ACTUARIAL SCIENCE (ASC)

Description
Website: http://cba.unl.edu/academic-programs/departments/finance/actuarial-science/

An actuary is a mathematically-oriented business person who will most likely be a manager or supervisor at some point in his/her career. A course of study culminating in a bachelor of science degree with 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. Because the demands change on a regular basis, often times, the number of hours, the sequencing of courses, and the specific requirements change for this major. Students should continue to consult with the department for the appropriate selection and listing of course requirements.

All actuarial science students are encouraged to visit the actuarial science program’s website (http://cba.unl.edu/academics/actuarial/) and an actuarial science program faculty advisor 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 Requirements
College Admission

College Admission
The entrance requirements for the College of Arts and Sciences are the same as the UNL General Admission Requirements. Students who are admitted through the Admission by Review process may have certain conditions attached to their enrollment at UNL. These conditions are explained under “Removal of Deficiencies.”

In addition to these requirements, the College of Arts and Sciences strongly recommends a third and fourth year of one foreign language. 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 UNL, and provide more opportunity to study abroad.

Transfer Students
To be considered for admission as a transfer student, Nebraska resident or nonresident, students must have an accumulated average of C (2.0 on a 4.0 scale) and a minimum C average in the last semester of attendance at another college. Transfer students who graduated from high school January 1997 and after must also meet the UNL General Admission Requirements. Those transfer students who graduated before January 1997 must have completed in high school, 3 years of English, 2 years of the same foreign language, 2 years of algebra, and 1 year of geometry. Transfer students who have completed less than 12 credit hours of college study must also submit either their ACT or SAT scores.

Ordinarily, hours earned at a similarly accredited college or university are applicable to the UNL degree. The College, however, will evaluate all hours submitted on an application for transfer, and reserves the right to accept or reject any of them, based upon its exclusion and restriction policies. Sixty is the maximum number of hours the University will accept on transfer from a two-year college or international institution. Transfer credit in the major or minor must be approved by the departmental advisor on a Request for Substitution Form to meet specific course requirements, group requirements, or course level requirements in the major or minor. At least half of the hours in the major field must be completed at the University regardless of the number of hours transferred.

The College of Arts and Sciences will accept no more than 15 semester hours of C- and D grades from other schools. The C- and D grades cannot be applied toward requirements for a major or minor. This policy does not apply to the transfer of grades from UNO or UNK to UNL. All D grades may be transferred from UNO or UNK, but they are not applicable to a major or minor.

Readmitted Students
UNL students who choose not to take courses for more than 2 consecutive terms, must reapply to UNL. Students readmitted to the College of Arts and Sciences will follow the requirements stated in the catalog for the academic year of readmission and re-enrollment as a degree-seeking student in Arts and Sciences. In consultation with advisors, a student may choose to follow a catalog for any academic year in which they are admitted to and enrolled as a degree-seeking student at UNL 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.

Admission Deficiencies/Removal of Deficiencies
Students must remove entrance deficiencies in geometry and foreign language as soon as possible, and before graduating from the College of Arts and Sciences. For questions and more information, students should consult a college advisor in the Academic and Career Advising Center in 107 Oldfather Hall.

Removing Foreign Language Deficiencies
Students must complete the second semester of a first year language sequence to clear the deficiency and the second semester of the second year language sequence to complete the college graduation requirement in language.

Removing Geometry Deficiencies
A deficiency of one year of geometry can be removed by taking high school geometry courses through an approved independent study program, or by completing a geometry course from an accredited community college or a four-year institution. Neither of these options will count for college credit.

College Degree Requirements
College Distribution Requirements
Bachelor of Arts or Bachelor of Science (16 hours + Language)
The College of Arts and Sciences distribution requirements are designed to further the purposes of liberal education by encouraging study in several different areas within the College. All requirements are in addition to University ACE requirements. A student may not use a single course to satisfy more than one of the following five distribution requirements. A student cannot use a single course to satisfy both an ACE outcome and a College distribution requirement. A student cannot use a course from their primary major to satisfy the Breadth Requirement (F), but may apply an ancillary requirement of the primary major or a course from their second major toward this requirement. Independent study or reading courses and internships cannot be used to satisfy distribution requirements. To see a complete list of excluded courses, run a degree audit through MyRED.
Courses from interdisciplinary programs will count in the same area as courses from the home/cross-listed department(s).

