STATISTICS MINOR (CASNR)

Description
Statistics is the science of data collection, classification, analysis and interpretation. It has evolved into a core discipline for a well-rounded liberal arts education, and is of central importance to nearly all of the biological, physical and social sciences. The Department of Statistics offers introductory courses to acquaint students from all disciplines with the essential elements of statistical thinking. STAT 218 Introduction to Statistics or STAT 380 Statistics and Applications can be taken to satisfy ACE Outcome 3.

The department offers a minor in statistics, which is a useful complement for many students. In addition, the minor provides background beneficial for graduate study in statistics. Career opportunities for statisticians with masters and doctoral degrees abound in industry, government and education. Employers include pharmaceutical, health and medical organizations, quality improvement in manufacturing and service, marketing and opinion research, credit and security risk analysis, agribusiness, various governmental agencies including Environmental Protection, Food and Drug Administration, Departments of Census, Energy, Agriculture, and Homeland Security, and emerging fields ranging from bioinformatics to statistical applications in sports.

College Requirements

College Admission
Requirements for admission into the College of Agricultural Sciences and Natural Resources (CASNR) are consistent with general University admission requirements (one unit equals one high school year): 4 units of English, 4 units of mathematics, 3 units of natural sciences, 3 units of social studies, and 2 units of foreign language. Students must also meet performance requirements (ACT composite of 20 or higher OR combined SAT score of 950 or higher OR rank in the top one-half of graduating class; transfer students must have a 2.0 (on a 4.0 scale) cumulative grade point average and 2.0 on the most recent term of attendance. For students entering the PGA Golf Management degree program, a certified golf handicap of 12 or better (e.g., USGA handicap card) or written ability (MS Word file) equivalent to a 12 or better handicap by a PGA professional or high school golf coach is required. For more information, please visit: http://pgm.unl.edu/requirements.

Admission Deficiencies/Removal of Deficiencies
Students who are admitted to CASNR with core course deficiencies must remove these deficiencies within the first 30 credit hours at UNL, or within the first calendar year at UNL, whichever takes longer, excluding foreign languages. Students have up to 60 credit hours to remove foreign language deficiencies. College-level course work taken to remove deficiencies may be used to meet degree requirements in CASNR.

Deficiencies in the required entrance subjects can be removed by completion of specified courses in the University or by correspondence.

College Degree Requirements

Curriculum Requirements
The curriculum requirements of the College consist of three areas: ACE (Achievement-Centered Education); College of Agricultural Sciences and Natural Resources Core; and Degree Program requirements and electives. All three areas of the College Curriculum Requirements are incorporated within the description of the Major/Degree Program sections of the catalog. The individual major/degree program listings of classes insures that a student will meet the minimum curriculum requirements of the College.

Foreign Languages/Language Requirement
Two units of a foreign language are required. This requirement is usually met with two years of high school language.

Minimum Hours Required for Graduation
The College grants the bachelors degree in programs associated with agricultural sciences, natural resources and related programs. Students working toward a degree must earn at least 120 semester hours of credit. A minimum cumulative grade point average of C (2.0 on a 4.0 scale) must be maintained throughout the course of studies and is required for graduation.

Grade Rules
Removal of C-, D and F Grades
Only the most recent letter grade received in a given course will be used in computing a student's cumulative grade point average if the student has completed the course more than once and previously received a grade or grades below C in that course.

The previous grade (or grades) will not be used in the computation of the cumulative grade point average, but it will remain a part of the academic record and will appear on any transcript.

A student can remove from his/her cumulative average a course grade of C, D+, D, D- or F if the student repeats the same course at the University of Nebraska and receives a grade other than P (pass), I (incomplete), N (no pass), W (withdrew), or NR (no report). If a course is no longer being offered, it is not eligible for the revised grade point average computation process.

For complete procedures and regulations, see the Office of the University Registrar website at http://www.unl.edu/regrec/course-repeats.

Pass/No Pass
Students in CASNR may take any course offered on a Pass/No Pass basis within the 24-hour limitation established by the Faculty Senate. However, a department may specify that the Pass/No Pass status of its courses be limited to non-majors or may choose to offer some courses for letter grades only.

GPA Requirements
A minimum cumulative grade point average of C (2.0 on a 4.0 scale) must be maintained throughout the course of studies and is required for graduation.

