ACTUARIAL SCIENCE & RISK MANAGEMENT (ASRM)

ASRM Class Schedule (https://courses.illinois.edu/schedule/DEFAULT/DEFAULT/ASRM)

Courses

ASRM 101 Introduction to Actuarial Science credit: 1 Hour. (https://courses.illinois.edu/schedule/terms/ASRM/101)
Introduction to actuarial science as a profession and as a field of study. Students will learn about the skills and qualities of professional actuaries, the process to become a credentialed actuary, and the various career paths for actuaries. The course will focus on what students can do during their time at the University to be as well prepared as possible to become a successful actuary after graduation. Prerequisite: For freshman or new transfer students only.

ASRM 195 Foundations of Data Management credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/ASRM/195)
An introduction to basic data management concepts and programming skills necessary for analyzing data in actuarial and financial applications. Students are expected to learn how to store, clean, explore, and analyze data using a programming language and statistical software. Prerequisite: For actuarial science majors only. For freshman only.

ASRM 199 Undergraduate Open Seminar credit: 1 to 5 Hours. (https://courses.illinois.edu/schedule/terms/ASRM/199)
Covers special topics. Approved for Letter and S/U grading. May be repeated in the same term up to 12 hours or separate terms up to 12 hours.

ASRM 210 Theory of Interest credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/ASRM/210)
Study of compound interest and annuities; applications to problems in finance. Prerequisite: MATH 231 or equivalent.

ASRM 390 Introduction to Actuarial Research credit: 0 to 3 Hours. (https://courses.illinois.edu/schedule/terms/ASRM/390)
Guided research on introductory actuarial topics. Approved for Letter and S/U grading. May be repeated in separate terms. Prerequisite: Instructor approval required.

ASRM 392 Actuarial Problem Solving credit: 1 Hour. (https://courses.illinois.edu/schedule/terms/ASRM/392)
Methods and techniques of solving problems in actuarial mathematics for advanced students intending to enter the actuarial profession. Approved for S/U grading only. May be repeated in the same or separate terms to a maximum of 4 hours. Prerequisite: Consent of instructor.

ASRM 398 Actuarial Internship credit: 0 Hours. (https://courses.illinois.edu/schedule/terms/ASRM/398)
Full-time or part-time practice of actuarial science in an off-campus government, industrial, or research laboratory environment. Summary report required. Approved for S/U grading only. May be repeated in separate terms. Prerequisite: After obtaining an internship, Actuarial Science students must request entry from the Director of the Actuarial Science Program.

ASRM 401 Actuarial Statistics I credit: 4 Hours. (https://courses.illinois.edu/schedule/terms/ASRM/401)
Same as STAT 408. See STAT 408.

ASRM 402 Actuarial Statistics II credit: 4 Hours. (https://courses.illinois.edu/schedule/terms/ASRM/402)
Same as STAT 409. See STAT 409.

ASRM 406 Linear Algebra with Financial Applications credit: 3 or 4 Hours. (https://courses.illinois.edu/schedule/terms/ASRM/406)
Emphasizes techniques of linear algebra and introductory and advanced applications to actuarial science, finance, and economics. Topics include linear equations, matrix theory, vector spaces, linear transformations, eigenvalues and eigenvectors and inner product spaces. In addition, current research topics such as modeling, data mining, and generalized linear models are explored. 3 or 4 undergraduate hours. 3 or 4 graduate hours. Credit is not given for both ASRM 406 (formerly MATH 410) and any of MATH 125, MATH 225, MATH 415 or MATH 416. 4 hours of credit requires approval of the instructor and department with completion of additional work of substance. Prerequisite: MATH 241; ASRM 210 (formerly MATH 210) or FIN 221; or consent of instructor.

ASRM 409 Stochastic Processes for Finance and Insurance credit: 3 or 4 Hours. (https://courses.illinois.edu/schedule/terms/ASRM/409)
An introduction to stochastic processes and their applications to finance and insurance. Topics include conditional probability, conditional expectation, Markov chains, Poisson processes, reliability theory, Brownian motion and elementary introductions to insurance risk theory and option pricing theory. 3 or 4 undergraduate hours. 3 or 4 graduate hours. Prerequisite: ASRM 401 (formerly MATH 408) or MATH 461.

ASRM 410 Investments and Financial Markets credit: 3 or 4 Hours. (https://courses.illinois.edu/schedule/terms/ASRM/410)
Theoretical foundation in financial models and their applications to insurance and other financial risks. Topics include derivative markets, no arbitrage pricing of financial derivatives, interest rate models, dynamic hedging and other risk management techniques. 3 undergraduate hours. 4 graduate hours. Prerequisite: Credit or concurrent registration in ASRM 402 or STAT 410.

