STAT-C1000: INTRODUCTION TO STATISTICS

Also listed as: STAT-C1000H

Effective Term
Fall 2025

BOT Approval Date
11/14/2024

Discipline
STAT - Statistics
Course Number
C1000

Course Title
Introduction to Statistics

Short Title
Intro to Statistics

Credit Status (CB 04)
D - Credit - Degree applicable

Units

Lecture Units
3.00

Total Units
3.00

Hours

Lecture Contact Hours
48-54
Out of Class Hours Lecture
96-108

Total Contact Hours
48 - 54

Total Out of Class Hours
96 - 108

Total Student Learning Hours
144 - 162

Distance Education
Yes

Distance Education

Distance Education Type
Both Fully Online and Hybrid Online

Does the DE also apply to the Honors section?
Yes

Honors component will meet synchronously (face-to-face or moderated through online technology such as Zoom)

Fully Online Delivery Requirements:
a. Students must be notified via the college schedule of classes and the syllabus for the class if proctored tests are required for this course
b. Any planned face-to-face meetings, such as an orientation or study session, must be optional
c. The MSJC curriculum committee requires the use of accessible, asynchronous discussion as a component of every fully online course

Are you using publisher content?
Yes

Link to VPAT
https://www.myopenmath.com/course/showlinkedtextpublic.php?cid=10962&id=420137

Attach VPAT
MyOpenMath VPAT.pdf

Regular Substantive Interaction
Instructor-to-student, student-to-student, and student-to-content contact shall be distributed in a manner that will ensure regular substantive interaction (RSI) is maintained not only weekly but also for the duration of the course. Instructor interactions should be equivalent in time, quality and consistency to the engagement students would receive in a face-to-face course—for example, through announcements, discussion participation, personalized feedback, video messages, or other instructional communications. Instructors are expected to be responsive to student inquiries within a 24-72 hour time frame excluding holidays. RSI will be maintained through a variety of methods: • Orientation - Students must be oriented to the online and face-to-face portions at the start of the course. • Announcements - Announcements using the course management system must be posted at least weekly to keep students current on course events, due dates, materials, etc. • Discussion Forums - Content-related discussion forums within the designated CMS will include appropriate instructor participation and will be initiated and maintained, with timely feedback provided. Instructors are required to monitor the discussions and related activities to provide guidance and direction. Open-ended discussion boards may be used to further learning and interaction. • MSJC Communication – Instructor will use MSJC-administered communication tools (such as email or the designated CMS communication tools) to regularly communicate with and provide ease of access to students. • Timely Feedback - Timely feedback on student work will be provided by the instructor, which may include comments and/or rubrics, within the Grades area of the designated CMS. • Scheduled Meetings – Hybrid and synchronous courses will meet at regularly scheduled times. ADA Compliance - All course interactions and content must be designed with accessibility in mind and meet ADA requirements.

Honors / Non-honors
STAT-C1000H
C-ID (Admin Only)

C-ID MATH 110

CB 00

CCC000633957

Course Title

Introduction to Statistics - Honors

Approved Cal-GETC Area

AREA-2

Approved Second Cal-GETC Area

Approved Third Cal-GETC Area

C-ID (Admin Only)
C-ID MATH 110

Catalog 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.

Requisites

Prerequisite(s)

Prerequisite(s) (must be taken before)
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.

Codes

TOP Code (CB 03)

1701.00 - Mathematics, General

CIP Code

27.0101 - Mathematics, General.

Repeatability Code

No

Grading Option

Letter grade OR P/NP

GE Information

Check GE Types Requested

AA/AS G - Math Competency

Cal-GETC Areas

Approved Cal-GETC Area

AREA-2

Learning Objectives

Learning Objectives

Learning Objective
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.
7. Utilize the appropriate statistical methods to analyze real-world applications that are culturally relevant and accentuate diversity and inclusion.

Honors Objectives

The goal of the course is to promote additional critical thinking, emphasize development of advanced analytical skills and facilitate discussions of course content beyond that provided in the main course. Students will be provided with broader intellectual experience and by the end of the course will be able to:

- Identify the issues surrounding the planning of a scientific survey or designed experiment.
- Design a statistical study or an experiment to collect data and conduct a statistical analysis.
- Write and present the results of their own research as well as analyze and question the results of their peers' research.