Transfer Credit Rules
To be considered for admission, a transfer student, Nebraska resident or nonresident, 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 have completed less than 12 credit hours of college study must submit either ACT or SAT scores.

Ordinarily, credits earned at an accredited college are accepted by the University. The College, however, will evaluate all hours submitted on an application for transfer and reserves the right to accept or reject any of them. Sixty is the maximum number of hours UNL will accept on transfer from a two-year college. Ninety is the maximum number of hours UNL will accept from a four-year college. Transfer credit in the degree program must be approved by the degree program advisor on a Request for Substitution Form to meet specific course requirements, group requirements, or course level requirements in the major. At least 9 hours in the major field, including the capstone course, must be completed at UNL regardless of the number of hours transferred.

The College will accept no more than 10 semester hours of C-, D+, D and D- grades from other schools. The C-, D+, D and D- grades can only be applied to free electives. This policy does not apply to the transfer of grades from UNO or UNK to UNL.

Joint Academic Transfer Programs
The College of Agricultural Sciences and Natural Resources has agreements with many institutions to support joint academic programs. The transfer programs include dual degree programs and cooperative degree programs. Dual degree programs offer students the opportunity to receive a degree from a participating institution and also to complete requirements for a bachelor of science degree in CASNR. Cooperative programs result in a single degree from either UNL or the cooperating institution.

Dual Degree Programs
A to B Programs
The A to B Program, a joint academic program offered by the CASNR and participating community colleges, allows students to complete the first two years of a degree program at the participating community college and continue their education and study in a degree program leading toward a bachelor of science degree.

The A to B Program provides a basic knowledge plus specialized course work. Students transfer into CASNR with junior standing.

Depending on the community college, students enrolled in the A to B Program may complete the requirements for an associate of science at the community college, transfer to UNL, and work toward a bachelor of science degree.

Participating community colleges include:
- Central Community College
- Metropolitan Community College
- Mid-Plains Community College
- Nebraska College of Technical Agriculture
- Northeast Community College
- Southeast Community College
- Western Nebraska Community College

3+2 Programs
Two specialized degree programs in animal science and veterinary science are offered jointly with an accredited college or school of veterinary medicine. These two programs permit CASNR animal science or veterinary science students to receive a bachelor of science degree from UNL with a degree in animal science or veterinary science after successfully completing two years of the professional curriculum in veterinary medicine at an accredited veterinary school. Students who successfully complete the 3+2 Program, must complete the “Application for Degree” form and provide transcripts to the Credentials Clerk, Office of the University Registrar, 107 Canfield Administration Building, UNL. Students should discuss these degree programs with their academic advisor.

Cooperative Degree Programs
Academic credit from UNL and a cooperating institution is applied towards a four-year degree from either UNL (UNL degree-granting program) or the cooperating institution (non UNL degree-granting program). All have approved programs of study.

UNL Degree-Granting Programs
A UNL degree-granting program is designed to provide students the opportunity to complete a two-year program of study at one of the four-year institutions listed below. Transfer to CASNR and complete the requirements for a bachelor of science degree.

Chadron State College. Chadron State College offers a 2+2 program leading to a grassland ecology and management degree program and a transfer program leading to a Bachelor of Science in Agricultural Education in the teaching option.

Wayne State College. Wayne State College offers a 3+1 program leading to a Bachelor of Science in Plant Biology in the ecology and management option.

University of Nebraska at Kearney. Transfer programs are available for students pursuing degree programs leading to a bachelor of science degree.

University of Nebraska at Omaha. The University of Nebraska at Omaha (UNO) cooperates with CASNR in providing four-semester pre-agricultural sciences, pre-natural resources, pre-food science and technology, pre-horticulture and pre-turfgrass and landscape management transfer programs.

A student enrolled in these programs may transfer all satisfactorily completed academic credits identified in the suggested program of study, and enter CASNR to study toward a degree program leading to a bachelor of science degree. The total program would require a minimum of four years or eight semesters (16 credit hours/semester or 120 credit hours).

UNL CASNR faculty teach horticulture and food science and technology courses at UNO to assist an urban population in better understanding the food processing, horticulture, and landscape horticulture industries.

For more information, contact the CASNR Dean's Office, 800-472-8800, ext. 2541.

Non UNL Degree-Granting Programs
The CASNR cooperates with other institutions to provide course work that is applied toward a degree at the cooperating institution. Pre-professional programs offered by CASNR allow students to complete the first two or three years of a degree program at UNL prior to transferring and completing a degree at the cooperating institution.

