

COURSE OUTLINE

Introduction to Statistics

Course Description

MA 119. Introduction to Statistics. 3 hours credit. Prerequisite: Placement score or MA 060 with a C or better or equivalent. This course will enable the student to identify misleading representations of data, summarize data, and interpret data.

Course Relevance

The principles learned in this course will enable the student to recognize misleading graphs and biased statistics and to calculate and interpret statistics.

Required Materials

Bennett, Briggs, and Triola., (2009) *Statistical reasoning for everyday life*, (3rd ed.).
Pearson Education

Scientific or Graphing Calculator
Graph Paper

Learning Outcomes

The intention is for the student to be able to:

1. Identify misleading representations of data
2. Calculate statistics
3. Interpret statistics

Primary Learning PACT Skills that will be DEVELOPED and/or documented in this course

Through the student's involvement in this course, he/she will develop his/her ability in the following primary PACT skill areas:

1. Problem Solving
 - Through the use of statistical methods the student will estimate the mean of a data set and calculate the likely error.
2. Critical Thinking
 - Through the study of words, visual representations, and sampling methods, the student will distinguish between reliable statistical information and biased or otherwise misleading statistics.

Secondary skills (developed but not documented):

Teamwork
Field-related technology
Reading
Writing
Listening
Ethical conduct

Major Summative Assessment Task(s)

These learning outcomes and the primary Learning PACT skills will be demonstrated by:

1. Calculating a confidence interval for a population mean given the sample (or the sample mean and the sample size) and, if necessary, information about the population distribution
2. Summarizing a given data set by calculating several meaningful statistics and conveying an accurate intuitive picture of the data with a graph

Course Content

- I. Themes - Key recurring concepts that run throughout this course:
 - A. Representative data
 - B. Calculating statistics
 - C. Interpreting statistics
- II. Issues - Key issues that will be addressed in this course: areas of conflict that must be understood in order to achieve the intended outcome:
 - A. Communicating mathematical concepts
 - B. Bias
- III. Concepts – Key concepts that must be understood to address the issues:
 - A. Bias
 - B. Graphs
 - C. Average
 - D. Spread
 - E. Probability
 - F. Normal distribution
 - G. Estimation of population mean
- IV. Skills - Actions that are essential to achieve the course outcomes:
 - A. Read and use notation
 - B. Recognize poor methods of gathering and presenting data
 - C. Calculate statistics
 - D. Calculate probability
 - E. Describe a normal distribution

Learning Units

- I. Statistical reasoning
 - A. Statistical concepts
 - B. Statistical studies
- II. Visual displays of data
 - A. Bar graphs
 - B. Time-series graphs
 - C. Frequency distributions
 - D. Histograms

- E. Stem-and-leaf displays
- III. Averages and variation
 - A. Measures of central tendency
 - B. Measures of spread
 - C. Box-and-whisker plots
- IV. Probability
 - A. Probability concepts
 - B. Compound events
 - C. Counting techniques
- V. Binomial distributions
 - A. Probability distribution
 - B. Binomial probabilities
 - C. Binomial distribution properties
- VI. Normal distributions
 - A. Normal graphs
 - B. Standard normal distribution
 - C. Areas under normal curves
 - D. Sampling distributions
 - E. Central limit theorem
- VII. Estimating means
 - A. Estimating with large samples
 - B. Estimating with small samples

Learning Activities

Learning activities may include in-class presentations, homework assignments from the textbook, small group or class discussion, and individual or group projects or exercises.

Grade Determination

The student will be graded on exams, satisfactory completion of learning activities, and/or attendance.