

**Tennessee Technological University
Mathematics Department**

MATH 1530: Introductory Statistics

I. COURSE DESCRIPTION FROM CATALOG:

Descriptive statistics including measures of central location and variation, frequency distributions, histograms, and frequency polygons. Probability relating to elementary sample spaces, events, conditional probability, discrete and continuous type random variables, mathematical expectation, and normal probability. Inferential statistics relating to the confidence intervals and hypothesis tests related to the mean and proportion. Lec. 3. Cr. 3.

II. PREREQUISITE(S):

Two years of high school algebra and one year of high school geometry.

III. COURSE OBJECTIVE(S):

To introduce the student to some of the foundations of probability and statistics like probability distributions, mathematical expectation and hypothesis testing. Also, it is a desire of this course to equip the student with the knowledge and background to understand hypothesis testing as related to the mean and proportion for future use in any research on the part of the student.

The goal of the general education mathematics requirement is to enhance students' abilities to utilize mathematics. Students will demonstrate

1. the ability to use mathematics to solve problems.
2. the ability to create or analyze graphs (or other mathematical representations of data/relationships).
3. proficiency in mathematical computations/algorithms.
4. understanding of mathematical concepts.

IV. STUDENT LEARNING OUTCOMES:

Upon successful completion of this course a student will: know the fundamentals of probability and be able to perform simple probability calculations; be able to calculate descriptive statistical information about a set of given data; be able to produce a visual summary of a set of given data; be able to describe the distribution of a set of given data; and be able to make inferences about given sets of data.

V. TOPICS TO BE COVERED:

The Nature of Probability and Statistics

- Descriptive and Inferential Statistics
- Variables and Types of Data
- Data Collection and Sampling Techniques

Describing Data

- Organizing Data
- Pie Chart, Dot Plot, Stem-and-Leaf Plots, Histograms

- Measure of Central Tendency
- Measures of Variation
- Measures of Position
- Exploratory Data Analysis

Association

- Response and Explanatory Variables
- Association Between Qualitative Variables
- Association Between Quantitative Variables

Probability

- Sample Spaces and Probability
- The Addition Rules for Probability
- The Multiplication Rule and Conditional Probability

Probability Distributions

- Discrete Probability Distributions
- Mean, Variance, and Expectation
- The Binomial Distribution
- The Normal Distribution

Sampling Distributions

- Sampling Distribution of a Sample Proportion
- Sampling Distribution of a Sample Mean
- The Central Limit Theorem

Confidence Intervals and Sample Size

- Confidence Intervals for the Mean (SD known and $n > 30$) and Sample Size
- Confidence Intervals for the Mean (SD unknown and $n < 30$)
- Confidence Intervals and Sample Size for Proportions

Hypothesis Testing

- Steps in Hypothesis Test
- Hypothesis Test for the Population Proportion
- Hypothesis Test for the Population Mean (SD known and $n > 30$)
- Hypothesis Test for the Population Mean (SD unknown and $n < 30$)

VI. ADDITIONAL INFORMATION:

Basically lecture with possibly minor computer lab demonstrations included.

VII. POSSIBLE TEXTS AND REFERENCES:

(Open Educational Resources)

Introductory Statistics, <https://openstax.org/details/books/introductory-statistics>

OpenIntro Statistics, <https://www.openintro.org/book/os/>

VIII. STUDENT ACADEMIC MISCONDUCT POLICY:

Maintaining high standards of academic integrity in every class at Tennessee Tech is critical to the reputation of Tennessee Tech, its students, alumni, and the employers of Tennessee Tech graduates. The Student Academic Misconduct Policy describes the definitions of academic misconduct and policies and procedures for addressing Academic Misconduct at Tennessee Tech. For details, view the Tennessee Tech's Policy 217 – Student Academic Misconduct at [Policy Central](#).

XI. DISABILITY ACCOMMODATION:

Students with a disability requiring accommodations should contact the Accessible Education Center (AEC). An Accommodation Request (AR) should be completed as soon as possible, preferably by the end of the first week of the course. The AEC is located in the Roaden University Center, Room 112; phone 931-372-6119. For details, view the Tennessee Tech's Policy 340 – [Services for Students with Disabilities at Policy Central](#).