GROSSMONT COLLEGE

PROPOSED Course Outline

MATHEMATICS 160 – ELEMENTARY STATISTICS

1. Course Number   Course Title   Semester Units   Semester Hours

    Math 160   Elementary Statistics   4   4 hours lecture
    64-72 total contact hours

2. Course Prerequisites

    A "C" grade or higher or "Pass" in MATH 103 or 110 or equivalent.

    Corequisite

    None

    Recommended Preparation

    None.

3. Catalog Description

    This course provides an introduction to descriptive statistics, probability theory and inferential statistics. Topics include data collection; summary and graphical displays of data; measures of central tendency and variability; elementary probability theory; standard procedures involving the normal, binomial, student's t, chi-square, and F distributions; confidence intervals and hypothesis testing; ~~nonparametric statistics~~; linear correlation and regression; **and ANOVA**. Students will learn ~~to use a graphing calculator and/or statistical software~~. **technology for statistical analysis and interpret the relevance of the statistical findings.** Applications come from various fields such as biology, business, economics, education, ~~engineering, demography~~, **social sciences, health science**, **life sciences,** and psychology.

4. Course Objectives

    T**he student will:**
    a. **Distinguish among different scales of measurement and their implications;**
    b. **Interpret data displayed in tables and graphically;**
    c. **Apply concepts of sample space and probability;**
    d. **Calculate measures of central tendency and variation for a given data set;**
    e. **Identify the standard methods of obtaining data and identify advantages and disadvantages of each;**
    f. **Calculate the mean and variance of a discrete distribution;**
    g. **Calculate probabilities using normal and t-distributions;**
    h. **Distinguish the difference between sample and population distributions and analyze the role played by the Central Limit Theorem;**
    i. **Construct and interpret confidence intervals** and calculate point estimates**;**
    j. **Determine and interpret levels of statistical significance including p-values;**
    k. **Interpret the output of a technology-based statistical analysis;**
    l. **Identify the basic concept of hypothesis testing including Type I and II errors;**
    m. **Formulate hypothesis tests involving samples from one and two populations;**
    n. **Select the appropriate technique for testing a hypothesis and interpret the result;**
    o. **Use linear regression and ANOVA analysis for estimation and inference, and interpret the associated statistics; and**

4. Course Objectives (continued)

    p. **Use appropriate statistical techniques to analyze and interpret applications based on data from disciplines including** biology, **business**, economics, **education, health science, social sciences, life sciences, and psychology.**

5. Instructional Facilities

    Standard classroom equipped with:
    a. **Whiteboards**
    b. **Overhead projector/document camera**
    c. **SmartCart**
    d. Occasional use of **a computer lab**

6. Special Materials required of Student

    a. **Graphing Calculator**
    b. **Statistical software (StatCrunch)**

7. Course Content

    a. **Summarizing data graphically and numerically:** histograms, stem and leaf chart, dot plot, box and whisker plot, percentiles, frequency tables**;**
    b. **Descriptive statistics: measures of central tendency, variation, relative position, and levels/scales of measurement;**
    c. **Sample spaces and probability:** simple, compound, complementary, independent and mutually exclusive events; conditional probabilities**;**
    d. **Random variables and expected value;**
    e. **Sampling and sampling distributions;**
    f. **Discrete distributions – Binomial,** ~~Poisson~~**;**
    g. **Continuous distributions – Normal,** Student's t, chi-square, and F;
    h. **The Central Limit Theorem;**
    i. **Estimation and confidence intervals** for population mean, population standard deviation and proportions**;**
    j. **Hypothesis Testing and inference, including t-tests for one and two populations, Chi-square test** ~~and nonparametric tests~~**;**
    k. **Correlation and linear regression**
    l. **Analysis of variance (ANOVA)** and contingency tables**;**
    m. **Applications using data from disciplines including** biology**, business,** economics**, education, health science, psychology, life sciences, and social sciences.**
    n. **Statistical analysis using technology such as StatCrunch and/or graphing calculators.**

8. Method of Instruction

    a. Lecture.
    b. Discussion.
    c. Graphing calculator presentations.
    d. **Statistical software presentations.**
    e. In class projects illustrating procedures, formulae, and **technology** discussed in lecture.

9. Methods of Evaluating Student Performance

    a. Homework, written or online
    b. Independent exploration activities.
    c. Group or individual projects.
    d. Class participation/problem presentations.
    e. Quizzes.
    f. Possible take-home tests or online assessments
    g. In-class exams.
    h. Comprehensive in-class final exam.

10. Outside Class Assignments

    a. Homework, written or online.
    b. Text readings.
    c. Possible take-home tests or online assessments.
    d. Problem sets/Case studies.
    e. Projects involving technology-based statistical analysis using data from various disciplines.

11. Texts

    a. Required Texts:
        (1) Triola, Mario. *Essentials of Statistics*, **5th** Edition. Boston, MA: Addision Wesley - Pearson, **2014** or online edition.
    b. Supplementary texts and workbooks:
        None.

    Addendum: Student Learning Outcomes

    Upon completion of this course, our students will be able to do the following:
    a. Categorize data set and use appropriate methods to find, summarize, and visually display statistics about the data set.
    b. Interpret visual display of statistical data
    c. Take sample statistics and use appropriate procedures, methods, and tests to make inferences about the population.
    d. Categorize probability problems and use appropriate theorems and formulas to solve them.
    e. Use the appropriate technology to analyze statistical problems.
    f. Interpret, communicate, and assess the validity of statistical processes and conclusions.

Date approved by the Governing Board: