DATA SCIENCE (CAS)

Description
The interdisciplinary data science major prepares students with skill and competency in data analysis and interpretation, algorithm design and implementation, and helps them develop aptitudes for interdisciplinary problem-solving. Thus, this program enables students to take advantage of career and employment opportunities across diverse fields involving data-rich, data-driven systems and applications. Ultimately, this will help address the increasing societal and economic need for a qualified workforce in today’s digital age.

The data science major is available through the College of Art and Sciences, the College of Engineering, and the College of Agricultural Sciences and Natural Resources. A shared set of core requirements exists in each college combining foundational knowledge in Computer Science, Mathematics, and Statistics. Beyond the core requirements, each college offers a unique approach within the overall degree. The College of Arts and Sciences data science majors will have the opportunity to pursue the major as part of an overall liberal arts curriculum characterized by both focus and range. Due to the flexible and customizable structure of the degrees, the major will pair well with a related minor or even a second major.

Learning Outcomes
The primary student learning outcomes of the interdisciplinary data science major are:

1. Foundational knowledge and expertise in the analysis of large-scale data sources from the interdisciplinary perspectives of applied computer science, data modeling, mathematics, and statistics.
2. Foundational knowledge and expertise in the application of computing, informatics, and modeling to solve multidisciplinary problems.
3. Abilities and professional skills to solve multidisciplinary data science problems as a member of an interdisciplinary team.
4. Familiarity with ethical challenges in data science, including ethical collection of data, responsible use of data and algorithmic bias.

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 (http://ace.unl.edu) website (http://ace.unl.edu) for the most current list of certified courses.

ACE Student Learning Outcomes

<table>
<thead>
<tr>
<th>ACE 1</th>
<th>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.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACE 2</td>
<td>Demonstrate competence in communication skills.</td>
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</tbody>
</table>
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.
- Internship (395 or 495), independent study or readings (396 or 496), research (398 or 498), and thesis (399, 499H, 499, or 499H) will not satisfy distribution requirements.
- Other courses with a 9 in the middle number (ex. PSYC 292) will not satisfy distribution requirements unless approved by an advisor.
- Cross-listed courses from interdisciplinary programs will be applied in the same area as courses from the lead department.

College Distribution Requirements

CDR: Written Communication

Select from courses approved for ACE outcome 1.

CDR: Natural, Physical, and Mathematical Sciences

Select a course from ASTR, BIOS, CHEM, GEOL, LIFE, METR, MATH, PHYS, or ANTH 242, GEOG 155, GEOG 181, POLS 250, or PSYC 273.

CDR: Laboratory

Laboratory courses may be embedded in a 4-5 credit course used in CDR Natural, Physical, and Mathematical Science (example GEOG 155), or stand alone (example LIFE 120L).

CDR: Humanities

Select a course from ARAB, CHIN, CLAS, CZEC, ENGL, FILM, FREN, GERM, GREK, HIST, JAPN, LATN, PHIL, RELG, RUSS, or SPAN.

CDR: Social Science

Select a course from ANTH, COMM, GEOG, NSST, POLS, PSYC, or SOCI.

CDR: Human Diversity in U.S. Communities

Select from the following approved courses also listed in your degree audit: ANTH 130, ANTH 412, ANTH 473, ARAB 313, COMM 311, COMM 364, COMM 465, ENGL 212, ENGL 245N, ENGL 312, ENGL 345D, ENGL 345N, ENGL 346, ENGL 376, ENGL 380, ENGL 445, ETHN 100, ETHN 201, ETHN 202, ETHN 205, FILM 344, GEOG 271, GEOG 403, GLST 350, HIST 115, HIST 246, HIST 251, HIST 323, HIST 340, HIST 351, HIST 357, HIST 402, PHIL 105, PHIL 106, PHIL 218, PHIL 323, PHIL 325, POLS 333, POLS 338, POLS 347, PSYC 310, PSYC 330, PSYC 421, PSYC 425, RELG 134, RELG 226, RELG 227, RELG 313, Soci 101, Soci 180, Soci 200, Soci 217, SPAN 206, SPAN 486, WMNS 101, WMNS 201, WMNS 202, WMNS 210, WMNS 356

CDR: Language

Fulfilled by the completion of the 4th level of a single language (either in H.S. or in college). Language study at UNL is available in: ARAB, CHIN, CZEC, FREN, GERM, GREK, JAPN, LATN, RUSS, SLPA, or SPAN.

Credit Hours Subtotal: 12-33

1 Excluded courses: BIOL 101, BIOS 100, CHEM 101, Mbio 101, PHYS 201, MATH 100A, MATH 101, MATH 102, MATH 103.
2 ANTH 242L, ASTR 224, BIOS 101L, BIOS 110L, BIOS 116, BIOS 213L, BIOS 214, CHEM 105L, CHEM 109L, CHEM 110L, CHEM 113L, GEOG 155, GEOG 101, GEOG 103, LIFE 120L, LIFE 121L, METR 100, PHYS 141, PHYS 142, PHYS 153, PHYS 221, or PHYS 222.
3 ARAB, CHIN, CZEC, FREN, GERM, GREK, JAPN, LATN, RUSS, and SPAN courses must be numbered 300 or above. ENGL courses must be ENGL 170, ENGL 180, or ENGL 200 level and above. Excluded courses: CLAS 116, ENGL 254, ENGL 300, ENGL 354, SPAN 300A, SPAN 303, and SPAN 304.
4 Excluded courses: ANTH 242/ANTH 242L, GEOG 155, GIST 111, GIST 311, POLS 101, POLS 250, PSYC 100, PSYC 273.
5 ARAB 202, CHIN 202, CZEC 202, FREN 202 or FREN 210, GERM 202, GREK 301 and GREK 302, JAPN 201 and JAPN 202, LATN 301 and LATN 302, RUSS 202, SLPA 202, or SPAN 202 or SPAN 210.

Language Requirement - BA and BS

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 - BA and BS

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 from disciplines within the College of Arts and Sciences or required in its majors: ACTS, ASTR, BIOL, BIOS, CHEM, CSCE, GEOG, LIFE, METR, MATH, PHYS, STAT or ANTH 242, ANTH 242L, ANTH 341, ANTH 385, ANTH 386, ANTH 389, ANTH 416, ANTH 422, ANTH 430, ANTH 442, ANTH 443, ANTH 444, ANTH 448, ANTH 473, ANTH 484, ANTH 487D, ENVR 201, GEOG 155, GEOG 181, GEOG 217, GEOG 281, GEOG 308, GEOG 317, GEOG 408, GEOG 417, GEOG 418, GEOG 419, GEOG 421, GEOG 422, GEOG 425, GEOG 427, GEOG 432, GEOG 444, GEOG 461, GEOG 467, PHIL 211, POLS 250, PSYC 273, PSYC 368, PSYC 370, PSYC 450, PSYC 451, PSYC 456, PSYC 458, PSYC 460, PSYC 461, PSYC 463, PSYC 464, or PSYC 465.

Excluded courses include: BIOL 101, BIOL 100, CHEM 101, MATH 100A, MATH 101, MATH 102, MATH 103, MBIO 101, PHYS 201 as well as any course numbered 395, 495, 399, 399H, 499, or 499H.

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

University policy for the Pass/No Pass (P/N) privilege:

- Neither the P nor the N grade factor into your GPA.
- 'P' is interpreted to mean a grade of C or above. A grade of C- or lower results in a "N".
- A change to or from a Pass/No Pass may be made until mid-term (1/2 of the course - see the academic calendar for specific dates per term).
- The Pass/No Pass or grade registration cannot conflict with the policy of the professor, department, college, or University policy governing the grading options.
- Changing to or from the Pass/No Pass grading option requires using MyRED, or processing a Schedule Adjustment Form.
- For undergraduates, the University maximum of 24 ‘Pass’ credit hours and/or college and department limits will apply. These limits do not include courses offered on a ‘Pass/No Pass’ basis only. Consult your advisor or the Undergraduate Catalog (https://catalog.unl.edu/undergraduate/) for restrictions on the number of ‘Pass’ hours you can apply toward your degree.

NOTE: See Course Repeats (https://registrar.unl.edu/academic-standards/course-repeats/)

College of Arts and Sciences policy on the Pass/No Pass (P/N) privilege:

- Pass hours can count toward fulfillment of University ACE requirements and college distribution requirements up to the 24-hour maximum.
- Most arts and sciences majors and minors do not permit any courses graded Pass/No Pass to apply, or limit them to no more than 6 hours. Students should refer to the major section of the catalog for clarification.
- Departments may specify that certain courses of theirs can be taken on a P/N-only or on a graded-only basis.

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

The term "Residency" refers to courses taken at UNL. 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 18 hours of their major coursework, and 15 of the 30 hours required at the 300 or 400 level, at UNL.

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.

### Major Requirements

The interdisciplinary data science major includes a set of core requirements, professional experience, and a selection of fifteen (15) hours from two focus areas of interest.

