

STA 115: Statistics

I. Basic Course Information

An introduction to descriptive statistics and statistical inference. STA 115 is worth one course unit and has two 80-minute meeting times each week. This course is intended for students who do not plan to take advanced statistics-based courses. Emphasis is placed on interpretation of results and their real-world consequences rather than calculation. STA 115 cannot be taken if STA 215 has already been successfully taken.

II. Learning Goals

This course introduces the students to statistical ideas and concepts with an emphasis on the interpretation of data and the communication of statistical results. Topics include sampling, surveys, experimental designs, observational studies, data exploration, chance phenomena, and methods of statistical inference.

On completion of the course, students will be able to:

- I. Recognize and apply the most appropriate probability sampling techniques in order to collect data from a population.
- II. Understand the basic principles of statistical design of experiments and critically evaluate claims based on statistical reasoning from survey and experimental results.
- III. Interpret and communicate statistical reasoning using basic statistical terms, descriptive statistics, and charts and graphs.
- IV. Recognize and evaluate the relationship between two quantitative variables through simple linear regression and correlation and be able to explain why correlation does not imply causation.
- V. Analyze and interpret relationships in two-way tables.
- VI. Understand the relationship between sample statistics and population parameters, determine appropriate point and confidence interval estimates of selected population parameters and interpret the estimates.
- VII. Describe basic principles of probability, including the application of the normal curve to social and physical phenomena.
- VIII. Understand the concept of statistical significance, including that it does not always imply practical significance.
- IX. Understand the concept of a hypothesis test and be able to describe the hypotheses, select the appropriate statistical test, determine the observed significance level (p-value), interpret the results, and draw appropriate conclusions.

III. Student Assessment

Students will receive regular feedback on their work through the assignment of homework, quizzes, student presentations and examinations. A common final exam will be used for this course. Through this feedback, students will be able to see and correct their misunderstandings and improve their performance. Student performance on these assessment instruments will be used to assess the success of STA 115 in achieving its learning goals and its contribution to the fulfillment of the goals of each student's program of study. Peer reviews and student evaluations will also be used to evaluate the course.

IV. Learning Activities

Learning activities will consist of lectures, projects, in-class group discussions and problem solving, online homework through Achieve, additional homework assignments utilizing spreadsheet software such as Excel or Google Sheets, group projects, and student presentations. The instructor has discretion in choosing the combination of methods they feel will be most effective but are encouraged to employ active learning practices. Projects that have been successful in this class include 1) designing, conducting, and analyzing a survey of TCNJ students or 2) finding and critiquing statistical statements in the popular media and presenting these to their classmates.

Approved 4-29-25