***Twin Cities Campus***

# Statistical Science B.S.

*Statistics, School of*

**College of Liberal Arts**

- Program Type: Baccalaureate
- Requirements for this program are current for Spring 2021
- Required credits to graduate with this degree: 120
- Required credits within the major: 64 to 69
- Degree: Bachelor of Science

Statistics is the science of learning from data, measuring, controlling, and communicating uncertainty. It provides the navigation essential for controlling the course of scientific and societal advances.

The statistical science BS degree is designed to help prepare students for graduate programs in statistics or careers as statisticians. It shares a core sequence of applied statistics courses with the statistical practice BA program, but requires more mathematics. This program allows students the flexibility to take additional advanced mathematics courses that are expected for admission to many graduate programs.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Admission Requirements

Students must complete 1 courses before admission to the program.

For information about University of Minnesota admission requirements, visit the Office of Admissions website.

**Required prerequisites**

**Preparatory Course**

Take exactly 1 course(s) totaling 3 - 4 credit(s) from the following:

- STAT 3011 - Introduction to Statistical Analysis [MATH] (4.0 cr)
  *or* STAT 3021 - Introduction to Probability and Statistics (3.0 cr)

## General Requirements

All students are required to complete general University and college requirements including writing and liberal education courses. For more information about University-wide requirements, see the liberal education requirements.Required courses for the major or minor in which a student receives a D grade (with or without plus or minus) do not count toward the major or minor (including transfer courses).

## Program Requirements

Students may earn no more than one degree from the statistics program: a BA or a BS or a minor.

At least 17 upper-division credits in the major must be taken at the University of Minnesota Twin Cities campus.

All incoming CLA freshmen must complete the First-Year Experience course sequence.

All students must complete a capstone in at least one CLA major. The requirements for double majors completing the capstone in a different CLA major will be clearly stated. Students must also complete all major requirements in both majors to allow the additional capstone to be waived. Students completing an additional degree must complete the Capstone in each degree area.

**Foundation Courses**

Take 5 - 6 course(s) totaling 20 - 24 credit(s) from the following:

**Calculus**

Take exactly 3 course(s) totaling exactly 12 credit(s) from the following:

- MATH 1271 - Calculus I [MATH] (4.0 cr)
  *or* MATH 1371 - CSE Calculus I [MATH] (4.0 cr)
  *or* MATH 1571H - Honors Calculus I [MATH] (4.0 cr)
- MATH 1272 - Calculus II (4.0 cr)
  *or* MATH 1372 - CSE Calculus II (4.0 cr)

© 2005 by the Regents of the University of Minnesota
The University of Minnesota is an equal opportunity educator and employer.

*or* MATH 1572H - Honors Calculus II (4.0 cr)
•MATH 2263 - Multivariable Calculus (4.0 cr)
*or* MATH 2374 - CSE Multivariable Calculus and Vector Analysis (4.0 cr)
*or* MATH 2573H - Honors Calculus III (4.0 cr)

**•Linear Algebra**

Choose one of the following options. Students planning to minor in mathematics should take Option 2.
Take 1 - 2 course(s) totaling 4 - 8 credit(s) from the following:

**Option 1**

MATH 2142 - Elementary Linear Algebra (4.0 cr)
*or* CSCI 2033 - Elementary Computational Linear Algebra (4.0 cr)

*or* **Option 2**

MATH 2243 - Linear Algebra and Differential Equations (4.0 cr)
MATH 4242 - Applied Linear Algebra (4.0 cr)

*or* **Option 3**

MATH 2373 - CSE Linear Algebra and Differential Equations (4.0 cr)
MATH 4242 - Applied Linear Algebra (4.0 cr)

**•Programming for Statisticians**

Take exactly 1 course(s) totaling exactly 4 credit(s) from the following:
•CSCI 1113 - Introduction to C/C++ Programming for Scientists and Engineers (4.0 cr)
*or* CSCI 2021 - Machine Architecture and Organization (4.0 cr)

**Core Courses**

Take exactly 7 course(s) totaling exactly 28 credit(s) from the following:

**Statistics**

Take exactly 6 course(s) totaling exactly 24 credit(s) from the following:
•STAT 3032 - Regression and Correlated Data (4.0 cr)
•STAT 3701 - Introduction to Statistical Computing (4.0 cr)
•STAT 4051 - Statistical Machine Learning I (4.0 cr)
•STAT 4052 - Statistical Machine Learning II (4.0 cr)
•STAT 5101 - Theory of Statistics I (4.0 cr)
*or* MATH 5651 - Basic Theory of Probability and Statistics (4.0 cr)
•STAT 5102 - Theory of Statistics II (4.0 cr)

**•Technical Writing**

Take exactly 1 course(s) totaling exactly 4 credit(s) from the following:
•WRIT 3562W - Technical and Professional Writing [WI] (4.0 cr)

**Electives**

Students planning to pursue a minor in mathematics or an advanced degree in statistics or biostatistics should consult the undergraduate advisor for suggested coursework.
Take 10 or more credit(s) from the following:

**STAT Electives**

Take 4 or more credit(s) from the following:
•STAT 3896 *{Inactive}*(1.0 - 4.0 cr)
•STAT 5201 - Sampling Methodology in Finite Populations (3.0 cr)
•STAT 5303 - Designing Experiments (4.0 cr)
•STAT 5401 - Applied Multivariate Methods (3.0 cr)
•STAT 5421 - Analysis of Categorical Data (3.0 cr)
•STAT 5511 - Time Series Analysis (3.0 cr)
•STAT 5601 - Nonparametric Methods (3.0 cr)
•STAT 5931 - Topics in Statistics (3.0 cr)

**•Other Electives**

Take at most 6 credit(s) from the following:
•CSCI 2011 - Discrete Structures of Computer Science (4.0 cr)
•CSCI 2011H - Honors Discrete Structures of Computer Science (4.0 cr)
•CSCI 2021 - Machine Architecture and Organization (4.0 cr)
•CSCI 2041 - Advanced Programming Principles (4.0 cr)
•CSCI 3003 - Introduction to Computing in Biology (3.0 cr)
•CSCI 3081W - Program Design and Development [WI] (4.0 cr)
•CSCI 4011 - Formal Languages and Automata Theory (4.0 cr)
•CSCI 4041 - Algorithms and Data Structures (4.0 cr)
•CSCI 4061 - Introduction to Operating Systems (4.0 cr)
•CSCI 4131 - Internet Programming (3.0 cr)
•CSCI 4211 - Introduction to Computer Networks (3.0 cr)
•CSCI 4511W - Introduction to Artificial Intelligence [WI] (4.0 cr)
•CSCI 4611 - Programming Interactive Computer Graphics and Games (3.0 cr)
•CSCI 4707 - Practice of Database Systems (3.0 cr)

© 2005 by the Regents of the University of Minnesota
The University of Minnesota is an equal opportunity educator and employer.