### College Distribution Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDR A</td>
<td>Written Communication</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select from courses approved for ACE outcome 1.</td>
<td></td>
</tr>
<tr>
<td>CDR B</td>
<td>Natural, Physical, and Mathematical Sciences with Lab</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Select from biochemistry, biological sciences, chemistry, computer science, geology, meteorology, mathematics, physics and statistics. 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. ¹</td>
<td></td>
</tr>
<tr>
<td>CDR C</td>
<td>Humanities</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select from classics, English, history, modern languages and literatures, philosophy, and religious studies. ²</td>
<td></td>
</tr>
<tr>
<td>CDR D</td>
<td>Social Science</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select from: anthropology, communication studies, geography, political science, psychology, or sociology. ³</td>
<td></td>
</tr>
<tr>
<td>CDR E</td>
<td>Language</td>
<td>0-16</td>
</tr>
<tr>
<td></td>
<td>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, modern languages and literatures, or anthropology. Instruction is currently available in Arabic, Chinese, Czech, French, German, Greek, Japanese, Latin, Omaha, Russian, and Spanish. A student who has completed the fourth-year level of one foreign language in high school is exempt from the language requirement.</td>
<td></td>
</tr>
<tr>
<td>CDR F</td>
<td>Additional Breadth</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select from: natural, physical and mathematical sciences (Area B), humanities (Area C), or social sciences (Area D). Cannot be a course from the primary major.</td>
<td></td>
</tr>
</tbody>
</table>

Credit Hours Subtotal: 16-32

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 210 or below apply only for the foreign language requirement.

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.

### Scientific Base

**Bachelor of Science Only (60 hours)**

The bachelor of science degree requires students to complete 60 hours in mathematical, physical and natural sciences. Approved courses for scientific base credit come from the following College of Arts and Sciences disciplines: actuarial science, anthropology (selected courses), astronomy, biochemistry (excluding BIOL 101), biological sciences (excluding BIOS 203), chemistry (excluding CHEM 101), computer science (excluding CSCE 10), geography (selected courses), geology, life sciences, mathematics (excluding courses below MATH 104), meteorology, microbiology, physics and statistics.

See your degree audit or a College of Arts and Sciences 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 a college advisor.

### Foreign Languages/Language Requirement

**Languages Exemption Policy**

UNL and the College of Arts and Sciences will exempt or waive students from the UNL entrance requirement of two years of the same foreign language or from the College’s language distribution requirement based on documentation only. The following are the options and procedures for documentation:

### High School Transcripts

**For the University entrance requirement**, students must show an official high school transcript with two or more years of the same foreign language.

**For the College of Arts and Sciences College Distribution Requirement**

**E-Language**, students must show an official high school transcript with four or more years of the same foreign language in high school, or show evidence of graduation from a non-English-speaking foreign high school. Students whose native language is not English must show English as a Second Language study on an official high school transcript. Four years of ESL at the high school level (9th, 10th, 11th and 12th grades) will be the basis for a waiver of the CDR E Language requirement.

### Proficiency Examination at UNL

**For the University entrance requirement**, students who do not have transcript documentation can request to take a proficiency exam in the language. *(This is not the same test as the Modern Languages Placement Exam.)* However, UNL will provide testing only in the languages it teaches. Currently, these languages are: Arabic, French, German, Russian, Czech, Japanese, Chinese.

**For the College of Arts and Sciences College Distribution Requirement**

**E-Language**, the Department of Modern Languages will oversee the test at the 202 level. If the student passes the test, the department will sign the College Request for Waiver form and indicate the level of proficiency. The form is then forwarded to the Arts and Sciences Advising Center for approval.

The Department of Modern Languages will oversee the test and provide written documentation to the Arts and Sciences Advising Center the level of proficiency passed.

### Distance Education

**For the University entrance requirement**, students without transcript documentation who claim proficiency in a language not taught at UNL, have the option of seeking out a distance education program in languages. If the student completes the equivalent of 102 from an approved distance education program, the student will meet the UNL entrance requirement. The student must have the course work approved before he/she takes/completes the course as equivalent to 102 by a College advisor. The student then completes the course and has the distance education program send the transcript to the Admissions Office.

**For the College of Arts and Sciences College Distribution Requirement**

**E-Language**, the student can seek out a distance education program and complete the equivalent of the 202-level course. The student must submit the request on the College Request for Substitution form and have the
course work approved by a College advisor. The student then completes the course and has the distance education program send the transcript to the Admissions Office.