Chadron State College–Range Science. The 3+1 Program in range science allows Chadron State College students to pursue a range science degree through Chadron State College. Students complete three years of course work at Chadron State College and one year of specialized range science course work (32 credit hours) atCASNR.
Dordt College (Iowa) – Agricultural Education: Teaching Option. This program allows students to pursue an Agricultural Education Teaching Option degree leading toward a bachelor of science in agricultural education. Students at Dordt College will complete 90 credit hours in the Agricultural Education: Teaching Option Transfer Program.

Residency
Students must complete at least 30 of the total hours for their degree using UNL credits. At least 18 of the 30 credit hours must be in courses offered through CASNR (≥299) including the appropriate ACE 10 degree requirement or an approved ACE 10 substitution offered through another UNL college and excluding independent study regardless of the number of hours transferred. 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.

Online and Distance Education
There are many opportunities to earn college credit online through the University of Nebraska–Lincoln. Some of these credits may be applicable not only as elective credits, but also toward the fulfillment of the College’s education requirements. Credits earned online may count toward residency. However, certain offerings may not be counted toward scholarship requirements or academic recognition criteria.

For further information, contact:
Office of Online and Distance Education
University of Nebraska–Lincoln
305 Brace Labs
Lincoln, NE 68588-0109
402-472-4681
http://online.unl.edu/

Independent Study Rules
Students wishing to take part in independent studies must obtain permission; complete and sign a contract form; and furnish copies of the contract to the instructor, advisor, departmental office, and the Dean’s Office. The contract should be completed before registration. Forms are available in 103 Agricultural Hall or online at the CASNR website.

Independent study projects include research, literature review or extension of course work under supervision and evaluation of a departmental faculty member.

Students may only count 12 hours of independent study toward their degrees and no more than 6 hours can be counted during their last 36 hours earned, excluding senior thesis, internships, and courses taught under an independent study number.

Other College Degree Requirements
Capstone Course Requirement
A capstone course is required for each CASNR degree program. A capstone course is defined as a course in which students are required to integrate diverse bodies of knowledge to solve a problem or formulate a policy of societal importance.

ACE Requirements
All students must fulfill the Achievement Centered Education (ACE) requirements. Information about the ACE program may be viewed at www.ace.unl.

The minimum requirements of CASNR reflect the common core of courses that apply to students pursuing degrees in the college. Students should work with an advisor to satisfy ACE outcomes 1, 2, 3, 4, 6 and 10 with the college requirements.

Catalog Rule
Students must fulfill the requirements stated in the catalog for the academic year in which they are first admitted to UNL or when they were first admitted to a Joint Academic Transfer Program. 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 Agricultural Sciences and Natural Resources. Students must complete all degree requirements from a single catalog year. The catalog which a student follows for degree requirements may not be more than 10 years old at the time of graduation.

Requirements for Minor Offered by Department

**Track 1**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>STAT 462</td>
<td>Introduction to Mathematical Statistics I:</td>
<td>4</td>
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<tr>
<td>STAT 463</td>
<td>Introduction to Mathematical Statistics II:</td>
<td>4</td>
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<td></td>
<td>Distribution Theory</td>
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<td></td>
<td>Statistical Inference</td>
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<td>Select at least 6 hours of the following:</td>
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<tr>
<td>STAT 318</td>
<td>Introduction to Statistics II</td>
<td></td>
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<tr>
<td>STAT 380</td>
<td>Statistics and Applications</td>
<td></td>
</tr>
<tr>
<td>STAT 412</td>
<td>Introduction to Experimental Design</td>
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<tr>
<td>STAT 414</td>
<td>Introduction to Survey Sampling</td>
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<tr>
<td>STAT 450</td>
<td>Introduction to Regression Analysis</td>
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<tr>
<td>STAT 494</td>
<td>Topics in Statistics and Probability</td>
<td></td>
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<tr>
<td>STAT 496</td>
<td>Independent Study</td>
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</tbody>
</table>