ASRM 450 Methods of Applied Statistics credit: 3 or 4 Hours. (https://courses.illinois.edu/schedule/terms/ASRM/450)
Same as STAT 450. See STAT 420.

ASRM 451 Basics of Statistical Learning credit: 3 or 4 Hours. (https://courses.illinois.edu/schedule/terms/ASRM/451)
Same as STAT 451. See STAT 432.

ASRM 453 Applied Bayesian Analysis credit: 3 or 4 Hours. (https://courses.illinois.edu/schedule/terms/ASRM/453)
Same as STAT 453. See STAT 431.

ASRM 461 Loss Models credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/ASRM/461)
Foundation in the actuarial modeling process; construction, selection and validation of empirical models and parametric models. Also covers survival, severity, frequency and aggregate loss models; statistical methods to estimate model parameters. 3 undergraduate hours. No graduate credit. Credit is not given for ASRM 461 (formerly MATH 478) and ASRM 561 (formerly MATH 568). Prerequisite: ASRM 401 (formerly MATH 408), MATH 461 or MATH 463; credit or concurrent registration in ASRM 402 (formerly MATH 409) or MATH 464.

Information listed in this catalog is current as of 03/2020
ASRM 469 Casualty Actuarial Mathematics credit: 3 or 4 Hours.  
(https://courses.illinois.edu/schedule/terms/ASRM/469)  
An introduction to property/casualty actuarial science, exploring its  
mathematical financial, and risk-theoretical foundations. Specific  
topics include risk theory, loss reserving, ratemaking, risk classification,  
credibility theory, reinsurance, financial pricing of insurance, and other  
special issues and applications. 3 or 4 undergraduate hours. No graduate  
credit. Credit is not given for ASRM 469 (formerly MATH 479) and  
ASRM 569 (formerly MATH 569). Prerequisite: ASRM 210 (formerly MATH  
210); credit or concurrent registration in ASRM 402 (formerly MATH 409);  
or consent of instructor.

ASRM 471 Life Contingencies I credit: 4 Hours.  
(https://courses.illinois.edu/schedule/terms/ASRM/471)  
Distribution of the time-to-death random variable for a single life, and  
its implications for evaluations of insurance and annuity functions,  
net premiums, and reserves. 4 undergraduate hours. 4 graduate hours.  
Prerequisite: ASRM 401 (formerly MATH 408) and ASRM 210 (formerly MATH  
210).

ASRM 472 Life Contingencies II credit: 3 Hours.  
(https://courses.illinois.edu/schedule/terms/ASRM/472)  
Continuation of ASRM 471. Introduction to tabular or parametric survival  
models with single or multiple-life states; life insurance and annuity  
premium calculations; reserving and profit measures; introductions to  
universal life insurances, participating insurances, pension plans and  
retirement benefits. 3 undergraduate hours. No graduate credit. Credit is  
not given for ASRM 472 (formerly MATH 472) and ASRM 575 (formerly  
MATH 565). Prerequisite: ASRM 471 (formerly MATH 471).

ASRM 490 Actuarial Research credit: 1 to 4 Hours.  
(https://courses.illinois.edu/schedule/terms/ASRM/490)  
Guided research on actuarial topics. 1 to 4 undergraduate hours. 1 to 4  
graduate hours. Approved for Letter and S/U grading. May be repeated  
in separate terms. Prerequisite: ASRM 390 or consent of instructor.

ASRM 499 Topics in Actuarial Science credit: 1 to 4 Hours.  
(https://courses.illinois.edu/schedule/terms/ASRM/499)  
Covers special topics in actuarial science. 1 to 4 undergraduate hours.  
1 to 4 graduate hours. Approved for Letter and S/U grading. May be  
repeated. Prerequisite: Consent of instructor.

ASRM 510 Financial Mathematics credit: 4 Hours.  
(https://courses.illinois.edu/schedule/terms/ASRM/510)  
Theoretical basis of financial models and their applications to insurance  
and other financial risks. Topics include derivative markets, no-arbitrage  
pricing of financial derivatives, interest rate models, dynamic hedging and  
other risk management techniques. 4 graduate hours. No professional  
credit. Credit is not given for ASRM 410 (formerly MATH 476) and  
ASRM 510 (formerly MATH 567). Prerequisite: ASRM 402 (formerly MATH  
409) or MATH 464.

ASRM 533 Risk Management Practices and Regulation credit: 4  
Hours.  
(https://courses.illinois.edu/schedule/terms/ASRM/533)  
Offers a comprehensive coverage of different aspects of risks and  
regulation of financial institutions. Topics include financial institutions  
and their trading, risk management frameworks, market risk, interest rate  
risk, liquidity risk, credit risk, operational risk, latest industry practices and  
regulation, including Basel and Solvency, fundamental review of trading  
books, scenario analysis and stress testing, etc. 4 graduate hours. No  
professional credit. Approved for Letter and S/U grading. Prerequisite:  
ASRM 401 or MATH 461 or STAT 400.

