Course Outline for Proposed PSY 348: Statistics for Psychology

FARMINGDALE STATE COLLEGE

DEPARTMENT: PSYCHOLOGY
PREPARED BY: PSYCHOLOGY DEPT.
DATE PREPARED: SPRING 2018

COURSE TITLE: Statistics for Psychology
COURSE CODE: PSY 348
CREDITS: 4
CONTACT HOURS: 60

PREREQUISITES: PSY 101; MATH 110; or permission from Department Chairperson
GENERAL EDUCATION: This course does not fulfill any General Education requirements.
REQUIRED FOR: B.S. in Applied Psychology

COURSE DESCRIPTION
This course will introduce students to the basic descriptive and inferential statistics used in the behavioral and social sciences. Topics will include the organization of data, measures of central tendency and variability, correlation and regression, hypothesis testing, and various parametric and nonparametric tests of significance including t-tests, ANOVA, and chi-square analysis. Students will focus on the interconnections between theory, statistical techniques, and research methods in order to identify the appropriate statistical tests to analyze data and reach objective conclusions regarding research questions in the social sciences. The course will provide practice in using statistical software for data summarization, presentation, and analysis.
Prerequisite(s): PSY 101 and MTH 110. Credits: 4(4,0)

INSTRUCTIONAL METHODOLOGY
Lecture, research based statistical problem analysis, statistical software demonstration and practice

REQUIRED FACILITIES AND SOFTWARE
Computer laboratory equipped with SPSS software

PROPOSED TEXTS

REQUIRED EQUIPMENT / MATERIALS
Statistics capable calculator
COURSE OBJECTIVES

As a result of this course, students will be able to understand statistical terms and research reports in the social sciences, use common statistical techniques to analyze experimental data for hypothesis testing, and use statistical software to aid in the presentation and analysis of quantitative data. To accomplish these objectives, students will be able to:

- Describe the four measurement scales (nominal, ordinal, interval, ratio)
- Construct frequency distributions and represent them graphically
- Define and calculate measures of central tendency including mean, median, and mode
- Define and calculate measures of variability including variance and standard deviation
- Define and calculate z-scores
- Describe the normal curve and use the curve to solve various problems including probability
- Explain the difference between populations and samples
- Explain the basic concepts of sampling theory and the sampling distribution
- Explain the basic concepts of hypothesis testing including the null, significance testing, and errors
- Define and calculate correlation coefficients
- Obtain and graph regression equations and use results to make predictions
- Test for significant differences between means using t-tests
- Calculate and interpret one-way and two-way analysis of variance
- Discuss main effects and interaction effects of two-way analysis of variance
- Use chi-square analysis to test for differences between observed and expected frequencies
- Determine appropriate hypothesis test based on research questions and level of data
- Perform statistical techniques by hand using formulas and with statistical software
- Interpret the results of inferential statistical techniques

COURSE OUTLINE

Section 1: Descriptive Statistics
This section will provide students with a number of tools to meaningfully and accurately summarize and describe samples of data. Students will learn to use tables and graphs to simplify large amounts of data and to present quantitative descriptions of data using measures of central tendency, variability, correlation, and regression.

Topic: Tables and Graphs

This topic will cover:

The construction of frequency distributions, histograms, and other graphical representations used to order data and detect data patterns.
### Measures of Central Tendency
The calculation of numerical summaries including the mean, median, and mode used to describe data.

### Measures of Variability
The calculation of variation among observations in a distribution using measures including range, variance, and standard deviation.

### Normal Distributions and z-scores
An introduction to the normal curve, z-score transformation, and using the normal curve to determine probability.

### Correlation and Regression
The calculation and graphing of correlation coefficients to describe the relationship between variables and the use of regression for prediction.

## Section 2: Inferential Statistics
In this section, students will learn to generalize beyond sets of actual observations to draw conclusions about the population. Following an introduction to sampling theory and hypothesis testing, students will learn to use parametric and non-parametric techniques including t-tests, analysis of variance, and chi-square to answer research questions by assessing mean differences and estimating significance.

### Topic: This topic will cover:

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<thead>
<tr>
<th>Topic</th>
<th>Description</th>
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<tr>
<td>Populations and Samples</td>
<td>The distinction between populations and samples, techniques for random sampling and assignment, and the sampling distribution of the mean.</td>
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<tr>
<td>Hypothesis Testing</td>
<td>An introduction to hypothesis testing including the null and alternative hypotheses, one- and two-tailed tests, levels of significance, and controlling errors.</td>
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<tr>
<td>Parametric Tests: t-tests</td>
<td>Inferential techniques to test for significant differences between or two means including one-sample, independent, and repeated measure t-tests.</td>
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<tr>
<td>Parametric Tests: ANOVA</td>
<td>Inferential techniques to test for significant differences across more than two groups including one-way and two-way ANOVAs.</td>
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<tr>
<td>Non-Parametric Tests: Chi-Square</td>
<td>Inferential techniques to test for significant differences between observed and expected frequencies of categorical variables including chi-square.</td>
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## Section 3: Application
In this section, students will focus on the interconnections between theory, statistical techniques, and research methods in order to identify the appropriate statistical tests to analyze data and reach objective conclusions regarding research questions in the social sciences. Specifically, students will engage in applied exercises designed to provide knowledge and skills to select and conduct appropriate statistical tests for psychological research, critically evaluate the results of statistical analyses and reach appropriate conclusions, and conduct data analysis using statistical software. Students will gain practice using Excel and SPSS for data entry, summarization, analysis, reporting, and presentation.