# STAT 216, Introduction to Statistics

# Fall 2025 and or Spring 2026

**Credits: 3**

**Course Start/End Date: August 28, 2025 – Jan 23, 2026 OR January 26,2026- June 9, 2026**

**Course Location/Days/Times: Capital High School M-F**

**Required Textbook(s):** Elementary Statistics Picturing the World, Larson and Farber, 6th Edition, 978-0-321-91121-6

## INSTRUCTOR INFORMATION

**Instructor Name** and preferred title: Mrs. Hollee Goody

**Phone Number:** 406-324-2575

**E-mail Address: hgoody@helenaschools.org**

**Website: chs.helenaschools.org/teachers/hgoody**

**Office Hours/Availability to Students: 7:45-8:20 am 11:10-noon**

**Helena College contact:** Stephanie Hunthausen, Executive Director of CTE & Dual Enrollment, Stephanie.Hunthausen@helenacollege.edu

## COURSE CONTENT

**Course Description:** This course teaches a basic introduction to the fundamental concepts and methods of statistics. Topics include: frequency distributions, measures of central tendency, measures of dispersion, fundamentals of probability, binomial distribution, estimation, confidence intervals and hypothesis testing for normal distributions, correlation and simple linear regression.

### **Course Learning Outcomes:**

1. Explores and interpret bias of statistical sampling methods and presented results.
2. Organize data into frequency distributions and histograms.
3. Interpret data in tabular and graphical formats such as pie charts, stem-and-leaf plots, box blots, histograms, frequency distributions, etc.
4. Summarize numerical data using measures of center; mean, median, mode, and measures of dispersion; range, standard deviation, quartiles.
5. Apply counting techniques to construe the randomness and probability of an event.
6. Identify the attributes of the binomial probability distribution for discrete variables.
7. Calculate the mean and standard deviation for a binomial probability distribution.
8. Investigate continuous variables, including the Standard Normal and Normal distributions; z-scores, proportions, percentiles, etc.
9. Compute and interpret population parameter estimate such as best point estimates and confidence intervals for proportion, mean, and variance.
10. Perform and interpret hypothesis tests of population parameters including type I and II errors.
11. Calculate and interpret the correlation coefficient.
12. Write and apply the equation of a linear regression line.

### **Program/Gen Ed Core Outcomes addressed by this course:**

Solve quantitative problems and interpret solutions.

**Institutional Competencies addressed by this course**:

[ ]  ***Diversity***: The student will learn to recognize and value individual, group and cultural differences from and within local, national and global perspectives and contexts.

[ ]  Critically examine the cultural, historical, social, economic, and/or political circumstances that produce and shape different social/cultural systems and communities either nationally and/or globally.

[ ]  Identify processes by which identities and notions of difference are constructed, reinforced, change over time.

[ ]  Examine how power structures, oppressions, and privilege shape the conditions of one or more underrepresented groups as well as various strategies and tools for empowerment, equity, social justice, and inclusion.

[ ]  ***Information Literacy****:* The student will learn to locate needed information, managing and evaluating the extracted information and using it critically and ethically.

[ ]  Pursue critical inquiry by using authentic questions, curiosity, and a willingness to challenge previously held beliefs in order to make new discoveries.

[ ]  Demonstrate persistence, flexibility, and patience in a strategic search for information, while recognizing that it may vary greatly in format, perspective, and value.

[ ]  Evaluate content among varied and conflicting perspectives in order to identify authoritative sources.

[ ]  Participate actively in scholarly or professional conversation by properly citing past research and accurately representing creators’ intended meaning.

[x]  ***Technology Literacy:*** The student will use appropriate technology to access, manage, integrate, or create information, and/or use technology to effectively accomplish a given task.

