**ACTUARIAL SCIENCE**

Co-Directors

Hongjun Ha, Ph.D. (Math)

John Whitaker, M.S., FSA (Math)

**Committee on Actuarial Science**

Hongjun Ha, Ph.D. (Math)

Patricia Bobo, M.S., ASA (Math)

John Whitaker, M.S., FSA (Math)

Benjamin Liebman, Ph.D. (Economics)

Ronald Klimberg, Ph.D. (Decision and System Sciences)

Carolin Schelhorn, Ph.D. (Finance)

**Undergraduate Majors**

- Actuarial Science ([https://academiccatalog.sju.edu/arts-sciences/actuarial-science/actuarial-science-major/](https://academiccatalog.sju.edu/arts-sciences/actuarial-science/actuarial-science-major/))

**Undergraduate Minors**

- Actuarial Science ([https://academiccatalog.sju.edu/arts-sciences/actuarial-science/actuarial-science-minor/](https://academiccatalog.sju.edu/arts-sciences/actuarial-science/actuarial-science-minor/))

**ASC 150 First Year Seminar (3 credits)**

This first year seminar course provides an introduction to the mathematical and financial techniques actuaries use to forecast the future and quantify risk. Topics may be selected from basic probability, introduction to financial mathematics, time series analysis and statistical correlation, credibility theory, pricing insurance products and risk load, portfolio theory and asset allocation management. Students are also required to make a presentation on a topic related to actuarial science. The course is taught in a computer classroom and students make extensive use of software such as Microsoft Excel in the development of mathematical models.

*Attributes: First-Year Seminar, Undergraduate*

**ASC 170 Topics in Actuarial Science (3 credits)**

Topics will vary according to the semester in which the class is offered.

*Attributes: Undergraduate*

**ASC 201 Financial Methods in Act Sci (3 credits)**

This course provides an introduction to financial theory and practice as it relates to the management and valuation of publicly-traded companies, and the role of interest rates in capital markets and the economy. Topics include: the corporation and financial markets, financial statement analysis, financial decision making, the time value of money, interest rates, bond valuation and debt financing, fundamentals of investment decisions and capital budgeting, stock valuation, raising equity capital, capital markets and the pricing of risk, optimal portfolios, the Capital Asset Pricing Model, and the cost of capital. ASC 201 is designed to (i) fulfill the Validation by Educational Experience (VEE) requirements of the Society of Actuaries (SOA) and the Casualty Actuarial Society (CAS) pertaining to Corporate Finance, and (ii) introduce actuarial science majors to the basic concepts necessary to succeed in ASC 401 (Financial Mathematics) and the SOA Exam FM / CAS Exam 2 sponsored by the actuarial societies. Where appropriate, examples and problems from prior FM/2 exams will be assigned and completed.

*Prerequisites: ECN 101 and ACC 101 and MAT 161
*Attributes: Undergraduate*

**ASC 202 Investment Mathematics (3 credits)**

This course introduces the basics of investment and financial pricing based on rigorous mathematical reasoning. It consists of two parts. In the first part, students will learn how to construct a portfolio based on the mean-variance principle, the capital asset pricing model, multi-factor model and behavioral finance. The second part is on financial derivatives: a put-call parity, the binomial model for pricing European and American contingent claims, Black-Scholes framework, delta-hedging, and exotic options. This course will prepare students for the actuarial science examination in financial mathematics which is co-sponsored by the Casualty Actuarial Society (Part 2) and the Society of Actuaries (Part FM).

*Prerequisites: MAT 162
*Attributes: Undergraduate*

**ASC 270 Topics in Actuarial Science (3 credits)**

Topics will vary according to the semester in which the class is offered.

*Attributes: Undergraduate*

**ASC 301 Actuarial Probability (3 credits)**

This course provides an introduction to the basic probabilistic principles of insurance and Risk Management. Selected topics are covered to enable the application of probability theory to solve problems found in insurance and risk management applications. A problem solving approach will be adopted to provide preparation to pass the first actuarial exam co-sponsored by the Casualty Actuarial Society (Part 1) and the Society of Actuaries (Part FM).

*Prerequisites: MAT 321
*Attributes: Undergraduate*

**ASC 370 Topics in Actuarial Science (3 credits)**

These courses are designed to give in-depth coverage of Actuarial Science topics that are not covered in great detail in other courses.

*Attributes: Undergraduate*

**ASC 401 Financial Math - Actuarial Sci (3 credits)**

This course provides an in depth study of the theory of interest. Topics that will be covered include: calculation of the effective rates of interest and discount, evaluation of accumulated and present values of fixed and variable annuities, solution of interest problems involving unknown time periods and rates, determination of yield rates, amortization of loans and sinking funds, calculation of the price of a bond, and valuation of securities. This course will prepare students for the actuarial science examination in financial mathematics which is co-sponsored by the Casualty Actuarial Society (Part 2) and the Society of Actuaries (Part FM).

*Prerequisites: MAT 162
*Attributes: Undergraduate*

**ASC 402 Investment Mathematics (3 credits)**

This course introduces the basics of investment and financial pricing based on rigorous mathematical reasoning. It consists of two parts. In the first part, students will learn how to construct a portfolio based on the mean-variance principle, the capital asset pricing model, multi-factor model and behavioral finance. The second part is on financial derivatives: a put-call parity, the binomial model for pricing European and American contingent claims, Black-Scholes framework, delta-hedging, and exotic options. This course will prepare students for the actuarial science examination in investment and Financial Markets (IFM) of the Society of Actuaries or Exam 3F of the Casualty Actuarial Society. If time permits, the class will discuss the fundamental difference between Actuarial Pricing and Financial Pricing and how to combine them to price hybrid products such as Variable Annuities.

*Prerequisites: MAT 322 and ASC 401
*Attributes: Undergraduate*

**ASC 470 Topics in Actuarial Science (3 credits)**

*Attributes: Undergraduate*

**ASC 471 Independent Study (3 credits)**

*Attributes: Undergraduate*

**ASC 472 Independent Study (3 credits)**

*Attributes: Undergraduate*

**ASC 473 Honors Capstone: Actuarial Sci (3 credits)**

*Attributes: Undergraduate*

**ASC 474 Honors Capstone: Actuarial Sci (3 credits)**

*Attributes: Undergraduate*