- CSCI 4950 - Senior Software Project (3.0 cr)
- CSCI 4970W - Advanced Project Laboratory [WI] (3.0 cr)
- CSCI 5103 - Operating Systems (3.0 cr)
- CSCI 5105 - Introduction to Distributed Systems (3.0 cr)
- CSCI 5106 - Programming Languages (3.0 cr)
- CSCI 5115 - User Interface Design, Implementation and Evaluation (3.0 cr)
- CSCI 5117 - Developing the Interactive Web (3.0 cr)
- CSCI 5125 - Collaborative and Social Computing (3.0 cr)
- CSCI 5143 - Real-Time and Embedded Systems (3.0 cr)
- CSCI 5161 - Introduction to Compilers (3.0 cr)
- CSCI 5211 - Data Communications and Computer Networks (3.0 cr)
- CSCI 5221 - Foundations of Advanced Networking (3.0 cr)
- CSCI 5231 *{Inactive}*(3.0 cr)
- CSCI 5271 - Introduction to Computer Security (3.0 cr)
- CSCI 5302 - Analysis of Numerical Algorithms (3.0 cr)
- CSCI 5304 - Computational Aspects of Matrix Theory (3.0 cr)
- CSCI 5421 - Advanced Algorithms and Data Structures (3.0 cr)
- CSCI 5451 - Introduction to Parallel Computing: Architectures, Algorithms, and Programming (3.0 cr)
- CSCI 5461 - Functional Genomics, Systems Biology, and Bioinformatics (3.0 cr)
- CSCI 5471 - Modern Cryptography (3.0 cr)
- CSCI 5481 - Computational Techniques for Genomics (3.0 cr)
- CSCI 5511 - Artificial Intelligence I (3.0 cr)
- CSCI 5512 - Artificial Intelligence II (3.0 cr)
- CSCI 5521 - Machine Learning Fundamentals (3.0 cr)
- CSCI 5523 - Introduction to Data Mining (3.0 cr)
- CSCI 5525 - Machine Learning: Analysis and Methods (3.0 cr)
- CSCI 5551 - Introduction to Intelligent Robotic Systems (3.0 cr)
- CSCI 5552 - Sensing and Estimation in Robotics (3.0 cr)
- CSCI 5561 - Computer Vision (3.0 cr)
- CSCI 5607 - Fundamentals of Computer Graphics 1 (3.0 cr)
- CSCI 5608 - Fundamentals of Computer Graphics II (3.0 cr)
- CSCI 5609 - Visualization (3.0 cr)
- CSCI 5611 - Animation & Planning in Games (3.0 cr)
- CSCI 5707 - Principles of Database Systems (3.0 cr)
- CSCI 5708 - Architecture and Implementation of Database Management Systems (3.0 cr)
- CSCI 5715 - From GPS, Google Maps, and Uber to Spatial Data Science (3.0 cr)
- CSCI 5801 - Software Engineering I (3.0 cr)
- CSCI 5802 - Software Engineering II (3.0 cr)
- ECON 3101 - Intermediate Microeconomics (4.0 cr)
- ECON 3102 - Intermediate Macroeconomics (4.0 cr)
- ECON 4113 *{Inactive}*(4.0 cr)
- ECON 4401 *{Inactive}*[GP] (3.0 cr)
- ECON 4431W - International Trade [GP, WI] (3.0 cr)
- ECON 4531 - Labor Economics (3.0 cr)
- ECON 4631 - Industrial Organization and Antitrust Policy (3.0 cr)
- ECON 4721 - Money and Banking (3.0 cr)
- ECON 4731 *{Inactive}*(3.0 cr)
- ECON 4751 - Financial Economics (3.0 cr)
- ECON 4758 - Advanced Financial Economics (4.0 cr)
- ECON 4831 - Cost-Benefit Analysis (3.0 cr)
- MATH 2283 *{Inactive}*(3.0 cr)
- MATH 3283W - Sequences, Series, and Foundations: Writing Intensive [WI] (4.0 cr)
- MATH 4065 - Theory of Interest (4.0 cr)
- MATH 4067W - Actuarial Mathematics in Practice [WI] (3.0 cr)
- MATH 4151 *{Inactive}*(3.0 cr)
- MATH 4152 - Elementary Mathematical Logic (3.0 cr)
- MATH 4281 - Introduction to Modern Algebra (4.0 cr)
- MATH 4428 - Mathematical Modeling (4.0 cr)
- MATH 4512 - Differential Equations with Applications (3.0 cr)
- MATH 4567 - Applied Fourier Analysis (4.0 cr)
- MATH 4603 - Advanced Calculus I (4.0 cr)
- MATH 4604 - Advanced Calculus II (4.0 cr)
- MATH 4707 - Introduction to Combinatorics and Graph Theory (4.0 cr)
- MATH 5067 - Actuarial Mathematics I (4.0 cr)
- MATH 5068 - Actuarial Mathematics II (4.0 cr)
- MATH 5075 - Mathematics of Options, Futures, and Derivative Securities I (4.0 cr)

© 2005 by the Regents of the University of Minnesota
The University of Minnesota is an equal opportunity educator and employer.
Information current as of March 28, 2024