Learning Outcome Information

Course Learning Outcomes

Learning Outcome
1. Students will analyze the world around them through questioning and problem posing.
2. Students will learn how to take responsible risks.
3. Students will understand, write, and communicate information symbolically, visually, and numerically with clarity and precision.

Program Learning Outcomes

Learning Outcome
1. Students will develop problem-solving and scientific and technological modeling skills to solve mathematical problems. They will be able to reflect on their own thoughts, question and propose problems, and apply past knowledge to new situations.
2. Students will develop the ability to think critically, independently, as well as interdependently, express ideas concisely, and reason logically.
3. Students will be able to synthesize ideas and apply mathematical reasoning and logic to relevant real-world applications.
4. Students will be able to understand, write, and communicate mathematical information symbolically, visually, and numerically with clarity and precision.
5. Students will be able to refine understanding of mathematical concepts by discussion and explanation with other students from different kinds of backgrounds, including different socioeconomic backgrounds, different cultures, different ethnic backgrounds, as well as at-risk students.

Institutional Learning Outcomes

Communication: The student will effectively express and exchange ideas through listening, speaking, reading, writing, visual works, and other modes of interpersonal expression.
Critical Thinking: The student will analyze problems, gather and synthesize relevant information, evaluate ideas, information, and evaluate alternative points of view to create, innovate and implement effective solutions.
Cultural Awareness and Humility: The student will demonstrate knowledge of and sensitivity toward individuals of diverse ethnicity, age, gender, sexual orientation, and religious affiliations, as well as toward those individuals with diverse abilities and socio-economic classes to respectfully interact with individuals of diverse perspectives, beliefs and values while being mindful of the limitation of their own cultural frameworks.
Information and Technology Literacy: The student will access, interpret, evaluate, and apply relevant information sources and digital media effectively, and in an ethical and legal manner.
Scientific Awareness: The student will apply the scientific method of inquiry to assess potential solutions for real-life challenges by employing science-based knowledge and methodologies in daily life.

Content

Course Lecture Content

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, personal finance, 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

Honors Content

The topics covered in the honors section are the same as those covered in the main course. However, the honors students will be provided the opportunity to delve into topics of their interest with greater depth and rigor. The honors students may be asked to design and perform all the stages of a statistical study using the population of their interest. The stages will include the collection of data, providing visual and numerical summaries, constructing confidence intervals to estimate population parameters, and testing statistical claims about the parameters of the population of their interest. As their culminating experience the students may be asked to write and present the results of their research to the class via multimedia presentation. For example, honors students may enquire about the differences in acceptance rates to UC and CSU for various minoritized populations.

Methods of Instruction

Method

Observation and Demonstration

Integration

Demonstrations using statistical software may be used to promote the use of probabilistic and statistical models in applications. Demonstrations may be used to promote analytical skills such as understanding and interpreting the results of a statistical study. For example, a simulation of a binomial experiment can be used to illustrate the Law of Large Numbers.

DE Adaptations for MOI

Demonstrations can be adapted using built-in features of a course management system (CMS). For example, an activity can be recorded by the instructor or a link to an online resource can be shared via CMS. All material will meet accessibility requirements.

Method

Discussion

Integration

Discussions (student-to-student) may be used for students to interact with their peers to share their interpretations of the content. Discussion (instructor-to-students) may also be used for students to interact with the instructor to clarify concepts. For example, a discussion can be used for students to determine whether a given sampling technique produces a biased sample or not; at the same time, the discussion can be used by the instructor as an opportunity to explain the concept and facilitate the discussion through the lens of diversity and inclusion.

DE Adaptations for MOI

Using accessible tools, discussions can be adapted via online communication service or using built-in features of a course management system. For example, student to student interactions can be facilitated using thematic discussion boards, peer review, and group assignments. Student to instructor discussions can be facilitated via email or within the comment section of assignment submission.

Method

Activity

Integration

Group activities may be used to develop a deeper understanding of topics and provide opportunities for collaboration while centering student voices. For example, groups of students can suggest ideas for an appropriate sampling technique when performing an experiment that explores a culturally relevant phenomenon.

