April 20, 2013

DEPARTMENT OF MATHEMATICS
SYLLABUS

I. MATH 235 - SURVEY OF STATISTICS - 3 Credits

II. Catalog Description

A survey of elementary probability theory, estimation, hypothesis testing, simple regression, and correlation. Interpretation of statistical inference in the analysis of data. Emphasis on application in both the behavioral and physical sciences.

Prerequisite: MATH 101 or Math Placement MATH 151

III. Objectives

The objectives of this course are to provide the student with a basic understanding of statistical inference in the areas of estimation, and hypotheses testing. Thus, the student should acquire:

A. An insight into the need and role of statistical inference in the analysis of data.
B. An ability to read and understand technical literature, now rather commonly interwove with statistical terminology.
C. An understanding of elementary probability theory:
   1. As background for upper level computer science courses.
   2. As a necessary foundation for subsequent courses such as operations research.
D. To introduce students to a statistical computing package (Minitab) and use this package to solve problems in probability and statistics.

IV. Course Outline

A. Introduction
   1. Descriptive and inferential statistics
   2. Populations and samples
   3. Problems for the statistician

B. Statistical Measures of Data
   1. Parameters and statistics; measures of central location
   2. Measures of variation; Chebyshev's theorem, Empirical Rule
   3. Graphic presentation of data

C. Probability
   1. Sample space; events
   2. Operations with events

3. Counting sample points. (Multiplication rule, permutations, combinations)
4. Probability of an event; additive rules
5. Conditional probability; multiplicative rules

D. Distributions of Random Variables
1. Concept of a random variable
2. Discrete probability distributions
3. Mean of a random variable; mathematical expectation
4. Variance of a random variable

E. Some Discrete Probability Distributions
1. Binomial distribution

F. Some Continuous Probability Distributions
1. Normal curve; areas under the curve
2. Applications

G. Sampling Distributions
1. Sampling distributions of the mean
2. Central limit theorem
3. t distribution
4. Sampling distributions of the differences of means

H. Estimation of Parameters
1. Statistical inference; classical methods of estimation; estimating the mean
2. Estimating the difference between two means (large sample, small sample, paired observations)
3. Estimation a proportion, and the difference between two proportions

I. Tests of Hypotheses
1. Statistical hypotheses; testing a statistical hypothesis Type I and Type II errors
2. One-tailed and two-tailed tests
3. P-values
4. Tests concerning means (large sample, small sample, paired difference)
5. Tests concerning proportions and the difference between two proportions

J. Correlation and Regression Analysis
1. Simple Linear Regression
2. Correlation Analysis

V. Suggested Text

McClave, J. T. and Sincich, T., Statistics, 12th Edition, Pearson, 2013.

VI. General Education Credit

This course may be taken for general education credit. (G2 block)

April 20, 2013