ASRM 539 Risk Analytics and Decision Making credit: 2 Hours.  
(https://courses.illinois.edu/schedule/terms/ASRM/539)  
The course will give students the opportunity to practice their existing  
data analytics skills to solve diverse real-world cases. Students will  
also deepen their ability to select the appropriate method to solve each  
problem, clearly and concisely present results, and clearly articulate  
the strengths and limitations of their analyses. 2 graduate hours. No  
professional credit. Prerequisite: Basic knowledge of probability and  
statistics.

ASRM 551 Statistical Learning credit: 4 Hours.  
(https://courses.illinois.edu/schedule/terms/ASRM/551)  
Same as CSE 542 and STAT 542. See STAT 542.

ASRM 552 Predictive Analytics credit: 4 Hours.  
(https://courses.illinois.edu/schedule/terms/ASRM/552)  
Focuses on financial and insurance applications of statistical learning  
techniques to build predictive models, with integrated case studies  
and training on computational software packages and effective  
communication of statistical results. Topics include the model building  
process, data preparation, model selection, refinement and validation.  
Same as STAT 541. 4 graduate hours. No professional credit. Approved  
for Letter and S/U grading. Prerequisite: ASRM 401 or STAT 410.

ASRM 561 Loss Data Analytics & Credibility credit: 4 Hours.  
(https://courses.illinois.edu/schedule/terms/ASRM/561)  
Introduction to the actuarial modeling process: construction, selection  
and validation of empirical and parametric models. Survival, severity,  
frequency and aggregate loss models; statistical methods to estimate  
model parameters. 4 graduate hours. No professional credit. Credit is  
not given for ASRM 461 (formerly MATH 478) and ASRM 561 (formerly  
MATH 568). Prerequisite: ASRM 401 (formerly MATH 408), MATH 461 or  
MATH 463.

ASRM 569 Extreme Value Theory and Catastrophe Modeling credit: 4  
Hours.  
(https://courses.illinois.edu/schedule/terms/ASRM/569)  
Principles and fundamental techniques of ratemaking for casualty and  
property insurances; risk classification; coinsurance; estimation of  
claim liabilities; financial reporting; catastrophe modeling. 4 graduate  
hours. No professional credit. Credit is not given for ASRM 469 (formerly  
MATH 479) and ASRM 569 (formerly MATH 569). Prerequisite: ASRM 401  
(formerly Math 408).

ASRM 575 Life Insurance and Pension Mathematics credit: 4 Hours.  
(https://courses.illinois.edu/schedule/terms/ASRM/575)  
Tabular and parametric survival models with single or multiple-life  
states; life insurance and annuity premium calculations; reserving, and  
profit measures; introduction to universal life insurances, participating  
isurances, pension plans and retirement benefits. 4 graduate hours. No  
professional credit. Credit is not given for ASRM 472 (formerly MATH  
472) and ASRM 575 (formerly MATH 565). Prerequisite: ASRM 401  
(formerly MATH 408).

ASRM 595 Advanced Topics in Actuarial Science and Risk Analytics  
credit: 1 to 4 Hours.  
(https://courses.illinois.edu/schedule/terms/ASRM/595)  
Covers special topics in actuarial science and risk analytics. 1 to 4  
graduate hours. No professional credit. May be repeated if topics vary.  
Prerequisite: Consent of instructor.

ASRM 597 Reading Course credit: 0 to 4 Hours.  
(https://courses.illinois.edu/schedule/terms/ASRM/597)  
Independent study in actuarial science and risk analytics. 0 to 4 graduate  
hours. No professional credit. Approved for Letter and S/U grading. May  
be repeated. Prerequisite: Consent of instructor.
ASRM 598  Literature Seminar  credit: 0 to 4 Hours. ([https://courses.illinois.edu/schedule/terms/ASRM/598](https://courses.illinois.edu/schedule/terms/ASRM/598))
Students present seminars and discussions on advanced topics in areas of actuarial and financial mathematics and advanced analytics. 0 to 4 graduate hours. No professional credit. Approved for Letter and S/U grading. May be repeated in separate terms or up to 8 hours in the same term if topics vary. Prerequisite: Consent of instructor.

ASRM 599  Thesis Research  credit: 0 to 16 Hours. ([https://courses.illinois.edu/schedule/terms/ASRM/599](https://courses.illinois.edu/schedule/terms/ASRM/599))
Research topics in actuarial science and risk analytics. 0 to 16 graduate hours. No professional credit. Approved for S/U grading only. May be repeated if topics vary. Prerequisite: Consent of Instructor.