

Common Course Outline for: MATH 1090 Statway Statistics 2**A. Course Description**

1. Number of credits: 4
2. Lecture hours per week: 4
Lab/Studio/Clinical hours per week: None
3. Prerequisites: MATH 0990
4. Co-requisites: None
5. MnTC Goals: Goal 2 Critical Thinking and Goal 4 Logical/Mathematical Reasoning

This course is the second in a two-semester sequence designed to guide students in completing the topics covered in both beginning algebra and college-level introductory statistics in one year. The two semester sequence is useful to students whose academic program is satisfied by an introductory statistics course. STATWAY Statistics 2 covers sampling distributions, Central Limit Theorems, confidence intervals, and hypothesis testing for population proportions, population means, and means of paired differences. Chi-square tests for one and two way tables and ANOVA methods are also covered, as well as necessary topics from beginning algebra. Students must commit to completing Math 0990 and MATH 1090 as a required sequence of courses: Math 0990 in one semester and MATH 1090 in a subsequent semester.

B. DATE LAST REVISED: November 2021

C. OUTLINE OF MAJOR CONTENT AREAS

1. Sampling distributions, Central Limit Theorem, and Introduction to Confidence Intervals for a Population Proportion.
2. Constructing Confidence Intervals for a Population Proportion, an Introduction to Hypothesis Testing, and Constructing a Hypothesis Test for a Population Proportion.
3. Constructing Confidence Intervals and Performing Hypothesis Tests for the Difference of Two Population Proportions.
4. Sampling distributions, Central Limit Theorem, Confidence Intervals, and Hypothesis Tests for a Population Mean and for Means of Paired Differences.
5. Chi-square Tests for One-way Tables (Goodness of Fit) and for Two-way Tables (Independence and Homogeneity).
6. One-way ANOVA methods for detecting differences in several means.
7. Necessary algebra concepts such as linear and exponential functions, exponents, graphing functions, solving equations, solving inequalities, and working with decimals and fractions in applied problems.

D. LEARNING OUTCOMES

The student will be able to:

1. Use simulations to create sampling distributions for a sample statistic.
2. Construct confidence intervals for population proportions, the difference between two population proportions, population means, and the mean of the difference of paired variables.
3. Perform a Hypothesis Test for population proportions, the difference between two population proportions, population means, and the mean of the difference of paired variables.
4. Perform a one-way ANOVA analysis for the detecting differences between several means.
5. Perform chi-square tests for goodness of fit, of independence, and of homogeneity.

E. LEARNING OUTCOMES (Mn Transfer Curriculum)

Goal 2 Critical Thinking and Goal 4 Logical/Mathematical Reasoning

The student will be able to:

1. Use simulations to explain the properties of a sampling distribution for a proportion and use sampling distributions to construct and interpret confidence intervals for a population proportion. (2a; 4b, d)
2. Construct a hypothesis test for the value of a population proportion. (4a, b, c, d)
3. Interpret the use of evidence in drawing a conclusion, including interpreting the meanings and consequences of Type I, Type II, and Type III errors. (2a, b, c, d; 4a, b, c, d)
4. Use simulations to explain the properties of a sampling distribution for a sample mean and use sampling distributions to construct and interpret confidence intervals for a population mean. (2a; 4b, d)
5. Construct a hypothesis test for the value of a population mean and for the mean of the differences between paired data. (4a, b, c, d)
6. Calculate and interpret the chi-square value for both one-way tables (goodness of fit) and two-way tables (independence and homogeneity). (2a, c; 4a, b, d)
7. Apply one-way ANOVA methods to test for possible differences between several population means. (2a, c; 4a, b, d)
8. Be able to use the appropriate tools of Algebra, such as graphing of linear and exponential functions, solving equations, use of basic functions and exponents, decimal and fraction operations, and percents to solve applied problems in each of the above topics. (2a, c; 4a, b, c, d)
9. Perform simple statistical procedures related to the above using a statistical software package or a statistical calculator. (4a, b, d)

F. METHODS FOR EVALUATION OF STUDENT LEARNING

In order to provide consistent data on the effectiveness of the project, the instructor is encouraged to use the assessments that are included in the STATWAY curriculum created by the Carnegie Foundation for the Advancement of Teaching. The instructor may choose other assessment methods to complement the included methods, including attendance and participation in group learning activities.

G. SPECIAL INFORMATION

The curriculum requires extensive use of either computer software (some of which is included in the STATWAY curriculum) or a statistical calculator (TI-83/84 is recommended).