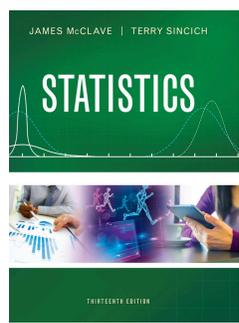


STAT 110: Fundamentals of Statistics  
Spring 2026

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**Text (Optional):**

<p><b>Text:</b> The official text for the course is Statistics 13th Edition by J. McClave and T. Sincich.</p>	
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**Notes:**

This course consists of a comprehensive set of notes. You are required to participate daily in class by completing your set of notes. You are responsible for completing notes for class periods for which you are absent. I may collect these notes on occasion to confirm your active participation in your learning.

**Quizzes:**

There will be several quizzes (10-12 is my target) given throughout the semester. Each quiz will be worth 20 points. These quizzes will contain a combination of True/False questions, multiple choice questions, and/or short answer questions. About half of the quizzes will be done in groups with the remaining being individual quizzes. I will not announce the type (individual or group) beforehand. The lowest two quizzes [if total number of quizzes is less than 10, then only the lowest quiz] will be dropped and will not be considered in your final grade. There is no makeup for missed quizzes.

**Exams:**

There will be three in-class exams given in this course. I will test your ability to make conclusions and/or extensions to current methods. The lowest of the three in-class exams will be weighted at 50%. If you know you are going to miss an exam, the exam must be taken early. Makeup exams will be given in *extreme* (my judgment) cases only.

**Grades:**

Your grade will be determined by your performance on exams and quizzes. My target for the number of points is: three in-class exams will be worth 250 points and quizzes will be worth about 200 points. In the end, I do no weighting in calculating your grade; so, every point is worth the same in this class. Your final grade will be determined using the following percentages.

Your Percentage	Grade
Greater than 90%	A
80-90%	B
70-80%	C
60-70%	D
60% or less	F

**Extras:**

- I encourage you to use a 3-ring binder for this class because class material will be a combination of note taking and handouts.
- Attendance is mandatory. If you miss class, it is your responsibility to get the material and get yourself caught up.
- If necessary, I reserve the right to make policy changes for this course as the course progresses.

**Academic Integrity Policy:**

The Academic Integrity Policy at Winona State University can be found at: <http://www.winona.edu/sld/academicintegrity.asp> Copying another student's work and/or allowing someone to copy your work are clear violations of WSU's Academic Integrity Policy. If there is reasonable evidence of copying another individual's or group's work, it will be construed as an act of plagiarism. The first occurrence of cheating will result in a score of zero on that specific homework assignment or exam portion; the second occurrence will result in failure of the course.

## **General Education Requirement - Goal 4:**

The purpose of General Education Requirement – Goal 4 is to increase students' knowledge about mathematical and logical modes of thinking. This will enable students to appreciate the breadth of applications of mathematics, evaluate arguments, and detect fallacious reasoning. Students will learn to apply mathematics, logic, and/or statistics to help them make decisions in their lives and careers. Minnesota's public higher education systems have agreed that developmental mathematics includes the first three years of a high school mathematics sequence through intermediate algebra.

**Student Competencies for Goal 4:** Students will be able to:

- Illustrate historical and contemporary applications of mathematical/logical systems
- Clearly express mathematical/logical ideas in writing
- Explain what constitutes a valid mathematical/logical argument (proof)
- Apply higher-order problem-solving and/or modeling strategies

Aside from the Goal 4 competencies list above, the Department of Mathematics and Statistics have the following additional learning outcomes for the Stat 110 course.

- use logical reasoning by studying mathematical patterns and relationships;
- use mathematical models to describe real-world phenomena and to solve real-world problems - as well as
- understand the limitations of models in making predictions and drawing conclusions;
- organize data, communicate the essential features of the data, and interpret the data in a meaningful way;
- do a critical analysis of scientific and other research;
- extract correct information from tables and common graphical displays, such as line graphs, scatter plots, histograms, and frequency tables;
- use appropriate technology to describe and solve quantitative problems.

The following is the official course outline for this course. My goal is to cover most of these topics, but not necessarily in the order given.

## OUTLINE OF MAJOR CONTENT AREAS

1. The Research Process
  - a. The research question/hypothesis and the predictor, response, and population of interest
  - b. The role of random samples; population vs. sample
  - c. Types of studies
    - i. experiments and the role of randomization
    - ii. observational studies and effects of confounding
    - iii. surveys and possible biases
2. Data Displays and Summary Statistics
  - a. Categorical variables
    - i. bar charts
    - ii. frequency distributions
  - b. For numeric variables
    - i. measure of central tendency: mean/average, median
    - ii. measures of variation: variance, standard deviation, interquartile range
    - iii. robustness
    - iv. histograms and boxplots
  - c. Contingency tables
    - i. row/column percentages
    - ii. relative risk, difference between proportions, and odds ratios
    - iii. relationships in  $r \times c$  tables
  - d. Scatterplots
    - i. measures of correlation
    - ii. simple linear regression
3. Introduction to Sampling Distributions
  - a. Statistics vs. parameters
  - b. Sampling errors
  - c. The importance of random samples
4. Confidence Interval Estimation
  - a. One-sample confidence intervals
    - i. Inference about a single proportion
    - ii. Inference about a single mean
  - b. Two-sample confidence intervals
    - i. Inference about a difference between two proportions
    - ii. Inference about relative risks
    - iii. Inference about a difference between means
  - c. Paired-sample confidence interval, involving inference about a mean difference

5. Hypothesis Testing
  - a. Logic of hypothesis tests
  - b. Formulating hypotheses
  - c. P-values, type I & type II errors
  - d. Interpretation of results
    - i. association vs. causation
    - ii. description of a sample vs. inference about a population
    - iii. statistical vs. practical significance
6. Comparative Analysis
  - a. Independent samples
    - i. difference between proportions
    - ii. difference between means
    - iii. Mann-Whitney-Wilcoxon Test
  - b. Paired-sample tests
    - i. paired-sample t-test
    - ii. Wilcoxon signed-rank test
  - c. Tests for contingency tables
    - i. Fisher's Exact Test for 2x2 tables
    - ii. Chi-square test