ACTUARIAL SCIENCE (CAS)

Description

Website: business.unl.edu/academic-programs/departments/finance/actuarial-science (http://business.unl.edu/academic-programs/departments/finance/actuarial-science/)

An actuary is a mathematically-oriented professional who will most likely be a manager or supervisor at some point in their career. A major in actuarial science is an excellent educational background for prospective actuaries. The actuarial science program is designed to prepare students for the current industry demands. All actuarial science students are encouraged to visit the actuarial science program's website and an actuarial science program faculty member for more information about the program, including the Actuarial Science Club, sequencing of courses, scholarship opportunities, and the requirements for achieving professional actuarial designations.

College Admission

The entrance requirements for the College of Arts and Sciences (CAS), including any of the majors or minors offered through the college, are the same as the University of Nebraska–Lincoln General Admission Requirements. In addition to these requirements, the College of Arts and Sciences strongly recommends a third and fourth year of one foreign language in high school. Four years of high school coursework in the same language will fulfill the College of Arts and Sciences' language requirement. It will also allow students to continue language study at a more advanced level at the University of Nebraska–Lincoln and provide more opportunity to study abroad.

Academic and Career Advising

Academic and Career Advising Center

Not sure where to go or who to ask? The Advising Center team in 107 Oldfather Hall can help. The Academic and Career Advising Center is the undergraduate hub for CAS students in all majors. Centrally located and easily accessed, students encounter friendly, knowledgeable people who are eager to help or connect students to partner resources. Students also visit the Advising Center in 107 Oldfather Hall to:

- Choose or change their major, minor, or degree program.
- Check on policies, procedures, and deadlines.
- Get a college approval signature from the Dean's representatives.

CAS Career Coaches are available by appointment (in-person or zoom) and located in the CAS Academic and Career Advising Center, 107 Oldfather Hall. They help students explore majors and minors, gain experience, and develop a plan for life after graduation.

Assigned Academic Advisors

Academic advisors are critical resources dedicated to students' academic, personal, and professional success. Every CAS student is assigned an academic advisor based on their primary major. Since most CAS students have more than just a single major, it is important to get to know the advisor for any minors or additional majors. Academic advisors work closely with the faculty to provide the best overall support and the discipline specific expertise. They are available for appointments (in-person or zoom) and through weekly virtual drop-ins. Assigned advisors are listed in MyRED (https://its.unl.edu/myunl/) and their offices may be located in or near the department of the major for which they advise.

Students who have declared a pre-health or pre-law area of interest will also work with advisors in the Exploratory and Pre-Professional Advising Center (Explore Center) in 127 Love South, who are specially trained to guide students preparing to enter a professional school.

For complete and current information on advisors for majors, minors, or pre-professional areas, visit https://cas.unl.edu/major-advisors (https://cas.unl.edu/major-advisors/), or connect with the Arts and Sciences Academic and Career Advising Center, 107 Oldfather Hall, 402-472-4190, casadvising@unl.edu.

Career Coaching

The College believes that **Academics + Experience = Opportunities** and encourages students to complement their academic preparation with real-world experience, including internships, research, education abroad, service, and leadership. Arts and sciences students have access to a powerful network of faculty, staff, and advisors dedicated to providing information and support for their goals of meaningful employment or advanced education. Arts and sciences graduates have unlimited career possibilities and carry with them important career competencies—communication, critical thinking, creativity, context, and collaboration. They have the skills and adaptability that employers universally value. Graduates are prepared to effectively contribute professionally and personally with a solid foundation to excel in an increasingly global, technological, and interdisciplinary world.

Students should contact the career coaches in the Arts and Sciences Academic and Career Advising Center in 107 Oldfather Hall, or their assigned advisor, for more information. The CAS career coaches help students explore career options, identify ways to build experience and prepare to apply for internships, jobs, or graduate school, including help with resumes, applications, and interviewing.