Third Language Option
If a student demonstrates knowledge of two foreign languages at the 102 level, the College of Arts and Sciences may consider waiving two semesters of the four semester College Distribution Requirement E-Languages requirement. If this waiver were granted, the student would then be required to complete 101 and 102 in another, 3rd foreign language at UNL.

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 total 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 schools except for UNO and UNK. No transfer C- and D grades can be applied toward requirements in a major or a minor. No UNL C- and D grades can be applied toward requirements in a major or a minor. 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 UNL 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 above 299
Thirty of the 120 semester hours of credit must be in courses numbered above 299. Of the 30 hours above 299, 15 hours (1/2) must be completed in residence at UNL.

Graduate Courses
Seniors in the University who have obtained in advance the approval of the dean for Graduate Studies may receive up to 12 hours credit for graduate courses taken in addition to the courses necessary to complete their undergraduate work, provided that such credits are earned within the calendar year prior to receipt of the baccalaureate. For procedures, inquire at the Office of Graduate Studies.

Course work taken prior to receipt of the baccalaureate may not always be accepted for transfer to other institutions as graduate work.

Residency
Residency Requirement and Open Enrollment and Summer Independent Study Courses
Students must complete at least 30 of the 120 total hours for their degree at UNL. Students must complete at least 1/2 of their major course work including 6 hours above 299 in their major, and 15 of the 30 hours required above 299 in residence. Credit earned during education abroad may be used toward the residency requirement if students register through UNL and participate in prior-approved education abroad programs. UNL open enrollment and summer independent study courses count toward residence.

ACE Requirements
Consistent with the mission and values of the University, ACE is based on a shared set of four institutional objectives and ten student learning outcomes. The ACE program was approved by faculty in all eight undergraduate colleges and endorsed by the Faculty Senate, the student government, and the Academic Planning Committee in January 2008 for implementation in the fall 2009. ACE aligns with current national initiatives in general education.

Key characteristics of ACE demonstrate the benefits of the program to students:
• Students receive a broad education with exposure to multiple disciplines, critical life skills and important reasoning, inquiry, and civic capacities.

• ACE is simple and transparent for students, faculty and advisors. Students complete the equivalent of 3 credit hours for each of the ten student learning outcomes.

• Students connect and integrate their ACE experiences with their selected major.

• Students can transfer all ACE certified courses across colleges within the institution to meet the ACE requirement and any course from outside the institution that is directly equivalent to a UNL ACE-certified course. Courses from outside institutions without direct equivalents may be considered with appropriate documentation for ACE credit (see academic advisor).

ACE allows faculty to assess and improve their effectiveness and facilitate students’ learning.

ACE Institutional Objectives and Student Learning Outcomes
To meet the ACE Program requirement, a student will complete a minimum of 3 credit hours for each of the ten ACE Student Learning Outcomes (a total of 30 ACE credit hours). See the ACE website at: http://ace.unl.edu for the most current information and the most recently certified courses.

Catalog Rule
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 UNL. 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 UNL 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.

Learning Outcomes
Majors in 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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 106</td>
<td>Calculus I</td>
<td>5</td>
</tr>
<tr>
<td>MATH 107</td>
<td>Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>MATH 208</td>
<td>Calculus III</td>
<td>4</td>
</tr>
</tbody>
</table>

Credit Hours Subtotal: 13

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 380</td>
<td>Statistics and Applications</td>
<td>3</td>
</tr>
<tr>
<td>STAT 462</td>
<td>Introduction to Mathematical Statistics I: Distribution Theory</td>
<td>4</td>
</tr>
<tr>
<td>STAT 463</td>
<td>Introduction to Mathematical Statistics II: Statistical Inference</td>
<td>4</td>
</tr>
</tbody>
</table>

Credit Hours Subtotal: 11

Total Credit Hours 24

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

Twenty-two (22) hours of ACTS courses. See the degree audit and the actuarial science advisor for specific course choices.

Credit Hours Subtotal: 22

Total Credit Hours 22

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

Plan A Minor
Fifteen (15) hrs of actuarial science plus prerequisite mathematics and statistics courses.

