

Lassen Community College Course Outline

STAT C1000 Introduction to Statistics

3.0 Units

I. Course Description

This course is an introduction to statistical thinking and processes, including methods and concepts for discovery and decision-making using data. Topics include descriptive statistics; probability and sampling distributions; statistical inference; correlation and linear regression; analysis of variance, chi-squared, and t-tests; and application of technology for statistical analysis including the interpretation of the relevance of the statistical findings. Students apply methods and processes to applications using data from a broad range of disciplines. This course has been approved for online, hybrid and correspondence delivery.

Prerequisite(s): Placement as determined by the college's multiple measures assessment process or completion of a course taught at or above the level of intermediate algebra.

Prerequisite Skills:

1. Solve rational equations and inequalities. Simplify rational expressions.
2. Simplify expressions using order of operations.
3. Determine the equation of a straight line and calculate the dependent variable's value given the independent variable's value.
4. Solve radical equations and inequalities. Simplify radical expressions.
5. Transform nonlinear functions into linear functions.
6. Manipulate and solve exponential functions.
7. Formulate strategies and choose the necessary information to solve applied problems.

Additional Course Information

- Cal-GETC GE Area: 2
- Local Area: 2
- C-ID Math 110
- 51 Hours Lecture, 102 Expected Outside Class Hours, 153 Total Student Learning Hours
- Scheduled: Fall, Spring, Summer

II. Coding Information

Repeatability: Not repeatable, take one time

Grading Option: Graded or Pass/No Pass

Credit Type: Credit - Degree Applicable

TOP Code : 170100

SAM Code :

III. Course Objectives

A. Objectives/Outcomes

At the conclusion of this course, the student should be able to:

1. Assess how data were collected and recognize how data collection affects what conclusions can be drawn from the data.
2. Identify appropriate graphs and summary statistics for variables and relationships between them and correctly interpret information from graphs and summary statistics.
3. Describe and apply probability concepts and distributions.
4. Demonstrate an understanding of, and ability to use, basic ideas of statistical processes, including hypothesis tests and confidence interval estimation.
5. Identify appropriate statistical techniques and use technology-based statistical analysis to describe, interpret, and communicate results.
6. Evaluate ethical issues in statistical practice.

B. Other Objectives

Upon completion of this course the student will be able to:

1. Interpret data displayed in tables and graphically.
2. Apply concepts of sample space and probability.
3. Calculate measures of central tendency and variation for a given data set.
4. Identify the standard methods of obtaining data and identify advantages and disadvantages of each.
5. Calculate the mean and variance of a discrete distribution.
6. Calculate probabilities using normal and student's t-distributions.
7. Distinguish the difference between sample and population distributions and analyze the role played by the Central Limit Theorem.
8. Construct and interpret confidence intervals.
9. Determine and interpret levels of statistical significance including p-values.
10. Interpret the output of a technology-based statistical analysis.
11. Identify the basic concept of hypothesis testing including Type I and II errors.
12. Formulate hypothesis tests involving samples from one and two populations.
13. Select the appropriate technique for testing a hypothesis and interpret the result.
14. Use regression lines and ANOVA for estimation and inference and interpret the associated statistics.

Use appropriate statistical techniques to analyze and interpret applications based on data from at least four of the following disciplines: business, economics, social science, psychology, political science, administration of justice, life science, physical science, health science, information technology, and

C. Course Student Learning Outcomes

Upon completion of this course the student will be able to:

1. Calculate and interpret measures of center and measurements of dispersion for given data.
2. Find probabilities for applications involving normal random variables.
3. Construct and interpret a confidence interval; formulate decisions on hypotheses based on data/information provided.
15. education.

IV. Course Content

A. Required Topics

1. Introduction to statistical thinking and processes
2. Technology-based statistical analysis
3. Applications using data from four or more of the following disciplines: administration of justice, business, economics, education, health science, information technology, life science, physical science, political science, psychology, and social science
4. Units (subjects/cases) and variables in a data set, including multivariable data sets
5. Categorical and quantitative variables
6. Sampling methods, concerns, and limitations, including bias and random variability
7. Observational studies and experiments
8. Data summaries, visualizations, and descriptive statistics
9. Probability concepts
10. Probability distributions (e.g., binomial, normal)
11. Sampling distributions and the Central Limit Theorem
12. Estimation and confidence intervals
13. Hypothesis testing, including t-tests for one and two populations, Chi-squared test(s), and ANOVA; and interpretations of results
14. Regression, including correlation and linear regression equations

B. Other Topics

1. Summarizing data graphically and numerically
2. Descriptive statistics: measurement, measures of central tendency, and variation. Sample spaces and probability
3. Random variables and expected value
4. Sampling and sampling distributions
5. Discrete distributions – Binomial
6. Continuous distributions – Normal
7. The Central Limit Theorem
8. Estimation and confidence intervals
9. Hypothesis Testing and inference, including t-tests for one and two populations, and Chi-square test
10. Correlation, regression lines, and analysis of variance (ANOVA)
11. Applications using data from at least four of the following disciplines: business, economics, social science, psychology, political science, administration of justice, life science, physical science, health science, information technology, and education.
12. Technology based statistical analysis.

V. Assignments

A. Writing Assignments

1. Prepare for class and review material and concepts presented in class.
2. Complete homework assignments, including applications of representative symbol systems and/or work problems.
3. Understand and apply the theories and techniques taught in class.