ACE Requirements

Students must complete one course for each of the ACE Student Learning Outcomes below. Certified course choices are published in the degree audit, or visit the ACE website (http://ace.unl.edu) for the most current list of certified courses.

ACE Student Learning Outcomes
ACE 1: Write texts, in various forms, with an identified purpose, that respond to specific audience needs, integrate research or existing knowledge, and use applicable documentation and appropriate conventions of format and structure.
ACE 2: Demonstrate competence in communication skills.
ACE 3: Use mathematical, computational, statistical, logical, or other formal reasoning to solve problems, draw inferences, justify conclusions, and determine reasonableness.
ACE 4: Use scientific methods and knowledge to pose questions, frame hypotheses, interpret data, and evaluate whether conclusions about the natural and physical world are reasonable.
ACE 5: Use knowledge, historical perspectives, analysis, interpretation, critical evaluation, and the standards of evidence appropriate to the humanities to address problems and issues.

ACE 6: Use knowledge, theories, and research perspectives such as statistical methods or observational accounts appropriate to the social sciences to understand and evaluate social systems or human behaviors.	
ACE 7: Use knowledge, theories, or methods appropriate to the arts to understand their context and significance.	
ACE 8: Use knowledge, theories, and analysis to explain ethical principles and their importance in society.	
ACE 9: Exhibit global awareness or knowledge of human diversity through analysis of an issue.	
ACE 10: Generate a creative or scholarly product that requires broad knowledge, appropriate technical proficiency, information collection, synthesis, interpretation, presentation, and reflection.	

College Degree Requirements

College Distribution Requirements – BA and BS

The College of Arts and Sciences distribution requirements are common to both the bachelor of arts and bachelor of science degrees and are designed to ensure a range of courses. By engaging in study in several different areas within the College, students develop the ability to learn in a variety of ways and apply their knowledge from a variety of perspectives. All requirements are in addition to University ACE requirements, and no course can be used to fulfill both an ACE outcome and a College Distribution Requirement.

- A student may not use a single course to satisfy more than one College Distribution Requirement, with the exception of CDR Diversity. Courses used to meet CDR Diversity may also meet CDR Writing, CDR Humanities, or CDR Social Science.
- Independent study or reading courses and internships cannot be used to satisfy distribution requirements.
- Courses from interdisciplinary programs will be applied in the same area as courses from the home/cross-listed department.

College Distribution Requirements	
CDR: Written Communication	*3*
Select from courses approved for ACE outcome 1.	
CDR: Natural, Physical, and Mathematical Sciences with Lab	*4*
Select from biochemistry, biological sciences, chemistry, computer science, geology, meteorology, mathematics, and physics. Must include one lab in the natural or physical sciences. Lab courses may be selected from biochemistry, biological sciences, chemistry, geology, meteorology, and physics.	
Some courses from geography and anthropology may also be used to satisfy the lab requirement above. [1]	
CDR: Humanities	*3*
Select from classics, English, film studies, history, modern languages and literatures, philosophy, and religious studies. [2]	
CDR: Social Science	*3*
Select from anthropology, communication studies, geography, national security studies, political science, psychology, or sociology. [3]	
CDR: Human Diversity in U.S. Communities	*0-3*
Select from a set of approved courses as listed in the degree audit.	
CDR: Language	*0-16*
Fulfilled by the completion of the 6-credit-hour second-year sequence in a single foreign language in one of the following departments: Classics and religious studies or modern languages and literatures. Instruction is currently available in Arabic, Chinese, Czech, French, German, Greek, Japanese, Latin, Russian, and Spanish.	
A student who has completed the fourth-year level of one foreign language in high school is exempt from the languages requirement, but encouraged to continue on in their language study.	
Credit Hours Subtotal:	13-32

[1] *See Degree Audit or a College of Arts and Sciences advisor for approved geography and anthropology courses that apply as natural science.*

[2] *Language courses numbered 220 and below do not fulfill the CDR Humanities.*

[3] *See Degree Audit or College of Arts and Sciences advisor for list of natural/physical science courses in anthropology, geography, and psychology that do not apply as social science.*

Language Requirement

The University of Nebraska–Lincoln and the College of Arts and Sciences place great value on academic exposure and proficiency in a second language. The University of Nebraska–Lincoln entrance requirement of two years of the same foreign language or the College's language distribution requirement (CDR: Language) will rarely be waived and only with relevant documentation. See the main College of Arts and Sciences page for more details.