Plan B Minor
Twelve (12) hrs of actuarial science plus prerequisite mathematics and statistics courses.
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 399 Independent Study
Prerequisites: Permission.
Credit Hours: 1-3
Min credits per semester: 1
Max credits per semester: 3
Max credits per degree: 24
Format: IND

ACTS 401 Problem Lab: Basic Actuarial Applications of Probability
Prerequisites: MATH 208/208H 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
Format: LAB

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-arbitrage as a fundamental concept in financial mathematics.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Format: LAB

ACTS 403 Problem Lab: Actuarial Models - Life Contingencies
Prerequisites: ACTS 470/870, 471/871, and 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
Format: LAB

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
Format: LAB

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
Format: LAB

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
Format: LEC
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
Format: LEC
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
Format: LEC
ACTS 440 Interest Theory
Crosslisted with: ACTS 840
Prerequisites: MATH 208/208H with a grade of "Pass" or "C" or better, or parallel
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
Format: LEC
Prerequisite for: ACTS 405; ECON 365; FINA 338; FINA 363; FINA 367; FINA 375; FINA 382; FINA 401; FINA 450

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
Format: LEC

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
Format: LEC

ACTS 443 Financial Mathematics for Actuaries
Crosslisted with: ACTS 843
Prerequisites: ACTS 442 with a grade of "C" or better
Description: Foundations of modern financial mathematics. Introduction to the mathematics of finance. Calculations involving yield curves, spot rates, forward rates, duration, convexity, and immunization.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

ACTS 444 Actuarial Applications in Practice
Crosslisted with: ACTS 844
Prerequisites: ACTS 443 with a grade of "C" or better
Description: Application of actuarial 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: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

ACTS 447 Actuarial Economics
Crosslisted with: ACTS 847
Prerequisites: ACTS 444 with a grade of "C" or better
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
Format: LEC

ACTS 448 Financial Economics and Risk Management
Crosslisted with: ACTS 848
Prerequisites: ACTS 447 with a grade of "C" or better
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
Format: LEC

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
Format: LEC

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
Format: LEC
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
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
Format: LEC

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
Format: LEC
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
Format: LEC

ACTS 475 Actuarial Applications in Practice
Crosslisted with: ACTS 875
Prerequisites: ACTS 471/871; FINA 307/307H or 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
Format: LEC

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.)

#### 15 HR TERM 1

**Calculus Sequence**

complete MATH 106

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Grade</th>
<th>Additional Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 106</td>
<td>5</td>
<td>C</td>
<td>MATH 106 will fulfill the ACE 3 requirement.</td>
</tr>
</tbody>
</table>

#### ACE 1 Written Texts

complete 1 from ACE1

3hr

#### CDR F: Additional Breadth

recommend 1 or more courses

Complete an approved additional course from CDR B, CDR C, or CDR D that is outside of the discipline of your primary major. CSCE 101 is recommended to fulfill this requirement including CSCE 101L for an additional 1 hour.

4hr

#### CDR E: Language

recommend 1 or more courses

If not complete, choose a language course according to your placement and proficiency. CDR E is met after 4th level (202) of most languages.

3hr

#### 16 HR TERM 2

**Calculus Sequence**

complete MATH 107

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Grade</th>
<th>Additional Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 107</td>
<td>4</td>
<td>C</td>
<td>MATH 208 is ideally completed in the third term of enrollment. It becomes critical to your success in the major if not completed by the fourth term of enrollment.</td>
</tr>
</tbody>
</table>

#### ACE 6 Social Sciences

complete 1 from ACE6

3hr

#### 17 HR TERM 3

**Calculus Sequence**

complete MATH 208

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Grade</th>
<th>Additional Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 208</td>
<td>4</td>
<td>C</td>
<td>MATH 208 is ideally completed in the third term of enrollment. It becomes critical to your success in the major if not completed by the fourth term of enrollment.</td>
</tr>
</tbody>
</table>

#### Actuarial Sci Core Course

complete ACTS 440

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Grade</th>
<th>Additional Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACTS 440</td>
<td>4</td>
<td>C</td>
<td>ACTS 440 is ideally completed in the third term of enrollment. It becomes critical to your success in the major if not completed by the fourth term of enrollment.</td>
</tr>
</tbody>
</table>

#### CDR A: Writing

complete 1 from ACE1

3hr

ECON 211 is recommended to fulfill the ACE 6 requirement.
Complete an additional course approved as ACE 1. JGEN 220 is recommended to fulfill the CDR A requirement.

ACE 8 Ethical Principles
complete 1 from ACE8

ECON 212 is recommended to fulfill the ACE 8 requirement.

Electives
complete Any Course

In consultation with your advisor, select elective courses or courses that meet a 2nd major, minor, sci-base or upper level requirement. ACCT 200 is recommended for this term.