B. Expected Outside Assignments

1. Students expected to spend a minimum of 2 hours outside of class in practice and preparation for each hour of class.
2. Assignments may include: reading the text, application of formulas and theorems, practice problems from the text, and assignments in the math lab.

C. Specific Assignments that Demonstrate Critical Thinking

1. Students will be required to interpret mathematical principles and techniques to solve a variety of problems, including those that demand the application of principles in a number of different context. Multiple measures of student performance including in- class, out-of-class work, multiple exams, and final exam.
2. Lecture notes, links to sample speeches and resources, evaluations of speeches, and use of online assignments. Online assignments may include posting to class learning module, participating in discussions (pairs, small group, or entire class), submitting assignments online, and completion of online quizzes.

VI. Methods of Evaluation

Examples of potential methods of evaluation used to observe or measure students' achievement of course outcomes and objectives could include but are not limited to quizzes, exams, laboratory work, field journals, projects, research demonstrations, etc. Methods of evaluation are at the discretion of local faculty. List general evaluation methods (i.e., mixed format exams, participation, written essays, oral and listening exams).

Traditional Evaluation

Term paper (topic choice, thesis statement, outline, bibliography, rough draft, final draft), homework, classroom discussion, essay, journals, lab demonstrations and activities, multiple choice quizzes, and participation.

Correspondence Evaluation

Same as face to face with the exception of the desired use of proctored exams and exclusion of participation in classroom activities. Students will be expected to complete assignments and activities equivalent to in-class assignments and activities. Written correspondence and a minimum of six opportunities for feedback will be utilized to maintain effective communication between instructor and student.

Hybrid Evaluation

Quizzes and exams could be administered in person and/ or online. Students will be expected to complete online assignments and activities equivalent to in class assignments and activities for the online portion of the course. Electronic communication, both synchronous and asynchronous (chat/forum) will be evaluated for participation and to maintain effective communication between instructor and students.

Online Evaluation

A variety of methods will be used, such as: research papers, asynchronous and synchronous (chat/forum) discussions, online quizzes and exams, posting to online website and email communications using the districts approved learning management system.

VII. Methods of Delivery

- Traditional Classroom Delivery
- Correspondence Delivery
- Hybrid Delivery
- Online Delivery

Traditional Classroom Delivery

Lecture and selected audio-visual materials

Correspondence Delivery

Assigned readings, instructor-generated typed handouts, typed lecture materials, exercises and assignments equal to face to face instructional delivery. Written correspondence and a minimum of six opportunities for feedback will be utilized to maintain effective communication between instructor and student.

Hybrid Delivery

A combination of traditional classroom and online instruction will be utilized. Each semester a minimum of 17 hours, or 1/3 of the instruction hours, will be taught face-to face by the instructor and the remaining hours will be instructed online through the technology platform adopted by the District. Traditional class instruction could consist of exercises/assignments, lectures, visual aids, practice exercises, exams and quizzes. Online delivery could consist of exercises/assignments, lecture posts, discussions, exams and quizzes, adding extra resources and other media sources as appropriate.

Online Delivery

Assigned readings, online-delivered instructor-generated written activities, lecture material, exercises, and assignments. Web-links to relevant websites and exercises may be used to supplement instructor-generated lecture material. Student and instructor participation in forum-based discussions. Electronic communication and a minimum of six opportunities for feedback will be utilized to maintain effective communication between instructor and student.

VIII. Representative Texts and Supplies

A. LCC Required Texts:

Illowsky & Dean, Introductory Statistics 2e, 2022, Open Stax. Hardcover: ISBN-13: 978-1-711472-57-7 Paperback: ISBN-13: 978-1-711472-58-4 Digital: ISBN-13: 978-1-961584-32-7 [Free Introductory Statistics 2e Textbook for Download - OpenStax] Students may download the eTextbook or get a printed book for a nominal fee via LCC's bookstore or the OpenStax Website for Statistics 2e at the following URL:

<https://openstax.org/details/books/introductory-statistics-2e>

B. Other Optional Texts:

1. Introduction to Modern Statistics 2e, Çetinkaya-Runde, M., Hardin, J., OpenIntro, 2024 (\$0- 25): <https://www.openintro.org/book/ims/>
2. Statistics: Learning From Data 3e, Peck, R., Case, C., Cengage, 2024 (\$57-250): <https://www.cengage.com/c/new-edition/9780357758298/>

3. Introductory Statistics: Exploring the World Through Data 4e, Gould, R., Wong, R., Ryan, C., Pearson, 2025 (\$65-80): <https://www.pearson.com/en-us/subject-catalog/p/introductorystatistics/P200000011641/9780138242145>
4. Introductory Statistics 2e, Illowsky, B., Dean, S., OpenStax, 2023 (\$0): <https://openstax.org/details/books/introductory-statistics-2e>
5. Introductory Statistics: Analyzing Data with Purpose, The Dana Center Mathematics Pathways, Charles A. Dana Center, University of Texas at Austin, 2021 (\$0): <https://www.utdanacenter.org/products/introductory-statistics>

IX. Course Status

1. Current Status: Active
2. Original Approval Date: 6/18/1990
3. Course Originator:
4. Board Approval Date: 10/08/2024
5. Chancellor's Office Approval Date: 12/11/2024
6. Revised By:
7. Curriculum/Academic Standards Committee Revision Date: 09/17/2024