DE Adaptations for MOI

Group activities can be adapted using built-in features of a course management system (CMS). For example, group activities can be facilitated via threaded discussions. Collaborations can be promoted by creating groups within the CMS. Instructions to group activities will meet accessibility requirements.

Method

Lecture

Integration

Lectures may be used to introduce the course material and explain concepts and relationships between concepts. Lectures may also be used to demonstrate the techniques for solving problems. For example, a lecture can be used to explain the purpose, components, and construction of confidence intervals.

DE Adaptations for MOI

Lectures can be adapted to a course management system to be delivered synchronously or asynchronously. For example, videos can be recorded by the instructor and embedded to a course page and lecture notes can be added utilizing a content editor. All material will meet accessibility requirements.

Method

Observation and Demonstration

Integration

Multimedia demonstrations may be used in class to explore, build, and strengthen the connections between concepts. For example, a visualization of a large number of confidence intervals to demonstrate the meaning of the confidence level and the interpretation of the interval as an estimate of the population parameter.

DE Adaptations for MOI

Multimedia demonstrations can be delivered within a course management system (CMS) by embedding applets, providing links to online resources, sharing recorded video or slide presentation. All material will meet accessibility requirements.

Additional Methods of Instruction for Honors

Students will be required to meet regularly with the instructor individually or in groups. To build rapport and to promote the community of practice it is recommended that the meetings occur regularly and at least monthly. The meetings can be used to develop and discuss the progress of the students' projects as well as to improve the understanding of the course content or to introduce new honors content. Students may be required to summarize and present the results of their projects via multimedia demonstration at the end of the term to the instructor, the honors section and/or the entire class. In DE course, the meetings will be held remotely using built-in features of a course management system (CMS).

Methods of Evaluation

Method

Homework

Integration

Homework may be used to measure the students’ advancement through the course content and learning objectives. For example, to assess student’s preparedness for confidence intervals, the homework on probabilities and critical values for normal variables can be used. Homework will be evaluated based on completeness and correctness and feedback will be delivered within a timely manner.

DE Adaptations for MOE

The homework will be assigned, submitted, and graded through the course management system (CMS). For example, a link to a third-party publisher’s content may be provided or the entire assignment can be embedded on CMS. Feedback will be delivered within a timely manner using the comment section or within an accompanying rubric. The instructions and the assignments will meet accessibility requirements.

Method

Class Participation

Integration

Class participation in the form of group discussions or in-class activities may be used by the instructor to determine whether students are comprehending the material and to evaluate the students' ability to apply their knowledge of the learning objectives. For example, before introducing a Binomial random variable, an instructor may hold a discussion on the topics of combinatorics and probability to evaluate the students' preparedness. The conversation will be facilitated through the lens of diversity and inclusion and participation will be evaluated based on the quality of responses.

DE Adaptations for MOE

Class participation is tracked through the CMS by keeping records of students' submissions of assignments, posting on discussion boards, and/or completed quizzes and exams.

Method

Exams/Tests

Integration

Tests may be used regularly by the instructor as a method of evaluation of students' comprehension of learning objectives. Instructor may choose the appropriate frequency, modality, and the format of the test. For example, the results of the midterm that covers the descriptive statistics can be used to evaluate the students' preparedness for the topics of inferential statistics. A comprehensive final examination will measure students' proficiency in the course learning objectives. The exams will be evaluated within a timely manner based on both correctness and completeness using a rubric established by the instructor.

DE Adaptations for MOE

Tests will be assigned, submitted, and graded through the course management system (CMS). For example, a link to a third-party publisher's content may be provided or the entire test can be embedded on CMS. Feedback can be delivered using the comment section or within an accompanying rubric. The instructions and the tests will meet accessibility requirements. Instructors may consider using online and real time proctoring services approved by the college.

Method

Projects

Integration

The instructor may use a group or individual project(s) to provide targeted feedback to enhance the students' understanding of learning objectives. For example, an instructor may ask students to create a survey about a culturally relevant phenomenon to check their understanding of different types of data. Projects will be evaluated in a timely manner based on both correctness and completeness.

DE Adaptations for MOE

Group or individual projects will be assigned and submitted through the course management system (CMS). Students can communicate with peers and the instructor through the discussion boards and inbox of the CMS. Students may be required to present their results through the creation of a slide presentation, a written report, or a live video conference and the presentations will then be made available to the entire class through the CMS. Feedback may be provided either through comments or within an accompanying rubric.