- MATH 5076 - Mathematics of Options, Futures, and Derivative Securities II (4.0 cr)
- MATH 5165 - Mathematical Logic I (4.0 cr)
- MATH 5248 - Cryptology and Number Theory (4.0 cr)
- MATH 5251 - Error-Correcting Codes, Finite Fields, Algebraic Curves (4.0 cr)
- MATH 5285H - Honors: Fundamental Structures of Algebra I (4.0 cr)
- MATH 5286H - Honors: Fundamental Structures of Algebra II (4.0 cr)
- MATH 5335 - Geometry I (4.0 cr)
- MATH 5345H - Honors: Introduction to Topology (4.0 cr)
- MATH 5378 - Differential Geometry (4.0 cr)
- MATH 5385 - Introduction to Computational Algebraic Geometry (4.0 cr)
- MATH 5445 - Mathematical Analysis of Biological Networks (4.0 cr)
- MATH 5447 - Theoretical Neuroscience (4.0 cr)
- MATH 5467 - Introduction to the Mathematics of Image and Data Analysis (4.0 cr)
- MATH 5485 - Introduction to Numerical Methods I (4.0 cr)
- MATH 5486 - Introduction To Numerical Methods II (4.0 cr)
- MATH 5525 - Introduction to Ordinary Differential Equations (4.0 cr)
- MATH 5535 - Dynamical Systems and Chaos (4.0 cr)
- MATH 5583 - Complex Analysis (4.0 cr)
- MATH 5587 - Elementary Partial Differential Equations I (4.0 cr)
- MATH 5588 - Elementary Partial Differential Equations II (4.0 cr)
- MATH 5615H - Honors: Introduction to Analysis I (4.0 cr)
- MATH 5616H - Honors: Introduction to Analysis II (4.0 cr)
- MATH 5652 - Introduction to Stochastic Processes (4.0 cr)
- MATH 5654 - Prediction and Filtering (4.0 cr)
- MATH 5705 - Enumerative Combinatorics (4.0 cr)
- MATH 5707 - Graph Theory and Non-enumerative Combinatorics (4.0 cr)
- MATH 5711 - Linear Programming and Combinatorial Optimization (4.0 cr)
- PUBH 3415 - Introduction to Clinical Trials - Online (3.0 cr)
- PUBH 6420 - Introduction to SAS Programming (1.0 cr)
- PUBH 6431 - Topics in Hierarchical Bayesian Analysis (1.0 cr)
- PUBH 6432 - Biostatistical Methods in Translational and Clinical Research (1.0 cr)
- PUBH 6470 *{Inactive}*(3.0 cr)
- PUBH 7415 - Introduction to Clinical Trials (3.0 cr)
- CSCI 4203 - Computer Architecture (4.0 cr)
  *or* EE 4363 - Computer Architecture and Machine Organization (4.0 cr)
- CSCI 5204 - Advanced Computer Architecture (3.0 cr)
  *or* EE 5364 - Advanced Computer Architecture (3.0 cr)

**Capstone: Consultation and Communication for Statisticians**

The capstone is a course that focuses on how to interact and collaborate as a statistician on a multidisciplinary team. Students will learn about all aspects of statistical consulting by performing an actual consultation. This includes understanding the needs of the researcher or client, designing a study to investigate the client's needs, and communicating study results in a manner that a non-statistician can understand.

Take exactly 1 course(s) totaling exactly 3 credit(s) from the following:

Students who double major and choose to complete the capstone requirement in their other major are still required to take the Statistics BS capstone.

- STAT 4893W - Consultation and Communication for Statisticians [WI] (3.0 cr)

**Upper Division Writing Intensive within the major**

Students are required to take one upper division writing intensive course within the major. If that requirement has not been satisfied within the core major requirements, students must choose one course from the following list. Some of these courses may also fulfill other major requirements.

Take 0 - 1 course(s) from the following:

- STAT 4893W - Consultation and Communication for Statisticians [WI] (3.0 cr)

© 2005 by the Regents of the University of Minnesota
The University of Minnesota is an equal opportunity educator and employer.