

**I. COURSE DESCRIPTION:**

**STA 2023:** Statistics, 3 hours lecture, and 3 credits.

**Prerequisite:** Prerequisite: Successful completion of developmental courses, appropriate placement test scores or meet state exemption requirement.

(Offered fall, spring, and summer). In this course, students will utilize descriptive and inferential statistical methods in contextual situations, using technology as appropriate. The course is designed to increase problem-solving abilities and data interpretation through practical applications of statistical concepts. This course is appropriate for students in a wide range of disciplines and programs. A graphing calculator is required. The TI-83/84 are the only allowable calculators for test days. If a student wishes to use any other calculator, they must see their instructor in advance for approval. (The combination of STA2023 and STA2122 will not meet the six-hour math General Education requirement. An additional three hours in math will be required.)

**II. TEXT: *Elementary Statistics: Picturing the World*, Larson, 8th edition, 2023, Pearson.**

**OTHER MATERIALS:** A calculator (TI-83, TI-84 etc.) is required in the course. Students may be expected to use computers in the computer lab for the completion of projects.

**LEARNING MANAGEMENT SYSTEM:** Canvas is utilized for course materials and instructor course evaluations.

**III. STUDENT LEARNING OUTCOMES:**

1. Students will visualize and summarize data using descriptive statistics.
2. Students will apply basic probability concepts to draw reasonable conclusions.
3. Students will employ concepts of random variables, sampling distributions, and central limit theorem to analyze and interpret representations of data.
4. Students will choose an appropriate method of inferential statistics, including confidence intervals and hypothesis testing, to make broader decisions based on sample data.
5. Students will model linear relationships between quantitative variables using correlation and linear regression.

**IV. COURSE OUTLINE: See the attached daily schedule for a detailed outline.****V. ATTENDANCE-WITHDRAWAL-GRADE FORGIVENESS-ATTEMPTS:****A. Attendance Policy:**

Attendance in class is vital to your success and is positively correlated with your final grade.

Furthermore, attendance with participation is even more highly correlated with your final grade. Please ensure that you are present and participating at each class session. Attendance will be recorded each day and you are expected to attend. If you do not attend class for the first two weeks, you will be withdrawn for non-attendance. Absences of more than one-eighth the course (ie, at six absences in a standard 16-week three class per week semester) may result in withdrawal. **YOU MUST ATTEND ON EACH TEST OR EXAM DAY.**

**B. Withdrawal Policy:**

Two withdrawals are permitted per course. After that, a grade will be assigned. Please be concerned about withdrawals. When admitting students into certain programs, universities may calculate withdrawals as grades. There are two kinds of withdrawals-student and administrative.

**1. Student Withdrawal:** Students may withdraw from a course prior to the scheduled withdrawal deadline published in the college catalog. Students must log onto Lighthouse, go to the student tab, select Admissions Forms, then select Student Withdrawal Form, before the deadline.

**2. Administrative Withdrawal:** This withdrawal is completed by an instructor for excess absences.

Withdrawals initiated prior to the published withdrawal deadline will be recorded as "W". After the withdrawal deadline, a student cannot be withdrawn from the course and will receive a grade.

**C. Grade Forgiveness:**

A student may repeat a course when a grade of "D" or "F" has been earned. The last grade counts. However, universities may count forgiven grades in calculating the grade point average. Forgiven grades may also be calculated in determining financial aid eligibility.

**D. Attempts:**

This course, which is a college credit course, may be attempted three times. On the third attempt, 100% of the full cost of instruction will be charged. Students with major extenuating circumstances may submit a letter of appeal stating the circumstances to Counseling Center. All grades from the third and subsequent attempts will be calculated in the grade point average.

**VI. HOMEWORK:**

Homework will be assigned daily. The daily completion of all homework is essential for learning the material in the course and as preparation for the examinations.

**VII. TESTING:**

There will be four in-class tests for this course. Each test will be worth 20% of your final grade and cover material from the previous unit. At the end of the course, students will have the option to replace their lowest test score with a new test over that unit. This replacement test will not be returned. The remaining 20% of your grade will be formative assessments consisting of quizzes, review material, or graded in-class assignments. Students will not be allowed to leave a testing situation and come back at a later time to finish the test. Students will not be allowed to "retake" a unit test with the exception of the replacement test (in lieu of the final).

**VIII. GRADING:**

Each test and the formative average will count equally (so, for 4 unit tests and a formative average, each will be 20%). The college catalog will be used to convert the numerical average to a letter grade. The college grading scale is: A (100-90), B (89-80), C (79-70), D (69-60), and F (59-0)

**IX. MAKE UP WORK:**

**No** daily quizzes will be made up. If you miss a unit test and you have a valid excuse, you may use the replacement test (in lieu of the final) as the first missing unit test grade. If you miss more than one unit test, you may take a make-up test at the discretion of the instructor.