#### Core Requirements

**Computer Science**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSCE 155T</td>
<td>Computer Science I: Informatics Focus</td>
<td>3-4</td>
</tr>
<tr>
<td>or CSCE 155A</td>
<td>Computer Science I</td>
<td></td>
</tr>
<tr>
<td>or CSCE 155E</td>
<td>Computer Science I: Systems Engineering Focus</td>
<td></td>
</tr>
<tr>
<td>or CSCE 155H</td>
<td>Honors: Computer Science I</td>
<td></td>
</tr>
<tr>
<td>or CSCE 155N</td>
<td>Computer Science I: Engineering and Science Focus</td>
<td></td>
</tr>
<tr>
<td>or RAIK 183H</td>
<td>Honors: Computer Problem Solving Essentials</td>
<td></td>
</tr>
</tbody>
</table>

**Mathematics**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>MATH 104</td>
<td>Applied Calculus</td>
<td>3-5</td>
</tr>
<tr>
<td>or MATH 106</td>
<td>Calculus I</td>
<td></td>
</tr>
<tr>
<td>MATH 203</td>
<td>Contemporary Mathematics</td>
<td>3-4</td>
</tr>
<tr>
<td>or MATH 107</td>
<td>Calculus II</td>
<td></td>
</tr>
<tr>
<td>MATH 315</td>
<td>Linear Algebra for Data Science</td>
<td>3</td>
</tr>
<tr>
<td>or MATH 314</td>
<td>Linear Algebra</td>
<td></td>
</tr>
</tbody>
</table>

**Statistics**

Select one of the following options:

**Option 1**

- STAT 218 Introduction to Statistics
- or STAT 380 Statistics and Applications
- RAIK 270H

**Option 2**

- STAT 101 Introduction to Data
- STAT 102 Principles of Statistical Analysis

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### Specific Major Requirements

#### Professional Experience

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 435</td>
<td>Math in the City</td>
<td>3</td>
</tr>
<tr>
<td>or RAIK 402H</td>
<td>Honors: RAIK Design Studio II</td>
<td></td>
</tr>
</tbody>
</table>

**Credit Hours Subtotal:** 3

#### Focus Area Courses

Select at least 15 hours from two of the following focus areas, with 9 credit hours in one focus area and 6 credit hours in another focus area.

**Artificial Intelligence**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSCE 421</td>
<td>Foundations of Constraint Processing</td>
</tr>
<tr>
<td>CSCE 472</td>
<td>Digital Image Processing</td>
</tr>
<tr>
<td>CSCE 473</td>
<td>Computer Vision</td>
</tr>
<tr>
<td>CSCE 474</td>
<td>Introduction to Data Mining</td>
</tr>
<tr>
<td>CSCE 475</td>
<td>Multiagent Systems</td>
</tr>
<tr>
<td>CSCE 476</td>
<td>Introduction to Artificial Intelligence</td>
</tr>
<tr>
<td>CSCE 478</td>
<td>Introduction to Machine Learning</td>
</tr>
<tr>
<td>CSCE 479</td>
<td>Introduction to Deep Learning</td>
</tr>
</tbody>
</table>

**Software Development**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>CSCE 361</td>
<td>Software Engineering</td>
</tr>
<tr>
<td>CSCE 378</td>
<td>Human-Computer Interaction</td>
</tr>
<tr>
<td>CSCE 412</td>
<td>Data Visualization</td>
</tr>
<tr>
<td>CSCE 460</td>
<td>Software Engineering for Robotics</td>
</tr>
<tr>
<td>CSCE 461</td>
<td>Advanced Topics in Software Engineering</td>
</tr>
<tr>
<td>CSCE 464</td>
<td>Internet Systems and Programming</td>
</tr>
<tr>
<td>CSCE 466</td>
<td>Software Design and Architecture</td>
</tr>
<tr>
<td>CSCE 467</td>
<td>Testing, Verification and Analysis</td>
</tr>
<tr>
<td>CSCE 468</td>
<td>Requirements Elicitation, Modeling and Analysis</td>
</tr>
<tr>
<td>RAIK 284H</td>
<td>Software Engineering IV</td>
</tr>
<tr>
<td>RAIK 403H</td>
<td>Honors: RAIK Design Studio III</td>
</tr>
<tr>
<td>RAIK 404H</td>
<td>Honors: RAIK Design Studio IV</td>
</tr>
<tr>
<td>RAIK 405H</td>
<td>Honors: RAIK Research Studio I</td>
</tr>
<tr>
<td>RAIK 406H</td>
<td>Honors: RAIK Research Studio II</td>
</tr>
<tr>
<td>RAIK 453H</td>
<td>Honors: User Interfaces</td>
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**Data Pipeline**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>CSCE 411</td>
<td>Data Modeling for Systems Development</td>
</tr>
<tr>
<td>CSCE 413</td>
<td>Database Systems</td>
</tr>
<tr>
<td>CSCE 436</td>
<td>Advanced Embedded Systems</td>
</tr>
<tr>
<td>CSCE 438</td>
<td>Internet of Things</td>
</tr>
<tr>
<td>CSCE 458</td>
<td>Molecular and Nanoscale Communication</td>
</tr>
<tr>
<td>CSCE 463</td>
<td>Data and Network Security</td>
</tr>
<tr>
<td>CSCE 465</td>
<td>Wireless Communication Networks</td>
</tr>
<tr>
<td>STAT 251</td>
<td>Statistical Computing I: Data Wrangling</td>
</tr>
<tr>
<td>STAT 351</td>
<td>Statistical Computing II: Data Management and Visualization</td>
</tr>
</tbody>
</table>

**Mathematical Modeling**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>MATH 208</td>
<td>Calculus III</td>
</tr>
<tr>
<td>MATH 221</td>
<td>Differential Equations</td>
</tr>
<tr>
<td>MATH 415</td>
<td>Theory of Linear Transformations</td>
</tr>
<tr>
<td>MATH 424</td>
<td>Introduction to Partial Differential Equations</td>
</tr>
</tbody>
</table>
MATH 428  Principles of Operations Research
MATH 433  Nonlinear Optimization
MATH 440 / CSCE 440  Numerical Analysis I
MATH 447  Numerical Methods for Applied Math
MATH 450  Combinatorics
MATH 452  Graph Theory
MATH 471  Introduction to Topology
MATH 487  Probability Theory
MATH 489  Stochastic Processes

Statistical Modeling
PLAS 420  Bioinformatics Applications in Agriculture
STAT 212  Principles of Study Design
STAT 301  Mathematical Statistics and Modeling I
STAT 302  Mathematical Statistics and Modeling II
STAT 325  Statistical Collaboration I
STAT 412  Advanced Statistical Design
STAT 414  Introduction to Survey Sampling
STAT 432  Introduction to Spatial Statistics
STAT 443  Statistical Analysis of Genomics Data
STAT 450  Introduction to Regression Analysis
STAT 462  Introduction to Mathematical Statistics I: Distribution Theory
STAT 463  Introduction to Mathematical Statistics II: Statistical Inference
STAT 464  Model Selection and Prediction
STAT 474  Introduction to Nonparametric Statistics
STAT 475  Introduction to Categorical Data Analysis
STAT 478  Introduction to Time Series Analysis
STAT 486  Introduction to Bayesian Analysis

Applied Computing: Journalism and Humanities
ADPR 358  UX/UI Design
HIST 461  Geospatial Approaches in Digital Humanities and Social Sciences
HIST 470  Digital History
JOUR 307  Data Journalism
JOUR 407  Data Visualization
NSST 376  Analysis for the National Security Establishment
SPMC 350  Sports Data Visualization and Analytics

Applied Computing: Sociology
SOCI 310A  Applied Sociology: Community-based Research I
SOCI 310B  Applied Sociology: Community-based Research II
SOCI 333  Applied Research in Public Opinion
SOCI 362  Ethics and the Responsible Conduct of Research
SOCI 407  Strategies of Social Research: Qualitative Methods
SOCI 430  Advanced Social Network Analysis
SOCI 465  Survey Design and Analysis

Applied Computing: Natural Resources
AECN 401  Advanced Farm Management and Linear Programming
AECN 436  Commodity Price Forecasting
AGST 433  Equipment and Tractor Testing
NRES 218  Introduction to Geospatial Technologies
NRES 415  GIS for Agriculture and Natural Resources
NRES 418 / GEOG 418  Introduction to Remote Sensing
PLAS 420  Bioinformatics Applications in Agriculture
PLAS 431 / AGEN 431 / AGST 431  Site-specific Crop Management

Credit Hours Subtotal: 15

Additional Major Requirements

Grade Rules
C- and D Grades
A grade of C or above is required for all courses in the major.

Pass/No Pass
No course taken Pass/No Pass will be counted toward the major, unless offered exclusively with a grade option of Pass/No Pass.