Experiential Learning Requirement

All undergraduates in the College of Arts and Sciences must complete an Experiential Learning (EL) designated course. This may include 0-credit courses designed to document co-curricular activities recognized as Experiential Learning.

Scientific Base - BS Only

The bachelor of science degree requires students to complete 60 hours in mathematical, physical, and natural sciences. Approved courses for scientific-based credit come from the following College of Arts and Sciences disciplines: actuarial science, anthropology (selected courses), astronomy, biochemistry (excluding BIOC 101), biological sciences (excluding BIOS 100 or BIOS 203), chemistry (excluding CHEM 101), geography (selected courses), geology, life sciences, mathematics (excluding courses below MATH 104), meteorology, microbiology (excluding MBIO 101), and physics (excluding PHYS 201.)

See your Degree Audit or your assigned academic advisor for a complete list, including individual classes that fall outside of the disciplines listed above. Up to 12 hours of scientific and technical courses offered by other colleges may be accepted toward this requirement with approval of the College of Arts and Sciences. See your assigned academic advisor to start the approval process.

Minimum Hours Required for Graduation

A minimum of 120 semester hours of credit is required for graduation from the College of Arts and Sciences. A cumulative grade point average of at least 2.0 is required.

Grade Rules

Restrictions on C- and D Grades

The College will accept no more than 15 semester hours of C- and D grades from other domestic institutions except for UNO and UNK. All courses taken at UNO and UNK impact the UNL transcript. No transfer of C- and D grades can be applied toward requirements in a major or a minor. No University of Nebraska–Lincoln C- and D grades can be applied toward requirements in a major or a minor. International coursework (including education abroad) with a final grade equivalent to a C- or lower will not be validated by the College of Arts and Sciences departments to be degree applicable.

Pass/No Pass Privilege

The College of Arts and Sciences adheres to the University regulations for the Pass/No Pass (P/N) privilege with the following additional regulations:

- Pass/No Pass hours can count toward fulfillment of University ACE requirements and college distribution requirements up to the 24-hour maximum.
- Most arts and sciences departments and programs do not allow courses graded Pass/No Pass to apply to the major or minor. Students should refer to the department's or program's section of the catalog for clarification. By college rule, departments can allow up to 6 hours of Pass/No Pass in the major or minor.
- Departments may specify that certain courses of theirs can be taken only on a P/N basis.
- The college will permit no more than a total of 24 semester hours of P/N grades to be applied toward degree requirements. This total includes all Pass grades earned at the University of Nebraska–Lincoln and other U.S. schools. **NOTE:** This 24-hour limit is more restrictive than the University regulation.

Grading Appeals

A student who feels that he/she has been unfairly graded must ordinarily take the following sequential steps in a timely manner, usually by initiating the appeal in the semester following the awarding of the grade:

1. Talk with the instructor concerned. Most problems are resolved at this point.
2. Talk to the instructor's department chairperson.
3. Take the case to the Grading Appeal Committee of the department concerned. The Committee should be contacted through the department chairperson.
4. Take the case to the College Grading Appeals Committee by contacting the Dean's Office, 1223 Oldfather Hall.

Course Level Requirements

Courses Numbered at the 300 or 400 Level

Thirty (30) of the 120 semester hours of credit must be in courses numbered at the 300 or 400 level. Of those 30 hours, 15 hours (1/2) must be completed in residence at the University of Nebraska–Lincoln.