Total Credit Hours

14

**Track 2**

<table>
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<tr>
<td>STAT 218</td>
<td>Introduction to Statistics</td>
<td>3</td>
</tr>
<tr>
<td>STAT 318</td>
<td>Introduction to Statistics II</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select at least 9 credits of the following:</td>
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</tr>
<tr>
<td>STAT 412</td>
<td>Introduction to Experimental Design</td>
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</tr>
<tr>
<td>STAT 414</td>
<td>Introduction to Survey Sampling</td>
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<td>STAT 463</td>
<td>Introduction to Mathematical Statistics II:</td>
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<td></td>
</tr>
<tr>
<td>STAT 496</td>
<td>Independent Study</td>
<td></td>
</tr>
</tbody>
</table>

Total Credit Hours

15

- Alternative classes may be substituted if approved by the Department of Statistics curriculum committee.
### Grade Rules

**C- and D Grades**
If a student receives a grade lower than C in a course, the course may not be used to satisfy the statistics minor requirement.

**Pass/No Pass**
Classes taken for a minor in statistics may not be taken Pass/No Pass.

### STAT 218 Introduction to Statistics
**Prerequisites:** Removal of all entrance deficiencies in mathematics.
**Notes:** Credit toward the degree may be earned in only one of: CRIM 300 or ECON 215 or EDPS 459 or SOCI 206. Credit toward the degree cannot be earned in STAT 218 if taken after or taken in parallel with STAT/MATH 380.
**Description:** The practical application of statistical thinking to contemporary issues; collection and organization of data; probability distributions; statistical inference; estimation; and hypothesis testing.
**Credit Hours:** 3
**Max credits per semester:** 3
**Max credits per degree:** 3
**Format:** LEC
**Prerequisite for:** ABUS 341, MRKT 341; ACCT 308; AECN 436; ASCI 330; BLAW 371; BLAW 371H; BLAW 372; ECON 311; FINA 361; FINA 361H; FORS 411; MNGT 301; MNGT 301H; MRKT 345; MRKT 350; MRKT 446; NUTR 486, NUTR 886; SCMA 331; SCMA 335; SCMA 350; SCMA 350H; SCMA 350L
**ACE:** ACE 3 Math/Stat/Reasoning

### STAT 318 Introduction to Statistics II
**Prerequisites:** STAT 218 or equivalent.
**Description:** Tests for means/proportions of two independent groups, analysis of variance for completely randomized design, contingency table analysis, correlation, single and multiple linear regression, nonparametric procedures, design of experiments.
**Credit Hours:** 3
**Max credits per semester:** 3
**Max credits per degree:** 3
**Format:** LEC
**Prerequisite for:** STAT 802

### STAT 380 Statistics and Applications
**Crosslisted with:** MATH 380, MATH 380H, STAT 380H, RAIK 270H
**Prerequisites:** MATH 107 or 107H
**Notes:** Credit toward the degree cannot be earned in STAT 218 if taken after or taken in parallel with STAT/MATH 380.
**Description:** Probability calculus; random variables, their probability distributions and expected values; t, F and chi-square sampling distributions; estimation; testing of hypothesis; and regression analysis with applications.
**Credit Hours:** 3
**Max credits per semester:** 3
**Max credits per degree:** 3
**Format:** LEC
**Prerequisite for:** ABUS 341, MRKT 341; BLAW 371; BLAW 371H; BLAW 372; ECEN 325; ECEN 355; ECEN 850, ECEN 450; ECON 311; FINA 361; FINA 361H; MATH 809, MATH 409; MECH 343; MNGT 301; MNGT 301H; MRKT 345; MRKT 350; MRKT 446; SCMA 331; SCMA 335; SCMA 350; SCMA 350H; SCMA 350L
**ACE:** ACE 3 Math/Stat/Reasoning
**Groups:** Advanced Mathematics Courses

### STAT 380H Statistics and Applications
**Crosslisted with:** MATH 380, MATH 380H, STAT 380, RAIK 270H
**Prerequisites:** MATH 107 or 107H
**Notes:** Credit toward the degree cannot be earned in STAT 218 if taken after or taken in parallel with STAT/MATH 380.
**Description:** Probability calculus; random variables, their probability distributions and expected values; t, F and chi-square sampling distributions; estimation; testing of hypothesis; and regression analysis with applications.
**Credit Hours:** 3
**Max credits per semester:** 3
**Max credits per degree:** 3
**Format:** LEC
**Prerequisite for:** ABUS 341, MRKT 341; BLAW 371; BLAW 371H; BLAW 372; ECEN 325; ECEN 355; ECEN 850, ECEN 450; ECON 311; FINA 361; FINA 361H; MATH 809, MATH 409; MECH 343; MNGT 301; MNGT 301H; MRKT 345; MRKT 350; MRKT 446; SCMA 331; SCMA 335; SCMA 350; SCMA 350H; SCMA 350L
**ACE:** ACE 3 Math/Stat/Reasoning
**Groups:** Advanced Mathematics Courses

