

NVCC COLLEGE-WIDE COURSE CONTENT SUMMARY
MTH 242 - STATISTICS II (3 CR.)

Course Description

Continues the study of estimations and hypothesis testing with emphasis on correlation and regression, analysis of variance, chi-square tests, and non-parametric methods. Lecture 3 hours per week.

General Course Purpose

The purpose of this course is to provide the student with the necessary abilities in inferential statistics to understand the results of statistical studies and to perform inferential statistical studies within their areas of interest. The course concepts would be beneficial for the student with an interest in statistics. Emphasis will be placed upon the use of the computer and the graphing calculator to perform statistical computations.

Course Prerequisites/Co-requisites

Prerequisite: MTH 241 - "Statistics I" or equivalent.

Course Objectives

As a result of the learning experience in this course, the student should be able to:

- A. compare and contrast z-tests, X^2 -tests, and F-tests for testing hypotheses
- B. use the F-test to determine homogeneity of treatments
- C. use software or calculator to compute and graph linear regression equations
- D. use software of calculator to compute and interpret the Pearson correlation coefficient
- E. formulate and test hypotheses concerning correlations
- F. state the assumptions in the ANOVA models
- G. perform an analysis of variance for the completely randomized design
- H. perform an analysis of variance for the randomized block design
- I. use nonparametric methods for testing hypotheses
- J. design a model for an experimental investigation
- K. conduct a survey, analyze the data, and draw appropriate conclusions
- L. use software to calculate z-scores, t-scores, X^2 -scores, and F-scores

Major Topics To Be Included

- A. Review of Hypothesis Testing
- B. Hypotheses Testing and Confidence intervals
 - 1. For a single proportion
 - 2. For the difference of two proportions
 - 3. For a single variance
 - 4. For the ratio of two variances
- C. Chi-Square tests of Hypotheses
 - 1. Goodness of Fit Test
 - 2. Test of Independence
 - 3. Test of Homogeneity
- D. Linear Regression and Correlation
 - 1. Scatter diagrams
 - 2. Method of Least Squares
 - 3. Predictions

4. Interpretations
5. Pearson correlation coefficient
 - a. Calculation
 - b. Interpretation
- E. Analysis of Variance
 1. Completely Randomized Design
 2. Randomized Block Design
 3. Interpretation of results
- F. Nonparametric Methods
- G. Design of Experimental Investigations
 1. Need and purpose
 2. Basic Principles
 3. Replication
 4. Common Errors within the experiment
 - a. Confounding
 - b. Randomization
 - c. Regression to the mean
 - d. Testing
 5. Treatments
 6. Effects and interaction
 7. Steps in developing a design
 8. Advantages and disadvantages of using experimental designs
- H. **Highly recommended:** Student Project
 1. Selection of survey topic
 2. Data collection
 3. Data analysis
 4. Appropriate conclusions
 5. Complete report

Extra Topics (optional)

- A. Multiple Regression and Correlation
- B. Two-Factor Analysis of Variance
- C. Multiple Comparison Procedures