Method

Quizzes

Integration

The instructor may use quizzes periodically as a method of low-stakes evaluation of students' ability to apply their knowledge of learning objectives. For example, the results of the quiz on central limit theorem can be used to evaluate the students' preparedness for confidence intervals. Quizzes will be evaluated within a timely manner based on both correctness and completeness.

DE Adaptations for MOE

Quizzes will be assigned, submitted, and graded through the course management system (CMS). For example, a link to a third-party publisher's content may be provided or the entire quiz can be embedded on CMS. Feedback can be delivered using the comment section or within an accompanying rubric. The instructions and the quizzes will meet accessibility requirements. Instructors may consider using online and real time proctoring services approved by the college.

Evaluation of Honors assignments

The students' performance will be evaluated within a timely manner using a rubric established by the instructor and shared with the students. Projects will be assessed on the clarity of the research question, the appropriateness of the chosen study design, the mathematical accuracy of the involved computations, and the correctness of inference. Summary reports will be assessed based on the clarity of writing and overall organization of paper. Presentations will be evaluated based on lucidity and overall organization of the presentation. In DE course, the assignments will be assigned, submitted, and graded through the course management system (CMS).

Assignments

Assignment Type

Writing

In-class and/or outside of class

In-class

Formative or Summative

Summative

Assignment

A comprehensive final assessment:
1. Chad has surveyed their 30 classmates about the number of cars in their household and received the following data: {6,2,4,5,2,5,2,3,3,0,2,0,0,3,4,2,0,6,1,5,1,3,1,6,4,4,3,0,0,5} Construct the frequency and relative frequency distribution tables.
2. Find the mean, median, mode, range, and sample variance of the data: {9,12,5,11,12,12,14,11,8,7}.
3. For a binomial random variable X#B(n=8,p=0.3), find the probability P(X=6).
4. For a normal variable X#N(μ=80.2,σ=5.2), find the probability P(X<79.3).
5. For a variable that follows Student T-distribution with 35 degrees of freedom find the value that divides the area under the density curve into 0.05 to the right and 0.95 to the left.
6. According to a study about first-time college students, only 53% graduate from the institution where they begin their studies within six years. If a cohort of 17 first-time college students is randomly selected, find the probability that at least 10 of them will graduate from the institution where they began their studies within six years.
7. The final scores in an Introductory Statistics course are normally distributed with a mean of 73% and the standard deviation of 9%. Find the success rate in this class, i.e., find the proportion of the population that scored at least 70%.
8. According to historical data, 77% of 20-year-olds live until 65 years old. A random sample of size 47 was obtained. Find the probability that between 85% and 94% of the sample live until 65 years old.
9. A survey was conducted involving 45 low-income students who recently graduated from college. The average time that it took for students in the sample to graduate was 3.28 years with a sample standard deviation of 0.47 years. Construct and interpret a 90% confidence interval for the average time it takes the low-income students to graduate. Based on the interval estimate, is it reasonable to believe that the low-income students take more than 2.5 years to graduate? Explain.
10. In late March 2020, a research firm conducted a national poll of U.S. adults that asked their views on the federal COVID-19 economic stimulus package. The question was, "As you may know, Congress is considering a new economic stimulus package of at least 2 trillion dollars. Do you favor or oppose Congress passing this legislation?" Of those sampled, 53 out of 146 republicans and 89 out of 121 democrats favored the passage. At the 10% significance level, do the data provide sufficient evidence to conclude that the proportion of democrats that favor the passage is greater than the proportion of democrats that favor the passage?

How assignment will be adapted in online format

The assignment will be assigned, submitted, and graded through the course management system (CMS). For example, a link to a third-party publisher's content may be provided or the entire assignment can be embedded on CMS or student may be allowed to submit a scan of their work. The feedback can be delivered using the comment section or within an accompanying rubric through the CMS. The instructions and the assignments will meet accessibility requirements.