Residency Requirement

Students must complete at least 30 of the 120 total hours for their degree at the University of Nebraska–Lincoln. Students must complete at least 1/2 of their major coursework, including 6 hours at the 300 or 400 level in their major and 15 of the 30 hours required at the 300 or 400 level, in residence. Credit earned during education abroad may be used toward the residency requirement only if students register through the University of Nebraska–Lincoln.

Catalog to Use

Students must fulfill the requirements stated in the catalog for the academic year in which they are first admitted to and enrolled as a degree-seeking student at the University of Nebraska–Lincoln. In consultation with advisors, a student may choose to follow a subsequent catalog for any academic year in which they are admitted to and enrolled as a degree-seeking student at the University of Nebraska–Lincoln in the College of Arts and Sciences. Students must complete all degree requirements from a single catalog year. Beginning in 1990-1991, the catalog which a student follows for degree requirements may not be more than 10 years old at the time of graduation.

Transfer Students: Students who have transferred from a community college may be eligible to fulfill the requirements as stated in the catalog for an academic year in which they were enrolled at the community college prior to attending the University of Nebraska-Lincoln. This decision should be made in consultation with academic advisors, provided the student a) was enrolled in a community college during the catalog year they are utilizing, b) maintained continuous enrollment at the previous institution for 1 academic year or more, and c) continued enrollment at the University of Nebraska-Lincoln within 1 calendar year from their last term at the previous institution. Students must complete all degree requirements from a single catalog year and within the time frame allowable for that catalog year.

Learning Outcomes

Graduates of actuarial science will be able to:

1. Demonstrate the ability to apply the concept of actuarial science in solving problems related to financial security.
2. Understand the content of the UNL courses that have been approved for the actuarial profession's Validation by Educational Experience (VEE) program for the topics of Economics, Corporate Finance, and Applied Statistics.
3. Understand the additional considerations in practical applications of actuarial theory, such as assumption setting, Actuarial Standards of Practice, the professional code of conduct, and effective communication.
4. Understand that being a professional requires that actuarial tasks be completed with the highest regard for personal and professional ethics.
5. Demonstrate the ability to transition from actuarial theory to actuarial practice and the ability to apply tools that actuaries use in practice to complete actuarial tasks, such as a modern procedural computer programming language, Excel or similar spreadsheet program, and commercially available actuarial software.
6. Demonstrate the ability to communicate the results of quantitative analysis effectively, both in writing and orally.
7. Demonstrate the ability to work cooperatively with others.
8. Understand what is involved in being a member of the actuarial profession, including the types of employment available in an actuarial career and the requirements to become, and remain, a member of the actuarial profession.
9. Demonstrate the ability to be productive in one or more actuarial roles, including: a. current or developing areas of actuarial practice;

b. research designed to deepen or broaden actuarial knowledge; or c. education of aspiring or practicing actuaries.

Major Requirements

Core Requirements

Required Calculus Sequence		
MATH 106	Calculus I	5
MATH 107	Calculus II	4
MATH 208	Calculus III	4
Credit Hours Subtotal:		13
Required Statistics and Probability Sequence		
STAT 380 / RAIK 270H	Statistics and Applications	3
STAT 462	Introduction to Mathematical Statistics I: Distribution Theory [1]	4
STAT 463	Introduction to Mathematical Statistics II: Statistical Inference [2]	4
Credit Hours Subtotal:		11
Required Finance Course		
FINA 338	Principles of Individual and Corporate Risk Management	3
Credit Hours Subtotal:		3
Required Actuarial Science Courses		
ACTS 440	Interest Theory	4
ACTS 470	Life Contingencies I	3
ACTS 475	Actuarial Applications in Practice	3
ACTS 95	Actuarial Practicum	0
Credit Hours Subtotal:		10
Total Credit Hours		**37**

[1] *Students must complete* STAT 462 *before taking any 400-level actuarial science course except* ACTS 440 *and* ACTS 441.

[2] STAT 463 *may be taken concurrently with* ACTS 470.

