



ACTUARIAL SCIENCE (ACTS)

ACTS 810 Credibility Theory and Loss Distributions

Crosslisted with: ACTS 410

Prerequisites: STAT 463 with a grade of "C" or better.

Description: Introduction to a variety of loss distributions used for prediction of losses in short-term insurance, different approaches to model selection, and Bayesian and empirical Bayesian credibility theory.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded

Offered: SPRING

ACTS 830 Actuarial Applications of Applied Statistics

Crosslisted with: ACTS 430

Prerequisites: STAT 463 with a grade of "C" or better.

Notes: Data sets processed and analyzed using statistical software.

Description: Introduction to forecasting in actuarial science. Simple and multiple regression, instrumental variables, time series methods, and applications of methods in forecasting actuarial variables. Interest rates, inflation rates, and claim frequencies.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded

ACTS 831 Actuarial Applications of Time Series and Machine Learning

Crosslisted with: ACTS 431

Prerequisites: STAT 463 with a grade of "C" or better.

Description: Introduction to statistical learning with actuarial applications using time series models and machine learning techniques. The topics covered include time series models, principal component analysis (PCA), decision tree, and clustering.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded

Offered: SPRING

ACTS 840 Interest Theory

Crosslisted with: ACTS 440

Prerequisites: MATH 208 or 208H, or parallel

Notes: Grade only

Description: Fundamental concepts of financial mathematics, and how those concepts are applied in calculating present and accumulated values for various streams of cash flows. Practical applications of these concepts in loans, bonds, capital budgeting, and portfolio management.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded

Prerequisite for: AECN 416; ECON 365; FINA 365; FINA 338; FINA 363; FINA 367; FINA 375; FINA 382; FINA 405; FINA 450; FINA 461; FINA 464; MNGT 475; MNGT 475H; RAIK 476H

ACTS 850 Stochastic Processes for Actuaries

Crosslisted with: ACTS 450

Prerequisites: STAT 463 with a grade of "C" or better.

Description: Introduction to stochastic processes and their applications in actuarial science. Discrete-time and continuous-time processes; Markov chains; the Poisson process; compound Poisson processes; non-homogeneous Poisson processes; arithmetic and geometric Brownian motions. Applications of these processes in computation of resident fees for continuing care retirement communities. Pricing of financial instruments.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded

ACTS 860 Short-Term Actuarial Mathematics

Crosslisted with: ACTS 460

Prerequisites: ACTS 445 and STAT 462, each with a grade of "C" or better.

Description: Introduction to short-term insurance coverage, risk measure, coverage modifications, aggregate loss models, introduction to credibility, short-term insurance loss reserving, and short-term insurance ratemaking.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded

Offered: SPRING

Prerequisite for: ACTS 473, ACTS 873

ACTS 870 Long-Term Actuarial Mathematics

Crosslisted with: ACTS 470

Prerequisites: ACTS 445 and STAT 462, each with a grade of "C" or better

Notes: First course of a two-course sequence that includes ACTS 471.

Description: Theory and applications of contingency mathematics in the areas of life and health insurance, annuities, and pensions. Probabilistic models.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded

Offered: SPRING

Prerequisite for: ACTS 471, ACTS 871; ACTS 472, ACTS 872

ACTS 871 Advanced Long-Term Actuarial Mathematics I

Crosslisted with: ACTS 471

Prerequisites: ACTS 470 and STAT 462, each with a grade of "C" or better; graduate students must complete ACTS 870 with a grade of "B" or better.

Notes: Second course of a two-course sequence that includes ACTS 470.

Description: Further applications of actuarial probabilistic methods to determine net premiums, gross premiums, and reserves in the areas of life and health insurance, and annuities. Other topics include insurance and annuities involving multiple lives, multiple decrements, multi-state models, and pensions.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded

Offered: FALL

ACTS 872 Advanced Long-Term Actuarial Mathematics II**Crosslisted with:** ACTS 472**Prerequisites:** ACTS 470 and STAT 462, each with a grade of "C" or better; graduate students must complete ACTS 870 with a grade of "B" or better.**Description:** Further applications of actuarial probabilistic methods to determine in the areas of interpreting and performing calculations involving profit testing on both traditional life insurance and more modern life insurance such as universal life and equity-linked insurance, as well as pricing and reserving embedded options.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded**Offered:** FALL**ACTS 873 Introduction to Advanced Short-Term Risk Models****Crosslisted with:** ACTS 473**Prerequisites:** ACTS 460 and STAT 462, each with a grade of "C" or better; graduate students must completed ACTS 860 with a grade of "B" or better.**Description:** The theory and applications of short-term actuarial models are explored. Topics include Interpreting and performing calculations involving: (i) some commonly used claim frequency and claim severity distributions as they are applied in so-called aggregate risk models; (ii) coverage modifications; (iii) actuarial ratemaking; and (iv) various loss-reserving techniques for property/casualty insurance policies.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded**Offered:** FALL**ACTS 875 Actuarial Applications in Practice****Crosslisted with:** ACTS 475**Prerequisites:** ACTS 470/870; FINA 338**Description:** Principles and practices of pricing and/or funding and valuation for life, health, property and liability insurance, and annuities and pension plans. Commercially available actuarial modeling software.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded**Offered:** FALL/SPR**ACTS 895 Actuarial Internship****Prerequisites:** Admissions to the masters degree program and permission of actuarial science director or actuarial science graduate advisor**Description:** Independent study of theories, principles, practices, techniques, and strategies utilized in a business environment at an employer in the actuarial, insurance, risk management, or related field. Practical experience in real-world business situations.**Credit Hours:** 1-6**Min credits per semester:** 1**Max credits per semester:** 6**Max credits per degree:** 6**Grading Option:** Grade Pass/No Pass Option**ACTS 898 Special Topics****Prerequisites:** Admission to the masters degree program and permission of major advisor.**Description:** Focused actuarial science, insurance, or risk management topics through research, narrowly targeted literature review, or extension of course work.**Credit Hours:** 1-3**Min credits per semester:** 1**Max credits per semester:** 3**Max credits per degree:** 6**Grading Option:** Graded**ACTS 899 Masters Thesis****Description:** A thesis in the area of actuarial science, insurance, or risk management.**Credit Hours:** 1-10**Min credits per semester:** 1**Max credits per semester:** 10**Max credits per degree:** 10**Grading Option:** Grade Pass/No Pass Option**ACTS 930 Fundamentals of Pension Mathematics****Description:** Basic theory of pension mathematics. Funding methods, unit credit, entry age normal, aggregate cost, actuarial assumptions, tax deductible contributions, multi-employer pension plans, deposit administration dividend formulas, variable annuities, and ERISA.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded**ACTS 950 Seminar in Actuarial Science****Credit Hours:** 1-3**Min credits per semester:** 1**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded