SU DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE
SYLLABUS *(Tentative)*
MATH 216 *Statistical Thinking*

INTENDED FOR: Students majoring in mathematics or other sciences. **Credit may not be received for more than one: MATH 151, 155 or 213.**

OBJECTIVES: To introduce the concepts of descriptive and inferential statistics by way of both nonparametric and the classical parametric methods.

PREREQUISITE: MATH 160 or MATH 201 (may be taken concurrently).

TEXTBOOK: "Statistics," by McClave & Sincich; Prentice-Hall, 13th Edition, 2017.

TECHNOLOGY: THIS COURSE IS COMPUTER DEPENDENT. Statistical software such as MINITAB or other, will be used throughout the course.

Hours

Chapters 1,2 ***Data, Data Collection, Methods for Describing Data Sets*** 4
Graphical methods, measures of central tendency, variation, and relative standing, Chebyshev's Rule, Box plots, bivariate relationships

Lab 1 Minitab Essentials **1**
File management, descriptive statistics techniques, and graphing (single- and multi-variable)

Lab 2 Data Collection Issues 1
Obtaining reliable data from published sources, measurement issues, and getting data into Minitab

Chapter 3 ***Probability*** 3

Lab 3 Probability 1
Probability & Conditional Probability from tallies;

Chapter 4 ***Discrete Random Variables*** 4
Probability distribution functions, expected value, Binomial, Hypergeometric, and Poisson

Lab 4 Discrete Random Variables 1
Distribution characteristics and applications, including Binomial, Geometric, Hypergeometric, and Poisson

Chapter 5 ***Continuous Random Variables*** 5
Uniform, Normal, and Exponential. Descriptive methods for assessing normality, normal approximation to the binomial

Lab 5 Continuous Random Variables 1
Distribution characteristics and applications, including Uniform, Exponential, and Normal

Lab 6 Applications of Random Variables 1

Chapter 6 ***Sampling Distributions and Central Limit Theorem*** 3
Estimators, unbiased, minimum variance, Central Limit Theorem

Lab 7 Sampling Distributions and the Central Limit Theorem 1
Illustration via simulation and applications

Lab 8 Concepts and Review 1
A review of some of the procedures and concepts learned in the previous labs.

Chapter 7 ***Estimation (One Sample)*** 4
Confidence intervals for means, proportions, sample size

Lab 9 Estimation 1
Confidence intervals for means and proportions; demonstration via simulation and applications

Lab 10 Decision Making 1

Applet simulations of hypothesis testing to study types of errors and probabilities of error.

Chapters 8, 14 ***Tests of Hypothesis (One Sample)*** 6

Tests for means, sign test, Wilcoxon signed rank test, tests for proportions, Type I and Type II error, power

Lab 11 Hypothesis Tests (one sample) 1

Parametric and non-parametric tests for means, medians, and proportions; demonstration via simulation and applications

Chapters 9, 14 ***Confidence Intervals & Tests of Hypotheses (Two Samples: Paired & Independent)*** 5

Paired: t, Wilcoxon signed rank, sign; Independent: z, t, Mann-Whitney (Wilcoxon Rank Sum)

Lab 12 Hypothesis Tests (two samples) 1

Parametric and non-parametric tests for means, medians, and proportions; demonstration via simulation and applications

Chapter 11 ***Simple Linear Regression*** 3

Least squares, inferences about the slope, estimation and prediction

Lab 13 Simple Linear Regression 1

Constructing and interpreting fitted line plots, estimation and prediction, inferences about slope

Selected Topics From: 3

Chapter 10 - One-way Analysis of Variance or Chapter 13 -Chi-Square Tests

Tests 3

EVALUATION

Homework and quizzes 10%
Lab attendance 5%
Lab reports and project 25%
Tests 40%
Final Exam 20%

Free tutoring is available for this course in the Spring and Fall semesters.

Writing Across the Curriculum: This course is in full support of the emphasis on this campus to give the students every opportunity to reinforce their skills in writing. Instructors will expect students to clearly communicate conclusions and thinking processes in written work.

NOTE: ONCE A STUDENT HAS RECEIVED CREDIT, INCLUDING TRANSFER CREDIT, FOR A COURSE, CREDIT MAY NOT BE RECEIVED FOR ANY COURSE WITH MATERIAL THAT IS EQUIVALENT TO IT OR IS A PREREQUISITE FOR IT.

BAW 2017