### STAT 412 Introduction to Experimental Design
**Prerequisites:** STAT 380.
**Description:** Survey of elementary experimental designs and their analyses completely randomized, randomized block, factorial, and split-plot designs.
**Credit Hours:** 3
**Max credits per semester:** 3
**Max credits per degree:** 3
**Format:** LEC

### STAT 414 Introduction to Survey Sampling
**Prerequisites:** STAT/MATH 380 or IMSE 321 or permission.
**Description:** Sampling Techniques: simple random sampling, sampling proportions, estimation of sample size, stratified random sampling, ratio and regression estimates.
**Credit Hours:** 3
**Max credits per semester:** 3
**Max credits per degree:** 3
**Format:** LEC

### STAT 430 Sensory Evaluation
**Crosslisted with:** FDST 430, FDST 830, STAT 830
**Prerequisites:** Introductory course in statistics.
**Description:** Food evaluation using sensory techniques and statistical analysis.
**Credit Hours:** 3
**Max credits per semester:** 3
**Max credits per degree:** 3
**Format:** LEC

### STAT 432 Introduction to Spatial Statistics
**Prerequisites:** STAT 218 or equivalent.
**Description:** Spatial point patterns, test of randomness, Morans I statistic and similar measures, checking assumptions for independence of observations, variography, estimation (point and global), Kriging, nearest neighbor techniques, cokriging, mixed models and their role in designed spatial experiments.
**Credit Hours:** 3
**Max credits per semester:** 3
**Max credits per degree:** 3
**Format:** LEC
**Prerequisite for:** ABUS 341, MRKT 341; BLAW 371; BLAW 371H; BLAW 372; ECEN 325; ECEN 355; ECEN 850, ECEN 450; ECON 311; FINA 361; FINA 361H; MATH 809, MATH 409; MECH 343; MNGT 301; MNGT 301H; MRKT 345; MRKT 350; MRKT 446; SCMA 331; SCMA 335; SCMA 350; SCMA 350H; SCMA 350L
**ACE:** ACE 3 Math/Stat/Reasoning
**Groups:** Advanced Mathematics Courses
STAT 442 Computational Biology
Crosslisted with: BIOC 842, STAT 842, BIOC 442
Prerequisites: Any introductory course in biology, or genetics, or statistics.
Description: Databases, high-throughput biology, literature mining, gene expression, next-generation sequencing, proteomics, metabolomics, system biology and biological networks.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

STAT 450 Introduction to Regression Analysis
Prerequisites: STAT/MATH 380 or IMSE 321, and knowledge of matrix algebra.
Description: General linear models for estimation and testing problems, analysis and interpretation for various experimental designs.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

STAT 462 Introduction to Mathematical Statistics I: Distribution Theory
Prerequisites: MATH 208 or 107H
Notes: STAT 380 or equivalent is strongly recommended.
Description: Sample space, random variable, expectation, conditional probability and independence, moment generating function, special distributions, sampling distributions, order statistics, limiting distributions, and central limit theorem.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Format: LEC
Prerequisite for: ACTS 401; STAT 463

STAT 463 Introduction to Mathematical Statistics II: Statistical Inference
Prerequisites: STAT 462
Description: Interval estimation; point estimation, sufficiency, and completeness; Bayesian procedures; uniformly most powerful tests, sequential probability ratio test, likelihood ratio test, goodness of fit tests; elements of analysis of variance and nonparametric tests.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Format: LEC

STAT 494 Topics in Statistics and Probability
Prerequisites: Permission.
Description: Special topics in either statistics or the theory of probability.
Credit Hours: 1-5
Min credits per semester: 1
Max credits per semester: 5
Max credits per degree: 24
Format: LEC

STAT 496 Independent Study
Prerequisites: Prior arrangement with a faculty member and submission of proposed study plan to department office.
Credit Hours: 1-5
Min credits per semester: 1
Max credits per semester: 5
Max credits per degree: 5
Format: IND