Assignment Type

Writing

In-class and/or outside of class

Outside of class

Formative or Summative

Summative

Assignment

Project Instructions:
Communities of people have shared the use of assets for thousands of years, but the advent of the Internet—and its use of big data—has made it easier for asset owners and those seeking to use those assets to find each other. This sort of dynamic can also be referred to as the shareconomy. Sharing economies allow individuals and groups to make money from underused assets such as parked cars and spare bedrooms. For example, car-sharing services like Uber and Lyft can help illustrate this idea. According to data provided by the Brookings Institute, private vehicles go unused for 95% of their lifetime so it can be very tempting to become a rideshare driver and earn an extra $$$. How much you make as a rideshare driver depends on where you live, which service you drive for, and how many hours you're willing to invest. According to Gridwise, the average ridesharing driver makes $17.25 an hour, ranging from $12.41 an hour in Miami to $23.15 an hour in San Jose, California. However, many drivers tend to overestimate their earnings and one of the reasons is that they forget about the car depreciation due to increased mileage. In this assignment, a student will approximate how much a rideshare driver loses an hour while driving at 40 mph. To do that please complete the following:
1. Pick a car make, model, and year (for example, 2015 Honda Civic LX) that we will assume is used for a rideshare service. It will make the experience more relatable if you pick a car make, model, and year of your car or of one that you are very familiar with.
Go to any website that sells cars (KBB, Craigslist, Autotrader, Yahoo!, Carmax, etc) and collect the data on at least 10 cars that match your criteria (note that all cars must have the same make, model, and year) in the nearby zipcode. As you collect the data, organize it in the table. Make sure your table has appropriate headers with units clearly labeled.
2. Transfer the data to Desmos Regression Calculator (Links to an external site.) or Microsoft Excel to perform the analysis. Plot a scatter plot with the line-of-best-fit. Find and interpret the slope and y-intercept for the equation and the determination coefficient.
3. Calculate the amount that the car depreciates per hour while driving at 40 mph.

How assignment will be adapted in online format

The problem will be assigned, submitted, and graded through the course management system (CMS). For example, the entire assignment can be embedded on CMS as a discussion. The feedback can be delivered using the comment section or within an accompanying rubric through the CMS. The instructions and the assignments will meet accessibility requirements.

Assignment Type

Other

In-class and/or outside of class

In-class
Outside of class

Formative or Summative

Formative

Assignment

Project Instructions:
There are two ways to collect data - sampling and experimenting. While learning how to design experiments is outside of the scope of this course, sampling via surveys is something that we can learn and practice in this course. As previously discussed, there are two main types of data - qualitative and quantitative. The quantitative data can be further divided into discrete and continuous. When talking about data we think of statistical variables, as a result, we can classify statistical variables in several types, e.g. categorical, discrete, continuous. For this assignment, please do the following:
1. Think of statistical variables of different types (categorical, discrete, continuous) that you would like to consider while studying the population of students in this college. For each statistical variable, provide the type, the name, the question that can be asked to collect data, the units (if applicable), and an example of a few values that you would anticipate from the survey.
2. Design a survey using FREE software such as Microsoft Forms, Google Forms, SurveyMonkey, JotForms, etc. To collect categorical data please use the "multiple-choice" or a similar alternative. To collect small discrete data please use the "star rating" or "drop-down" or a similar alternative. To collect large discrete data please use the "drop-down" or "text entry" or a similar alternative. To collect continuous data use "text entry" or a similar alternative.
3. Share the survey with the classmates and collect data.
4. Provide the summary of data and describe what you learned about your classmates in a few sentences.

How assignment will be adapted in online format

The problem will be assigned, submitted, and graded through the course management system (CMS). For example, the entire assignment can be embedded on CMS as a discussion or a group assignment. The feedback can be delivered using the comment section or within an accompanying rubric through the CMS. The instructions and the assignments will meet accessibility requirements.

Assignment Type

Reading

In-class and/or outside of class

In-class
Outside of class

Formative or Summative

Formative

Assignment

Discussion prompt:
Research and read about how Statistics is used in the field of your academic interest. For example, in education, statistics can be used in many ways - all colleges and universities collect data about their student population so they can understand their needs better and make decisions based on that. Alternatively, research and read about how Statistics is used to study some of the current culturally relevant phenomena. For example, statistics can be used to analyze the ethnic diversity of the population.

How assignment will be adapted in online format

The problem will be assigned, submitted, and graded through the course management system (CMS). For example, the entire assignment can be embedded on CMS as a discussion. The feedback can be delivered using the comment section or within an accompanying rubric through the CMS. The instructions and the assignments will meet accessibility requirements.