**X. ACCESSIBILITY STATEMENT:**

Gulf Coast State College supports an inclusive learning environment for all students. If there are aspects of the instruction or design of this course that hinder your full participation, reasonable accommodations can be arranged. Prior to receiving accommodations, you must register with Student Accessibility Resources. Appropriate academic accommodations will be determined based on the documented needs of the student. For information regarding the registration process, email [sar@gulfcoast.edu](mailto:sar@gulfcoast.edu) or call 850-747-3243.

**XI. TRIO**

**TRIO Student Support Services (SSS)** is a federally funded grant program which serves first generation students (neither parent has a 4-year bachelor degree), low-income students, and/or students with disabilities achieve their academic goals. Student success is at the center of everything we do in our program. We offer academic advising, 24/7 online tutoring in most subjects, textbook and computer/technology loans, transfer and cultural trips, assistance with financial aid applications and scholarships, career exploration and a dedicated computer lab and study area. All services are FREE to SSS program participants. Visit <https://www.gulfcoast.edu/current->

[students/trio/](#) to apply online or call (850) 913-2937 for more information. SSS is located in Student Union West rm89.

**XII. AVAILABLE HELP:**

**Studying requires discipline, tenacity, and hard work.** View this course as a job. Attendance is absolutely necessary, as well as attentiveness to detail and alertness. You must earn a “C” in this course in order to receive credit.

**1. Your Instructor**

Full time faculty have posted ten (10) hours per week on their schedule. Their offices are located in the Student Union West on the 2nd floor (SUW). Adjunct faculty are available for assistance 30 minutes before or after class. Students having difficulty are strongly encouraged to see the instructor for additional help.

**2. Specific Course Objectives**

Specific Course Objectives are available upon request. These objectives are posted on the Mathematics’ Web Site. Ask your instructor how to obtain a copy.

**3. Course Videos**

Course videos are available via Canvas from your instructor.

**4. Math Lab**

The Math Lab is available in room SUW 261 for tutoring during the week (see door for hours).

**XIII. PAPER CUT:**

The PaperCut print management client is installed in all computer labs. The PaperCut user web console is accessed through the MyGCSC portal. The logon is the first part of your student email address, everything before the @mygulfoast.edu. Students will be required to add money to their PaperCut accounts before they are able to print. Money can be added to student print accounts by cash, credit, or debit card. Cash is accepted at PaperCut kiosks located in the Library. Credit and debit card payments, minimum \$5.00, can be made through the “add credit” tab on the PaperCut user web console. Instructions for the use of PaperCut are located at <https://www.gulfoast.edu/administration-departments/information-technology-services/printing/>

**XIV. HB 233:**

In accordance with federal and state privacy laws, students may record class lectures for their own personal educational use, in connection with a complaint to the college, or as evidence in internal or external legal proceedings. Students may not publish or upload the recordings or any components thereof without the knowledge and written permission of the faculty member. Failure to obtain permission to publish could lead to the students’ having to pay damages, attorney fees, and court costs. For more information about what can be recorded, please see the guidelines on pages 36-38 in the GCSC Student <https://www.gulfoast.edu/current-students/documents/student-handbooks/2025-2026-student-handbook.pdf>.

**XV. USE OF ARTIFICIAL INTELLIGENCE (AI) TOOLS:**

Generative Artificial Intelligence Policy (AI): See the student handbook for further information. Students with questions about acceptable use should consult their instructor.

Prohibited Use of AI: The use of AI-generated content is strictly prohibited in all assignments, class work, and throughout all stages of the work process, such as brainstorming, outlining, or drafting. This includes, but is not limited to, tools such as ChatGPT, Copilot, and Grammarly’s AI function. Use of AI tools will be treated as a violation of academic integrity and may result in penalties, including a zero on the assignment and additional disciplinary actions as outlined in the college’s academic integrity policy.

**XVI. MATHEMATICS DIVISION POLICY ON AI**

The Math Division at GCSC discourages you from utilizing AI as a substantial source of your learning. You are expected to do your own work in this course and will be graded on your mastery of the material herein. Although AI can be an outside resource for problem solving, it may not be a reliable source. What is most important in a math course is that you personally learn the step-by-step processes that it takes to find solutions to problems, to analyze data sets, to create mathematical models, and to apply what you have learned, in theory or through formulas, to applications of mathematics found in real-life instances.