[ ]  Internet and email: web search, web navigation, send and receive email, email attachments, security, messaging

[ ]  Operating system operations: locating and executing programs, booting, login, updates

[ ]  File management: navigation in OS, create files, folders, copy, delete, rename and upload files, Zip and unzip files, access Flash drive

[ ]  Word processing software basics

[ ]  Presentation software basics

[ ]  Spread Sheet software basics

### **Course Schedule/Topical Outline:**

***Course schedule is subject to change based on the needs of the course.***

**Introduction to Statistics**

* Definitions: population, sample, parameter, statistic, branches
* Data Classification: type and level
* Experimental Design and Sampling Techniques

**Descriptive Statistics**

* Frequency Distribution, midpoints, relative and cumulative frequencies and their graphs
* Stem and leaf plot, dot plot, pie chart, pareto chart, and scatter plot
* Measures of central tendency, weighted mean and mean of grouped data, shape of distributions
* Measures of Variation, empirical rule, Chebychev’s theorem, standard deviation of grouped data
* Measures of position

**Probability**

* Probability experiments, types of probability, properties of probability
* Conditional probability, independent and dependent events, multiplication rule
* Mutually exclusive events, addition rule
* Fundamental counting principle, permutations, combinations

**Discrete Probability Distributions**

* Random Variables, discrete probability distributions, mean, variance and standard deviation, expected value
* Binomial Distributions
* Geometric and Poisson distributions

**Normal Probability Distributions**

* Properties of normal distribution, normal curves and probability
* Z-scores, standard normal distribution and table
* Comparing normal distribution, probability and normal distribution
* Sampling distributions, central limit theorem
* Approximating binomial distribution and probabilities, correction for continuity

**Confidence Interval**

* Confidence intervals for the mean (large samples), minimum sample size
* Confidence intervals for the mean (small samples), t-distribution, choosing normal of t-distribution
* Confidence intervals for a population proportion, minimum sample size
* Confidence intervals for variance and standard deviation, chi-square distribution

**Hypothesis Testing with One Sample**

* Introduction to hypothesis testing: stating hypothesis, types of error and level of significance, statistical tests and rejection regions, making and interpreting decision, strategies for testing
* Testing for the Mean (large samples) critical values in normal distribution, the z-Test fro a mean, using P-values for a z-Test
* Testing for the Mean (small samples), critical values in t-Distribution, the t-Test for a mean, using p-values with t-Tests
* Hypothesis testing for Proportions
* Hypothesis testing for variance and standard deviation, critical values and chi-square test

**Students will be able to use the following charts:**

* Binomial Distribution Chart
* Poisson Distribution Chart
* Standard Normal Table
* t-Distribution Chart
* Chi-Square Distribution

**Critical Dates:** Quizzes and test every Friday Final Project due June 4th

***Course schedule and critical dates are subject to change based on the needs of the course.***

### **Grade Calculation Procedure:**

### **Grading Scale:**

Letter grades for the course will be assigned based on the following percentages:

|  |  |  |
| --- | --- | --- |
|  | A (94-100%) | A- (90-93.9%) |
| B+ (87-89.9%) | B (83-86.9%)  | B- (80-82.9%) |
| C+ (77-79.9%) | C (73-76.9%) | C- (70-72.9%) |
| D+ (67-69.9%) | D (63-66.9%) | D- (60-62.9%) |
|  | F (0-59.9%) |  |

(Post additional grading information/expectations here, e.g. *I will round-up to whole number, so an 89.45 will round up to an 89.5, which rounds up to a 90 A-.*)

Total points

Homework 5 points

In Class activities 16-30 points

Quizzes 50 points

Tests 100 Points

Final Exam is 20% of total grade will consist of a written portion 100 points and a final project 200 points

**Instructor’s Educational Philosophy**

Students and faculty each have responsibility for maintaining an appropriate learning environment. Those who fail to adhere to such behavioral standards may be subject to discipline in accordance with Helena College’s Student Code of Conduct. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences including, but not limited to race, ethnicity, nationality, culture, religion, politics, veterans status, sexual orientation, gender, gender identity/expression, age, or disability. Class rosters include students’ legal names, but I will gladly honor your request to address you by an alternate name or preferred gender pronoun.

***Official Helena College attendance/excused absence, course withdrawal, incomplete grade, and grade appeal policies and procedures are located in the Academic Information section of the 2019-2020 catalog on the Helena College website. (****This statement must be included in the syllabus.)*

## Additional Resources/Information:

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| --- | --- |
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### **Official (Email) Communication:**

The College provides each student with a free email account that is to be used in all communication with college personnel. Official notifications will be sent to students through this account, as well.