Honors Assignments

Assignment

Honors students will complete all regular course requirements for STAT-C1000 and be graded according to the requirements and criteria used for the rest of the class. In addition, Honors students will be expected to complete either Option A or Option B individually or in groups.

Option A:
1. Formulate a research question of interest to address norms and standard narratives and plan an observational study or design an experiment to collect evidence in favor of or against the claim.
2. Design and carry out an observational study or experiment to collect data and then perform a variety of tasks using statistical software to collect evidence to draw a conclusion in favor of or against the studied claim.
3. Compile a 4–6-page report summarizing the results of the statistical study in an acceptable format. The report will include the clearly formulated question of interest, the data collected, a variety of visual and numerical summaries along with the statistical procedures and conclusions answering the clearly formulated question of interest.
4. Present the results of a study in classroom or remotely to the instructor and peers in a formal academic setting via a 10–15-minute multimedia presentation.

For example, honors students may use the publicly available institutional research data at MSJC to compare the effects of the removal of remedial Math and English classes on the success rates of various minoritized populations.

Required or Optional

Required

Honors Core Values

Academic Rigor and Research
Engagement
Leadership
Positive Transgressive Behavior (as evidenced by creativity, innovation, risk taking, challenging norms and standard narratives)

Justify how the assignment reflects the Academic Rigor and Research Core Value

This assignment will encourage students to learn more about the process of authoring a research paper in an academic environment.

Justify how the assignment reflects the Engagement Core Value

This assignment will encourage student presenters to engage the audience regarding the topic of their interest and validate their results through a scholarly discussion.

Justify how the assignment reflects the Leadership Core Value

This assignment will provide students with an opportunity to lead a research effort by overseeing the entire process from start to finish. Also, it will give students an opportunity to address any issues encountered or anticipated while planning or executing the study.

Justify how the assignment reflects the Positive Transgressive Behavior Core Value

Students are encouraged to question norms and standard narratives and to use evidence-based methods to formulate their beliefs.

Assignment

Honors students will complete all regular course requirements for STAT-C1000 and be graded according to the requirements and criteria used for the rest of the class. In addition, Honors students will be expected to complete either Option A or Option B individually or in groups.

Option B:
1. Pick a peer-reviewed statistical study and identify the research question of interest (alternatively, formulate a research question of interest and then find a peer-reviewed study with the same or similar question), identify the study as observational study or designed experiment, analyze how the data was collected. Compile a 2–3-page report summarizing the results of the statistical study in an acceptable format.
2. Pick a peer-reviewed statistical study and identify the statistical claim, the validity of the methods for collecting data and the types of statistical tools used to analyze the claim. Compile a 2–3-page report providing a variety of visual and numerical summaries used in the statistical study.
3. Pick a peer-reviewed statistical study and analyze the results of the statistical study and evaluate the strength of evidence. Compile a 2–3-page report summarizing the statistical procedures and conclusions answering the clearly formulated question of interest.
4. Pick a peer-reviewed statistical study and present the results of the study in classroom or remotely to the instructor and peers in a formal academic setting via a 10–15-minute multimedia presentation.

For example, an article "Estrogen and alpha-fetoprotein levels in maternal and umbilical cord blood samples in relation to birth weight." can be used to study on the relationship between the estriol levels of pregnant women and the birth weights of their children. Reference: Nagata C, Iwasa S, Shiraki M, Shimizu H. Estrogen and alpha-fetoprotein levels in maternal and umbilical cord blood samples in relation to birth weight. Cancer Epidemiol Biomarkers Prev. 2006 Aug;15(8):1469-72. doi: 10.1158/1055-9965.EPI-06-0158. PMID: 16896034.

Required or Optional

Required

Honors Core Values

Academic Rigor and Research
Engagement
Leadership
Positive Transgressive Behavior (as evidenced by creativity, innovation, risk taking, challenging norms and standard narratives)

Justify how the assignment reflects the Academic Rigor and Research Core Value

This assignment will encourage students to learn more about the process of authoring a research paper in an academic environment.

Justify how the assignment reflects the Engagement Core Value

This assignment will encourage student presenters to engage the audience regarding the topic of their interest and validate their results through a scholarly discussion.

