

College of Arts and Sciences – Interdisciplinary Programs

Actuarial Science (ACSC)

Youn (MATH), director, Dayananda (MATH)

The Bachelor of Science in Actuarial Science is an interdisciplinary degree program offered through the Department of Mathematics. (See also the Department of Mathematics in this catalog.)

Actuarial science education equips students with strong mathematical problem-solving skills that can be applied to business careers. The major requirements consist of courses in mathematics, actuarial science, computer science, business, economics and a course in communication. Coupled with a firm foundation in the liberal arts, this major provides a sound grounding in analytical problem-solving and communication skills.

This program prepares students for a variety of careers with insurance companies, consulting firms, financial institutions, industrial corporations or government agencies. It also provides a good preparation for non-actuarial careers in banking, finance or insurance. In addition, the statistical background developed by an actuarial student is valuable in a variety of other fields.

Students graduating with a major in Actuarial Science will become proficient in basic mathematics through multi-variate calculus and probability together with basic notions of insurance and risk management. They will demonstrate the ability to think clearly and critically in solving problems related to the analysis and management of risk. They will be able to effectively communicate technical and non-technical information to their peers and to non-specialists in their work environment.

To be certified as a Fellow or an Associate by either the Society of Actuaries or the Casualty Actuarial Society, one must pass a series of rigorous examinations. The earlier examinations are focused on mathematics and statistics and can be taken while a student. The later examinations cover aspects of business, economics, and the regulatory climate.

A careful selection of courses from a variety of departments helps a student to prepare for many excellent professional opportunities in this field. Students should see the director of the Actuarial Program for advice in selecting courses for a particular purpose.

Within the Department of Mathematics, the Center for Applied Mathematics provides opportunities for actuarial science students to work on significant mathematical problems of current interest to business, industry, and government.

Major in Actuarial Science (B.S.)

ACCT	205	Introduction to Accounting
ACSC	264	Theory of Interest
ACSC	320	Risk Management and Insurance
ACSC	351	Foundations of Actuarial Mathematics
ACSC	352	Actuarial Contingencies
BUS	201	Ethics and Practice: Foundations of Business
ECON	252	Principles of Microeconomics
FINC	321	Financial Management
MATH	113	Calculus I
MATH	114	Calculus II
MATH	200	Multi-Variable Calculus
MATH	210	Linear Algebra and Differential Equations
MATH	313	Probability
MATH	314	Mathematical Statistics
QMCS	230	Software Design Using the JAVA Language

Plus one of:

ACSC	464	Mathematical Finance
MATH	333	Applied Statistical Methods: Regression, Time Series, Forecasting
MATH	385	Mathematical Methods of Numerical Analysis

Plus one of:

COMM	100	Public Speaking
COMM	105	Communication in the Workplace
ENGL		200 or above
JOUR	215	Journalistic Writing in the Workplace
JOUR	311	Persuasion in Writing

Suggested Electives:

BLAW	301	Legal Environment of Business
ECON	251	Principles of Macroeconomics
ECON	351	Macroeconomic Theory
ECON	352	Microeconomic Theory
ECON	355	Game Theory
FINC	324	Advanced Financial Management
FINC		400-level Investment Courses
MBIS	701	Insurance Seminar

Actuarial Science – American Cultural Studies

MKTG	300	Principles of Marketing
QMCS	281	Object-Oriented Design and Programming
QMCS	450	Database Design

Minor in Actuarial Science

ACSC	264	Theory of Interest
ACSC	320	Risk Management and Insurance
MATH	113	Calculus I
MATH	114	Calculus II

Plus eight credits from the following:

Note: At least four credits must not satisfy the student's major field requirement (including allied requirements)

ACCT	205	Introduction to Accounting
ACSC	351	Foundations of Actuarial Mathematics
ACSC	464	Mathematical Finance
ECON	252	Principles of Microeconomics
FINC	321	Financial Management or FINC 300 Finance for non-Business Majors
MATH	200	Multi-Variable Calculus
MATH	313	Probability or MATH 303 Statistics for the Applied Sciences

264 Theory of Interest

A survey of topics in the mathematical analysis of financial transactions which involve payments made over time. Specific areas of concentration will include the time value of money; the analysis of annuities; amortization and sinking funds; and the pricing and rates of return on investments. Both continuous time and discrete time problems will be considered.

Prerequisite: MATH 114.

320 Risk Management and Insurance

This course introduces students to the subjects of insurance—theory and practice—and corporate risk management. In addressing these subjects, students will receive exposure to risk theory, insurance pricing, contract analysis, insurance company operations, reinsurance, regulation and the concepts and principles of business risk management.

Prerequisite: Junior standing or MATH 114

351 Foundations of Actuarial Mathematics

The course covers the theory and applications of contingency mathematics in the area of life and health insurance, annuities and pensions from both the probabilistic and deterministic approaches. Topics will include: survival distributions, actuarial notation, life insurance and life annuities, net premiums and reserves.

Prerequisite: 264 and MATH 313.

352 Actuarial Contingencies

Extension of the analysis of 351 to multiple life functions and multiple decrement theory. Topics will include: multiple life functions and multiple decrement models, valuation of pensions, insurance models including expenses, nonforfeiture benefits and dividends.

Prerequisite: 351

464 Mathematical Finance

The focus of this course is on applications of probability, stochastic processes, and other mathematical tools to problems in finance. Both discrete and continuous models, including binomial, Brownian motion, and geometric Brownian motion models will be used to investigate the effects of randomness in financial markets and the behavior of financial instruments. The mathematical realization of arbitrage and hedging strategies will be examined, including the Arbitrage Theorem and the concept of risk-neutral pricing. Applications will include the pricing of equity options, currency transactions and the use of duration and convexity in fixed income analysis. The course will be of interest to students of actuarial science, mathematics, finance and economics who want to develop a better quantitative understanding of financial risk.

Prerequisites: MATH 313 or MATH 303 and ACSC 264 or a course in FINC approved by the instructor

American Cultural Studies (ACST)

W. Banfield, director

American Cultural Studies is an interdisciplinary minor in which students will have the opportunity to develop a critical perspective on the rich and multiple meanings of two crucial terms: "American" and "culture." Drawing on perspectives from a number of participating departments and programs (e.g. communication, English, history, art history, sociology, music, theology, philosophy, theater, journalism and mass communication, and modern and Classical languages), the American Cultural Studies minor examines the symbols, practices, and histories