn a grade of C in this course if they are using it to fill the writing intensive course requirement for their degree.

College Restrictions: Must be enrolled in one of the following Colleges: Business & Mngmnt, Fox School
Course Attributes: WI
Repeatability: This course may not be repeated for additional credits

Pre-requisites:
(RMI 2101|Minimum Grade of C|May not be taken concurrently)
OR RMI 2901|Minimum Grade of C|May not be taken concurrently
OR RM01 Y|May not be taken concurrently
AND (MATH 2043|Minimum Grade of C|May not be taken concurrently)
OR MA08 Y|May not be taken concurrently
AND (AS 1501|Minimum Grade of C|May not be taken concurrently)
OR AS 1901|Minimum Grade of C|May not be taken concurrently
AND (ACCT 2101|Minimum Grade of C|May not be taken concurrently)
OR ACCT 2901|Minimum Grade of C|May not be taken concurrently).

AS 3999. Honors Thesis I. 1 to 3 Credit Hour.
The first of a two-part sequence of courses in which independent research is conducted under the supervision of a thesis advisor from the Actuarial Science department resulting in a substantial piece of original research, roughly 30 to 50 pages in length upon completion of Actuarial Science 4999. The student must publicly present his/her findings at a Temple University Research Forum session or the equivalent during one of the two semesters during which these courses are undertaken.

Field of Study Restrictions: Must be enrolled in one of the following Majors: Actuarial Science
College Restrictions: Must be enrolled in one of the following Colleges: Business & Mngmnt, Fox School
Cohort Restrictions: Must be enrolled in one of the following Cohorts: SCHONORS, UHONORS, UHONORSTR
Course Attributes: HO
Repeatability: This course may be repeated for additional credit.

AS 4999. Honors Senior Thesis II. 1 to 3 Credit Hour.
Independent research conducted under the supervision of a thesis advisor from the Actuarial Science Department resulting in a substantial piece of original research, roughly 30 to 50 pages in length. Student must publicly present his/her findings at a Temple University Research Forum session or the equivalent if this was not done in Actuarial Science 3999.

Field of Study Restrictions: Must be enrolled in one of the following Majors: Actuarial Science
College Restrictions: Must be enrolled in one of the following Colleges: Business & Mngmnt, Fox School
Cohort Restrictions: Must be enrolled in one of the following Cohorts: SCHONORS, UHONORS, UHONORSTR
Course Attributes: HO
Repeatability: This course may be repeated for additional credit.

Pre-requisites:
AS 3999|Minimum Grade of C-|May not be taken concurrently.

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
Pre-requisites:
AS 5103|Minimum Grade of B-|May not be taken concurrently.

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 develops the conceptual framework for corporate finance and financial derivatives from an actuarial perspective. It prepares students for Exam FM and also offers VEE credit for corporate finance as required by the Society of Actuaries. Topics covered in this course include financial statements, asset valuation, capital budgeting, capital structure, the cost of capital and dividend policy. Financial derivatives, such as forwards, futures, swaps, and options, will be discussed in detail, and their application in corporate risk management will be examined.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate
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 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.