

BROOME COMMUNITY COLLEGE
Binghamton, New York

COURSE TITLE STATISTICS II **MAT 224**

CLASS LECTURE HOURS 3 **LAB HOURS** 0 **CREDIT HOURS** 3

DIVISION DEAN Julia Peacock

DEPT. CHAIRPERSON Mary Woestman **DATE** March 2002

PREREQUISITE: MAT 124 Statistics I

Learning Objectives of Course:

The student should be able to:

1. Define a population, a sample, and random sampling
2. Compute the mean and standard deviation for a discrete probability distribution and construct the probability histogram.
3. Solve probability problems using discrete probability distributions such as the binomial, Poisson and hypergeometric.
4. Use the chi-square distribution to perform tests on multinomial experiments, goodness-of-fit and tests of homogeneity and independence.
5. Compute the probability of Type I and Type II errors associated with tests of hypotheses about means.
6. Compute the least squares regression line for a bivariate population and test it as a model for the population.
7. Compute, test, and interpret the meaning of the correlation coefficient for a bivariate population.
8. Use the F-distribution to test inferences about two variances.
9. Perform analysis of variance (ANOVA).
10. Test the assumptions for ANOVA.
11. Perform analysis using multiple regression and correlation models.
12. Use nonparametric statistics to conduct tests of hypotheses.
13. Use a statistical software package to conduct various data analyses.

CATALOG COURSE DESCRIPTION:

Review of probability fundamentals, discrete random variables and probability distributions. Continuous random variables and probability distributions, joint probability distributions and random samples, hypothesis testing, analysis of variance, multifactor analysis of variance, linear regression and correlation, nonlinear and multiple regression, the analysis of categorical data, nonparametric procedures, use of a statistical software package.

3 class hours; Prerequisite: MAT 124 Statistics I

MAT 224 Statistics II

Course Outline

Distributions of Paired Variables

- Simple Linear Regression
- Model Testing
- Inferences Related to Regression
- Correlation Including Inference

Multiple Regression and Correlation

- Procedure for Multiple Regression and Correlation
- Inferences Relative to Multiple Regression
- Model Fitting
- Logarithmic Transformations
- Polynomial Regression

Discrete Distributions

- Random Variables and Probability Distributions
- Expected Value and Variance of a Probability Distribution
- Binomial Distribution
- Poisson Distribution
- Hypergeometric Distribution

The chi-square Distributions

- The Nature of chi-square Distributions
- Goodness-of-Fit Tests
- Contingency Table Analysis

Techniques for Analysis of Variance

- The F-Distribution
- Inference about Two Variables
- The Additive Model
- One-Way Analysis of Variance Procedure
- Multiple Comparison Procedures
- One Degree of Freedom Comparisons
- Estimation
- Randomized Block Designs and Two-Way ANOVA

The Analysis of Variance Model

- Random Effects and Fixed Effects
- Assumptions for ANOVA
- Transformations

Nonparametric Statistics

- Sign Test
- Median Test
- Wilcoxon Rank Sum Test
- Wilcoxon Signed Rank Test
- Rank Correlation Coefficient
- Kruskal-Wallis Test
- Friedman 2-Way ANOVA by Rank

Statistical Software Package

- Regression/Correlation Project
- Analysis of Variance Project