Justify how the assignment reflects the Leadership Core Value

This assignment will provide students with an opportunity to lead a research effort by overseeing the entire process from start to finish. Also, it will give students an opportunity to address any issues encountered or anticipated while planning or executing the study.

Justify how the assignment reflects the Positive Transgressive Behavior Core Value

Students are encouraged to question norms and standard narratives and to use evidence-based methods to formulate their beliefs.

Course Materials

Textbooks

Introduction to Modern Statistics 2e, Çetinkaya-Runde, M., Hardin, J., OpenIntro, 2024 ($0- 25): https://www.openintro.org/book/ims/

Statistics: Learning From Data 3e, Peck, R., Case, C., Cengage, 2024 ($57-250): https://www.cengage.com/c/new-edition/9780357758298/

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

Introductory Statistics 2e, Illowsky, B., Dean, S., OpenStax, 2023 ($0): https://openstax.org/details/books/introductory-statistics-2e

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

Other Resources

StatCrunch

Open Educational Resources

Introductory Statistics 2e, Illowsky, B., Dean, S., OpenStax, 2023 ($0):
https://openstax.org/details/books/introductory-statistics-2e
MyOpenMath

Class Size Information

Class Size

40

Class Size Category

A - Lecture/discussion 40

Diversity and Inclusion

Explain how diversity and inclusion(e.g., gender, culture/race, sexuality, etc.) is infused into the course.

In this course, students will learn a range of real-world applications. One of the objectives is to learn how to test hypotheses to compare parameters of two or more populations which is a major source of applications for highlighting and raising awareness of the current and historical issues. For example, a hypothesis testing can be used to study the wage gaps between the genders or wealth distribution inequality between different racial groups. Confidence intervals are another major source of applications to promote diversity and inclusion as it can be used to emphasize the similarities or highlight the differences between two or more populations. For example, confidence intervals can be used to estimate the time needed to graduate for students with diverse socioeconomic backgrounds.

Describe how assignments, instruction, evaluation, course content, and interactions are contextualized for diverse learners promoting an equitable course.

The course is designed to allow a variety of methods of instruction and assessments to better support diverse learners. The methods of instruction include demonstrations, group work, and lectures which altogether serve a variety of learning styles such as visual, verbal, physical, and logical. For example, when computing the confidence interval, multiple instructions will be provided depending on the resources available to the student, such as doing the problem by hand or with the use of technology. Also, an OER textbook was included which promotes equity by significantly lowering the cost of taking the course and removing additional barriers for learners. In addition, the class has been revised with the focus on accessibility and the assignments have been updated to provide students with the opportunity to reflect on their cultural frame of reference. The course offers many opportunities for students to connect their experiences with the terms and concepts presented in the course and to validate their life experience by seeing themselves in the material and research.

Interactions

Explain how the course will incorporate student-to-student interaction.

The course promotes student-to-student interaction by allowing and encouraging group projects and group discussions as methods of evaluation. Discussions may be used for students to interact with their peers to share their interpretations of the content and ask questions. Group activities may be used to develop a deeper understanding of topics and provide opportunities for collaboration while centering student voices. For example, students may be asked to survey their classmates and use the results to test a hypothesis.

Explain how the course will incorporate instructor-to-student interaction.

The instructor will introduce the course material, explain concepts and relationships between concepts, and demonstrate the techniques for solving problems. Instructor will grade the assignments according to the rubric and provide timely feedback on all assessments. For example, the instructor can moderate the discussion of the results of a statistical study on some controversial topic.

Explain how the course will incorporate student-to-content interaction.

The course promotes student-to-content interactions by allowing a variety of methods of instruction. In this course, students may be presented with the material in a variety of ways such as lectures, individual and group activities, visual and virtual demonstrations, and experiments. Students are encouraged and will have plenty of opportunities to interact and engage with the content whether it is a reading in a book or a visual simulation. For example, students can be asked to select and perform the correct statistical procedure for a given data set.

Explain how the course will incorporate student-to-self interaction (metacognitive).

This course incorporates metacognition by encouraging students to actively monitor and modify their thought processes. For example, after learning a variety of hypothesis testing procedures students may be asked to think about what strategies they are using to identify the appropriate procedure for the task.

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