For graded assignments (tests or quizzes), you will not be allowed to use any AI tools, such as chatbots, text generators, paraphrasers, summarizers or solvers, to complete any part of your assignments. Using AI tools for graded assignments will be considered a form of academic dishonesty and could result in a grade of zero for the assignment and disciplinary action. If you have any questions about what constitutes acceptable uses of AI tools, inside or outside the classroom, please consult your instructor.

## CLASSROOM CONDUCT POLICY

In order to promote a learning environment, in which you as a student may receive the greatest consideration, we will do all we can to prevent unnecessary interruptions and class disruptions. To this end, it is the stated policy of the Division of Mathematics that disruptions, absolutely and unequivocally, will not be tolerated in the classrooms administered by this division. To this end, we remind you that the **instructors are obligated** to adhere strictly to the following policies:

1. Everyone is required to be in class on time.  
Anyone entering the classroom after the instructor has begun class is late and is a disruption to the class. The instructor must implement an appropriate policy to discourage late arrivals.
2. Disciplinary action in the case of cheating will be administered in accordance with college policy. Do not cheat. As stated in the college course catalog, "Honest participation in academic endeavors fosters an environment in which optimal learning can take place and is consistent with the college's mission. Academic misconduct, including cheating and plagiarism, is destructive to the spirit of an education environment and therefore cannot be condoned. See the Student Handbook for details on this policy.

The Student Handbook defines cheating to include, but not be limited to, unauthorized assistance in taking quizzes, tests, or examinations; dependence upon the aid of sources beyond those authorized by the instructor; the acquisition without permission of tests or other academic material belonging to (another student) or a member of the College's faculty. In the case of this course, cheating will result in you receiving a grade of F.

3. The student must have prior consent of the instructor before leaving the class early.  
If you must leave class early, notify the instructor before the beginning of class. We do not conduct "open" classrooms where individuals may arrive and exit at their discretion. This activity is disruptive to those trying to learn and will not be allowed. If you leave early without prior notification to the instructor, you will not be allowed back in the classroom without first obtaining permission from Mrs. Reynolds, Division of Mathematics Chair.
4. The instructor is not to allow talking or other distractions to occur at inappropriate times. **Use of electronic communication devices** (including, but not limited to, cell phones, Ipods, PDA's, MP3/Music players, Blackberries, etc) are allowed in the classroom only at the discretion of the instructor and must be used only as they directly relate to the class. Talking or other disruptive behavior (including ringing cell phones) are distractions to other students and have no place in a college environment. Students who engage in such behavior will be asked to stop. If the behavior continues, the student(s) will be asked to leave and confer with Mrs. Reynolds, Division of Mathematics Chair, concerning the nature of the behavior before being allowed back in the classroom. **NO** electronic devices will be allowed in the classroom on test days with the exception of an approved calculator.
5. **No food or drink is allowed in the classroom.**
6. Infractions of discipline may be handled by the instructor as final authority.  
The student has a right to appeal.

**COURSE SYLLABUS**  
**STUDENT LEARNING OUTCOMES**  
**STATISTICS**

1. Students will visualize and summarize data using descriptive statistics.
2. Students will apply basic probability concepts to draw reasonable conclusions.
3. Students will employ concepts of random variables, sampling distributions, and central limit theorem to analyze and interpret representations of data.
4. Students will choose an appropriate method of inferential statistics, including confidence intervals and hypothesis testing, to make broader decisions based on sample data.
5. Students will model linear relationships between quantitative variables using correlation and linear regression.

**1.1 An Overview of Statistics**

- a. The definition of statistics.
- b. Distinguish between a population and a sample.
- c. Distinguish between a parameter and a statistic.
- d. Distinguish between descriptive and inferential statistics.

**1.2 Data Classification**

- a. Distinguish between qualitative and quantitative data.
- b. Classify data as nominal, ordinal, interval, and ratio.

**1.3 Data Collection and Experimental Design**

- a. Design a statistical study.
- b. Collect data by doing an observational study, performing an experiment, using a simulation, or using a survey.
- c. Design an experiment.
- d. Create a sample.

**2.1 Frequency Distributions and Their Graphs**

- a. Construct a frequency distribution.
- b. Construct a frequency histogram.

**2.2 More Graphs and Displays**

- a. Graph and interpret quantitative data.
- b. Graph and interpret qualitative data.

**2.3 Measures of Central Tendency**

- a. Find the mean, median, and mode.
- b. Describe the shape of a distribution.

**2.4 Measures of Variation**

- a. Find the range, standard deviation, and variance.
- b. Use the Empirical Rule.
- c. Use Chebychev's Theorem.
- d. Approximate the sample standard deviation.