Specific Major Requirements

Actuarial Science Courses		
Twelve (12) hours of additional courses to be selected from the list of courses below and in consultation with the faculty advisors. [3]		12
ACTS 410	Introduction to Credibility, Smoothing of Data, and Simulation	
ACTS 425	Survival Models	
ACTS 430	Actuarial Applications of Applied Statistics	
ACTS 441	Introduction to Financial Economics	
ACTS 471	Life Contingencies II	
ACTS 473	Introduction to Risk Theory	
ACTS 474	Introduction to Property/Casualty Actuarial Science	
FINA 467A	Options, Futures and Derivative Securities for Actuarial Science	
Credit Hours Subtotal:		12
Total Credit Hours		**12**

[3] ACTS 399, ACTS 401, ACTS 402, ACTS 403, ACTS 404, *and* ACTS 405 *do not count toward the 12 additional hours but may be recommended by the faculty advisors.*

Additional Major Requirements

Grade Rules

C- and D Grades

A grade of C or above is required for all courses in the major and minor.

Pass/No Pass

No course taken Pass/No Pass will be counted toward the major or minor.

Requirements for Minor Offered By Department

At least thirteen (13) hours of actuarial science as indicated below, plus prerequisite courses (MATH 106, MATH 107, MATH 208, and STAT 380, STAT 462, STAT 463).

Required Courses		
ACTS 440	Interest Theory	4
ACTS 470	Life Contingencies I	3
ACTS 475	Actuarial Applications in Practice	3
One additional ACTS course		3
Credit Hours Subtotal:		13
Total Credit Hours		**13**

Grade Rules

C- and D Grades

A grade of C or above is required for all courses in the major and minor.

Pass/No Pass

No course taken Pass/No Pass will be counted toward the major or minor.

ACTS 395 Professional Internship
Crosslisted with: BSAD 395, ACCT 395, ECON 395, FINA 395, MNGT 395, SCMA 395
Prerequisites: An undergraduate major in the College of Business with at least sophomore standing and departmental consent and acceptance into an approved internship. Departmental credit for course cross-listings may have additional requirements for consent.
Notes: May be repeated.
Description: Provides an opportunity to study theories, principles, practices, techniques, and strategies utilized in the business field through an internship related to the major field of study and an integral or important part of their program of study. Reflect on classroom knowledge and develop practical experience in professional business situations through an approved internship.
Credit Hours: 0-3
Min credits per semester:
Max credits per semester: 3
Max credits per degree: 6
Grading Option: Graded with Option
Experiential Learning: Internship/Co-op

ACTS 399 Independent Study
Prerequisites: Permission.
Credit Hours: 1-3
Min credits per semester: 1
Max credits per semester: 3
Max credits per degree: 24
Grading Option: Graded with Option

ACTS 401 Problem Lab: Basic Actuarial Applications of Probability
Prerequisites: MATH 208 or 208H and STAT 462, or parallel, and both with a grade of "Pass" or "C" or better.
Description: Calculus-based probability, both univariate and multivariate, applications to risk management-related problems. Problems as posed in the Society of Actuaries (SOA) Exam "P" and/or Casualty Actuarial Society (CAS) Exam "1". Determination of loss frequency distributions and their characteristics, expected value, variance, and percentiles. Determination of loss severity distributions and their characteristics, expected value, variance, and percentiles. Determination of loss sharing parameters, deductibles, and maximum payments.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Graded

ACTS 402 Problem Lab: Basic Actuarial Applications of Financial Mathematics
Prerequisites: ACTS 440/840 or parallel
Description: Application of basic mathematics of finance to problems involving valuation of financial transactions. Problems as posed in the "Society of Actuaries (SOA) Exam 'FM'" and/or "Casualty Actuarial Society (CAS) Exam '2'". Determining equivalent measures of interest; estimating the rate of return on a fund; discounting or accumulating a sequence of payments with interest; determining yield rate; length of investment; amounts of investment contributions or amounts of investment returns for various types of financial transactions; and basic calculations involving yield curves, spot rates, forward rates, duration, convexity, immunization and short sales; introduction to financial derivatives (forwards, options, futures, and swaps) and their use in risk management; and introduction to the concept of no-arbitage as a fundamental concept in financial mathematics.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Graded