13 HR TERM 4

Statistics Probability
complete STAT 380

Actuarial Science
complete Any Actuarial Science Course

ACE 2 Communication Skill
complete 1 from ACE2

COMM 286 or MRKT 257 are recommended to fulfill the ACE 2 requirement.

Electives
complete Any Course

ACTS 441 and 402 are recommended for this term.

16 HR TERM 6

Statistics Probability
complete STAT 463

Actuarial Science
complete Any Actuarial Science Course at Any Level

In consultation with your advisor, select elective courses or courses that meet a 2nd major, minor, sci-base or upper level requirement. FINA 464 and MATH 314 are recommended for this term.

CDR C: Humanities

C

14 HR TERM 5

Statistics Probability
300 Level, Any History Course, Any Japanese Course at the 300 Level, Any Latin Course at the 300 Level, Any Latin Course at the 400 Level, Any Philosophy Course, Any Religious Studies Course at any Level, Any Russian Course at the 300 Level, Any Russian Course at the 400 Level, SPAN 264, SPAN 265, Any Spanish Course at the 300 Level, Any Spanish Course at the 400 Level

Complete an approved course from a Humanities discipline: ARAB, CLAS, CZEC, ENGL, FILM, FREN, GERM, GREK, HEBR, HIST, JAPN, LATN, PHIL, RELG, RUSS, SPAN.

**Electives**

complete Any Course

6hr

In consultation with your advisor, select elective courses or courses that meet a 2nd major, minor, sci-base or upper level requirement. FINA 467 along with either FINA 307 or 338 are recommended for this term.

**16 HR TERM 7**

**Actuarial Science**

complete Any Actuarial Science Course

9hr

ACTS 471, 473, and 430 are recommended for this term.

**ACE 7 Arts**

complete 1 from ACE7

3hr

**CDR B: Math/Sci w/Lab**

complete 1 from Approved Science Courses

3hr

Complete an approved course from a Math or Science discipline with a lab: ASTR, BIOL, BIOS, CHEM, CSCE, GEOG, LIFE, MATH, METR, PHYS, STAT (select ANTH or GEOG allowed).

**CDR B: Lab**

complete 1 from ASCLAB1

1hr

Complete an approved lab associated with a course from a Math or Science discipline: BIOS, CHEM, GEOG, LIFE, METR, PHYS (select ANTH or GEOG allowed).

**13 HR TERM 8**

**ACE 10 Capstone**

complete 1 from ACE10

3hr

ACTS 475 is the recommended ACE 10 course.

**Actuarial Science**

complete Any Actuarial Science Course

3hr

C

ACTS 474 is recommended for this term.

**ACE 9 Global/Human Divers**

complete 1 from ACE9

3hr

ECON 321 is recommended to fulfill the ACE 9 requirement.

**Electives**

complete Any Course

4hr

In consultation with your advisor, select elective courses or courses that meet a 2nd major, minor, sci-base or upper level requirement. FINA 461 is recommended for 3 of the 4 hours for this term.

**Graduation Requirements**

1. A minimum 2.00 GPA required for graduation.
2. ***Total Credits Applying Toward 120 Total Hours***
3. Complete 30 hours in residence at UNL.

**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**

- Comprehend and critically evaluate complex information
- Use quantitative analytical computational techniques
- Make predictions using mathematical, statistical, and scientific modeling methods
- Understand and use proper laboratory and technical skills and instruments
- Define problems and identifying causes
- Support and communicate claims using clear evidence
- Simplify complex information and present it to others
- Apply mathematical and scientific skills to solve real-world problems
- Document and replicate processes and procedures
- Design and implement research experiments

**Jobs of Recent Graduates**

- Trainee Actuary, KPMG - Tokyo
• Executive Actuarial Analyst, Pacific Orient Insurance Co. Berhad - Kuala Lumpur ZZ
• Instructional Technology Specialist, University of Nebraska-Lincoln - Lincoln NE
• Associate Actuarial Analyst, Coventry Health Care - Omaha NE
• Underwriting Service Assistant, State Farm - Lincoln NE
• Actual Technician, Rockhill Insurance - Kansas City MO
• Value Chain Analyst, ATS Secured - Omaha NE
• Actuarial Development Program, Lincoln Financial Group - Omaha NE
• Actuarial Assistant, Milliman Consulting - Milwaukee WI
• Teller, Union Bank and Trust - Lincoln NE

Grad Schools
• Ph. D. in Statistics, University of Nebraska-Lincoln - Lincoln NE
• Management Science Engineering, Stanford University - Stanford CA