**2.5 Measures of Position**

- a. Find the first, second, and third quartiles as well as the interquartile range of a data set.
- b. Determine outliers.
- c. Construct box plots.
- d. Interpret percentiles.
- e. Find and interpret z-scores.

**3.1 Basic Concepts of Probability and Counting**

- a. Identify sample space and simple events.
- b. Use the Fundamental Counting Principle to find number of events.
- c. Distinguish between classical, empirical, and subjective probability.
- d. Find the probability of a complement of an event.
- e. Use a tree diagram to find probability.

**3.2 Conditional Probability and the Multiplication Rule**

- a. Find the probability of an event, given another event has occurred.
- b. Distinguish between independent and dependent events.
- c. Use the Multiplication Rule to find the probability of a sequence of events.
- d. Use the Multiplication Rule to find the probability of a conditional event.

**3.3 The Addition Rule**

- a. Determine if events are mutually exclusive.
- b. Use the Addition Rule to find the probability of two events.

**4.1 Probability Distributions**

- a. Distinguish between continuous and discrete random variables.
- b. Construct a discrete probability distribution.
- c. Determine if a probability distribution is valid.
- d. Find the mean, variance, and standard deviation of a discrete probability distribution.
- e. Find the expected value of a discrete probability distribution.

**4.2 Binomial Distributions**

- a. Determine if a probability experiment is a binomial experiment.
- b. Find binomial probabilities.
- c. Find the mean, variance and standard deviation of a binomial probability distribution.

**5.1 Introduction to Normal Distributions and the Standard Normal Distribution**

- a. Interpret normal distribution graphs.
- b. Find areas under the standard normal curve.

**5.2 Normal Distributions: Finding Probability**

- a. Find probabilities associated with normal distributions.

**5.3 Normal Distributions: Finding Values**

- a. Find values associated with normal distributions.
- b. Transform z-scores to x values.

**5.4 Sampling Distributions and the Central Limit Theorem**

- a. Find and verify sampling distributions.
- b. Interpret the Central Limit Theorem.
- c. Find probabilities using the Central Limit Theorem.

**6.1 Confidence Intervals for the Mean ( $\sigma$  Known)**

- a. Find a point estimate and margin of error.
- b. Construct and interpret confidence intervals when  $\sigma$  is known.
- c. Determine minimum sample size needed for a given margin of error.

**6.2 Confidence Intervals for the Mean ( $\sigma$  Unknown)**

- a. Interpret the t-distribution.
- b. Construct and interpret confidence intervals when  $\sigma$  is unknown.

**6.3 Confidence Intervals for Population Proportions**

- a. Find a point estimate and margin of error.
- b. Construct and interpret confidence intervals.
- c. Determine minimum sample size needed for a given margin of error.

**7.1 Introduction to Hypothesis Testing**

- a. State null and alternative hypotheses.
- b. Identify Type I and II errors.
- c. Identify one and two tailed tests.
- d. Interpret a decision based on statistical test results.

**7.2 Hypothesis Testing for the Mean ( $\sigma$  Known)**

- a. Find p-values.
- b. Find critical values.
- c. Perform z-tests for the mean.
- d. Determine whether to reject or fail to reject a hypothesis.

**7.3 Hypothesis Testing for the Mean ( $\sigma$  Unknown)**

- a. Find critical values on the t-distribution.
- b. Perform t-tests for the mean.
- c. Determine whether to reject or fail to reject a hypothesis.

**7.4 Hypothesis Testing for Proportions**

- a. Perform z-tests for the proportion.
- b. Determine whether to reject or fail to reject a hypothesis.

**8.1 Testing the Difference Between Means (Independent Samples with  $\sigma_1$  and  $\sigma_2$  Known)**

- a. Determine if samples are independent or dependent.
- b. Perform two sample z-tests for the difference between means.

**8.2 Testing the Difference Between Means (Independent Samples with  $\sigma_1$  and  $\sigma_2$  Unknown)**

- a. Perform two sample t-tests for the difference between means.

**8.3 Testing the Difference Between Means (Dependent Samples)**

- a. Perform t-tests on difference of paired data.

**8.4 Testing the Differences Between Proportions**

- a. Perform two sample z-tests for the difference between proportions.

**9.1 Correlation**

- a. Construct a scatterplot.
- b. Find a correlation coefficient.

**9.2 Linear Regressions**

- a. Find the equation of a regression line.
- b. Use regression line to predict values.

**11.1 The Sign Test**

- a. Use sign test to test claims about a population median.