### **Academic Dishonesty Definition/Policy Statement:**

Helena College expects its students to adhere to a high standard of academic integrity. It is a violation of academic integrity standards and the student code of conduct to present the ideas, designs, works, or words of another person as one’s own efforts, or to permit another person to do so. The following guidelines are intended to clarify these issues for students, faculty, and administration.

The College will regard the following acts as violations of academic integrity constituting academic dishonesty. Although the list and descriptions are not intended to be exhaustive of all types or instances of academic dishonesty, they are presented as examples of behavior to avoid. It is explicitly the student’s responsibility to avoid academic dishonesty of all kinds, and each student is required to seek guidance in advance of taking any questionable action, including but not limited to those enumerated, below.

**Plagiarism:** A student will be considered in violation of standards for academic integrity if they submit an assignment in any form (written, oral, graphic, or computer-generated, etc.) which consists wholly or partially of the words, work, or ideas of another individual without giving the original author proper credit. A similar violation would occur in cases where a student submits a paper or other project/assignment for one course that was originally created for another course even if that student was the originator of the paper/project/assignment in the first instance. Similarly, using facts, figures, graphs, charts or information without acknowledging the source constitutes plagiarism, which may occur verbally, in written form, through computer programs and files, research methods, designs, particular distinctive words or phrases, ideas and images or any other information that was created by another person without acknowledgement of that person’s role in its creation. Inadvertent or unintentional misuse or appropriation of another’s work (such as relying heavily on source material that is not expressly acknowledged) is still considered plagiarism.

**Copying/Cheating:** A student will be considered in violation of academic integrity standards if they gain, or attempts to gain, credit for work by dishonest or deceptive means. Examples include the use of crib notes, cheat sheets, books, or any other material or electronic device as aids in an examination or any other graded exercise, unless the instructor of the class has given explicit permission to use such materials. Collaboration with another student on an examination or other graded exercise, unless the instructor has given permission, also constitutes copying. It is the policy of the College to prohibit phones, smart watches, and other similar devices during examinations. Prior to administering an examination, instructors will require all such devices are turned off and stored in an inaccessible place. Failure to comply with this policy will constitute a violation of the academic integrity policy. If a student is found in possession of such a device during an examination, they will be assigned a score of 0 for the examination. Further examples include: copying assignments from another source (classmate, etc.); working with others on exams or homework that is not explicitly permitted by the instructor to be collaborative; looking at another student’s paper or screen during an exam or assignment; disclosing exam content to others during an exam, or after completion of an exam, including allowing such information to be disclosed to you; and/or attempting to or allowing another person to complete assignments for another person (such as in an online course). The above examples are meant to illustrate violations of the principle of academic integrity and are not intended to be all-inclusive. Additional instances of dishonesty that are not explicitly identified in the above list will nevertheless be treated as violations.

**Contributing to Academic Dishonesty:** A student will be considered in violation of academic integrity standards if they willfully assist another student in an act of academic dishonesty. Academic dishonesty will not be tolerated. Academic sanctions for a first violation are at the discretion of the instructor and range from a failing grade for the assignment to a failing grade in the course in which the academic dishonesty occurs. When a faculty member assigns a failing grade on the basis of academic dishonesty, they shall notify the affected student(s), the appropriate unit administrator (Director or Division Chair), as well as the Associate Dean of Academic & Student Affairs of the violation and provide any and all supporting documentation to the Associate Dean of Academic & Student Affairs. Record of the infraction will be kept on file in the office of the Associate Dean of Academic & Student Affairs, although no further official action will be taken unless/until a second infraction is reported. In cases of repeated offenses, the Associate Dean of Academic & Student Affairs will administer a range of disciplinary sanctions up to and including expulsion from the College. Students retain their right to due process and may refer to the Student Handbook or the Associate Dean of Academic & Student Affairs regarding any disciplinary sanctions.

### **Disclaimer Regarding Changes to Syllabus:**

This syllabus is subject to change as deemed necessary by the instructor to fulfill the changing needs of the class.