

Course Description

STA2023 | Statistical Methods | 3 credits

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. Student learning outcomes: students will visualize and summarize data using descriptive statistics; students will apply basic probability concepts to draw reasonable conclusions; students will employ concepts of random variables, sampling distributions, and central limit theorem to analyze and interpret representations of data; students will choose an appropriate method of inferential statistics, including confidence intervals and hypothesis testing, to make broader decisions based on sample data; and students will model linear relationships between quantitative variables using correlation and linear regression. Prerequisites: MAT 1033 or MGF 1131 with a grade of "C" or higher. Special Fee. Fulfills Gordon Rule Computational Requirement.

Course Competencies

Competency 1:

The student will demonstrate knowledge of terminology by:

- Defining statistical terms.

Learning Outcomes

- Communication

Competency 2:

The student will be able to describe, explore, and compare data by:

- Constructing and interpreting frequency tables and graphs such as bar graphs, pie charts, and stem and leaf plots.
- Computing and interpreting the measures of centrality: the mean, median, mode, and midrange.
- Computing and interpreting the measures of dispersion: The range, variance, and standard deviation.

Learning Outcomes

- Communication
- Critical thinking
- Information Literacy
- Numbers / Data
- Social Responsibility

Competency 3:

The student will be able to apply the measures of positions by:

- Computing z-scores.
- Applying the Empirical Rule to the Normal Distribution.
- Applying the Chebyshev's Rule to the Non-Normal (or unknown) Distributions.

Learning Outcomes

- Communication
- Critical thinking

- Information Literacy
- Numbers / Data
- Social Responsibility

Competency 4:

The student will be able to apply the counting principles by:

- Defining the Fundamental Counting Principle.
- Computing the possible outcomes of compound events.
- Computing Combinations and Permutations.

Learning Outcomes

- Communication
- Critical thinking
- Information Literacy
- Numbers / Data
- Social Responsibility

Competency 5:

The student will demonstrate knowledge of probability by:

- Describing a sample space and an event.
- Calculating probabilities of simple, compound, and conditional events.

Learning Outcomes

- Communication
- Critical thinking
- Information Literacy
- Numbers / Data
- Social Responsibility

Competency 6:

The student will demonstrate knowledge of random variables by:

- Distinguishing between discrete and continuous random variables.
- Constructing a probability distribution for a discrete random variable and be able to compute its mean and standard deviation.
- Computing probabilities for random variables having a binomial distribution.
- Computing probabilities for random variables having a normal distribution.
- Applying the Central Limit Theorem.
- Approximating the Binomial Probability using the Normal Distribution.

Learning Outcomes

- Communication
- Critical thinking
- Information Literacy
- Numbers / Data
- Social Responsibility

Competency 7:

The student will demonstrate knowledge of confidence intervals by:

- Constructing confidence intervals for the mean using the Z and t tables.
- Constructing confidence intervals for a proportion.
- Constructing confidence intervals for the difference of two means.

Learning Outcomes

- Communication
- Critical thinking
- Information Literacy
- Numbers / Data
- Social Responsibility

Competency 8:

The student will demonstrate knowledge of hypotheses testing by:

- Identifying Type I and Type II errors.
- Identifying and interpreting p-values.
- Testing a single mean for large and small samples.
- Testing the difference between two means.
- Testing a single proportion.

Learning Outcomes

- Communication
- Critical thinking
- Information Literacy
- Numbers / Data
- Social Responsibility

Competency 9:

The student will demonstrate knowledge of bivariate data by:

- Constructing and interpreting a scatter-plot.
- Computing and interpreting the linear correlation coefficient.

Learning Outcomes

- Communication
- Critical thinking
- Information Literacy
- Numbers / Data
- Social Responsibility