ACTS 403 Problem Lab: Actuarial Models - Life Contingencies
Prerequisites: ACTS 470/870, ACTS 471/871, and ACTS 473/873
Description: Problems as posed in the "Society of Actuaries (SOA) Exam 'M'" and/or "Casualty Actuarial Society (CAS) Exam '3'". Survival and severity models; "Markov Chain" models; life contingencies; and "Poisson" processes.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Graded

ACTS 404 Problem Lab: Construction and Evaluation of Actuarial Models
Prerequisites: ACTS 410 and 425
Description: Problems as posed in the Society of Actuaries (SOA) Exam "C" and/or Casualty Actuarial Society (CAS) Exam "4". Construction of empirical models; construction and selection of parametric models; credibility theory; interpolation and smoothing of data; and simulation.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Graded

ACTS 405 Problem Lab: Actuarial Models - Financial Economics
Prerequisites: ACTS 440/840 and FINA 467
Description: Problems as posed in the "Society of Actuaries (SOA) Exam 'M'". Interest rate models; rational valuation of derivative securities (option pricing: put-call parity, the binomial model, Black-Scholes formula, and actuarial applications; interpretation of option Greeks and delta-hedging; features of exotic options; an introduction to Brownian motion and Itô's lemma); and risk management techniques.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Graded

ACTS 410 Introduction to Credibility, Smoothing of Data, and Simulation
Crosslisted with: ACTS 810
Prerequisites: STAT 463
Description: Full, partial, Buhlmann, and Buhlmann-Straub credibility models. Introduction to empirical Bayes and statistical distributions used to model loss experience. Application of "polynomial splines" to actuarial data. Simulation of "discrete" and "continuous random" variables in context of actuarial models. Simulation to "p-value" of hypothesis test. "Bootstrap method" of estimating the "mean squared error" of an estimator.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Prerequisite for: ACTS 404

ACTS 425 Survival Models
Crosslisted with: ACTS 825
Prerequisites: STAT 463 with a grade of "C" or better
Description: Parametric and tabular survival models. Estimation based on observations that might not be complete. Concomitant variables. Use of population data. Applications to groups with impaired lives.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Prerequisite for: ACTS 404

ACTS 430 Actuarial Applications of Applied Statistics
Crosslisted with: ACTS 830
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 431 Actuarial Applications of Time Series and Machine Learning
Crosslisted with: ACTS 831
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 440 Interest Theory
Crosslisted with: ACTS 840
Prerequisites: MATH 208 or 208H with a grade of "Pass" or "C" or better, or parallel
Notes: Grade only
Description: Application of financial mathematics to problems involving valuation of financial transactions; equivalent measures of interest; rate of return on a fund; discounting or accumulating a sequence of payments with interest; and yield rates, length of investment, amounts of investment contributions or amounts of investment returns for various types of financial transactions; loans and bonds. Introduction to the mathematics of modern financial analysis. Calculations involving yield curves, spot rates, forward rates, duration, convexity, and immunization.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Graded
Prerequisite for: ACTS 405; ECON 365, FINA 365; FINA 338; FINA 363; FINA 367; FINA 375; FINA 382; FINA 401; FINA 450; FINA 464; MNGT 475

ACTS 441 Introduction to Financial Economics
Crosslisted with: ACTS 841
Prerequisites: MATH 208 with grade of "C" or better or concurrent; ACTS 440
Description: Financial mathematics concepts related to short sales, forwards, options, futures, and swaps, and their use in risk management, hedging and investment strategies, fundamental concepts of put-call parity and no-arbitrage, and interest rate models.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded

ACTS 442 Principles of Pension Valuation
Crosslisted with: ACTS 842
Prerequisites: ACTS 471/871 with a grade of "C" or better
Description: Actuarial cost methods. Determination of normal costs and accrued liability. Effect on valuation results due to changes in experience, assumptions and plan provisions. Valuation of ancillary benefits. Determination of actuarially equivalent benefits at early or postponed retirement and optional forms of payment.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded

ACTS 450 Stochastic Processes for Actuaries
Crosslisted with: ACTS 850
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 470 Life Contingencies I
Crosslisted with: ACTS 870
Prerequisites: ACTS 440 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
Prerequisite for: ACTS 403

ACTS 471 Life Contingencies II
Crosslisted with: ACTS 871
Prerequisites: ACTS 470 and STAT 462, each with a grade of "C" or better
Notes: Second course of a two-course sequence that includes ACTS 470.
Description: Life insurance reserve for models based on a single life. Introduction to multiple life models for pensions and life insurance and to multiple decrement models.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Prerequisite for: ACTS 403; ACTS 442, ACTS 842

ACTS 473 Introduction to Risk Theory
Crosslisted with: ACTS 873
Prerequisites: STAT 462 with a grade of "C" or better
Description: Applications of compound distributions in modeling of insurance loss. Continuous-time compound Poisson surplus processes, computation of ruin probabilities, the distributions of the deficit at the time of ruin, and the maximal aggregate loss. The effect of reinsurance on the probability of ruin.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Prerequisite for: ACTS 403

ACTS 474 Introduction to Property/Casualty Actuarial Science
Crosslisted with: ACTS 874
Prerequisites: STAT 462 with a grade of "C" or better.
Description: Mathematical, financial, and risk-theoretical foundations of casualty actuarial science. Risk theory, loss reserving, ratemaking, risk classification, credibility theory, reinsurance, financial pricing of insurance, and other special issues and applications.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded

ACTS 475 Actuarial Applications in Practice
Crosslisted with: ACTS 875
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
ACE: ACE 10 Integrated Product

PLEASE NOTE
This document represents a sample 4-year plan for degree completion with this major. Actual course selection and sequence may vary and should be discussed individually with your college or department academic advisor. Advisors also can help you plan other experiences to enrich your undergraduate education such as internships, education abroad, undergraduate research, learning communities, and service learning and community-based learning.

Actuarial Science (B.S.) Career Information

The following represents a sample of the internships, jobs and graduate school programs that current students and recent graduates have reported.

Transferable Skills

- Apply mathematical and scientific skills to solve real-world problems
- Develop basic techniques of statistical analysis
- Make predictions using mathematical, statistical, and scientific modeling methods
- Analyze and explain data
- Support and communicate claims using clear evidence
- Collaborate with a team to develop solutions
- Confidently navigate complex, ambiguous projects and environments
- Understand and operate within ethical framework for professional work in the field
- Use quantitative analysis techniques
- Use qualitative analysis techniques

Jobs of Recent Graduates

- Assistant Account Manager, FACTS – Lincoln, NE
- Project Manager, Mach 33 Engineering – Washington D.C.
- Actuarial Analyst, Endure Energy – Overland Park, KS
- Business Analyst II, Fiserv – Omaha, NE
- Technical Solutions Engineer, Epic – Verona, WS
- Corporate Auditor, Union Pacific Railroad – Omaha, NE
- Machine Learning Engineer, Enhance IT – Atlanta, GA
- Associate Actuarial Analyst, UnitedHealthcare – Lincoln, NE
- Data Analyst, Kiewit – Lone Tree, CO
- Underwriter, Omaha National – Omaha, NE

Graduate & Professional Schools

- Master's Degree, Applied Mathematics, University of Nebraska-Lincoln – Lincoln, NE
- Master's Degree, Business Analytics, Pepperdine University – Los Angeles, CA
- Master's Degree, Finance, Peking University – Beijing, China
- Master's Degree, Analytics, Northeastern University – Boston, MA
- Master's Degree, Statistics, Northern Arizona University – Flagstaff, AZ
- Doctoral Degree, Mathematics, Kansas State University – Manhattan, KS