Course Overview
Statistics are ways of understanding more about questions and issues that interest us. The *Tao of Statistics* is a journey down a path that leads to an intriguing view of the world. The statistical view of the world is of a place where knowledge is neither certain nor random. Statistical portraits are painted in pastel rather than in primary colors. . . . *The Tao of Statistics* lays a path to this understanding of the world. The path leads to a view of the subtle patterns in life that were invisible before. (Dana Keller, 2006, *The Tao of Statistics*, p. ix)

Quantitative data analyses require the use of statistics (descriptive and inferential) to summarize data collected, to make comparisons of data sets, and to generalize results obtained for a sample back to the population from which the sample was drawn. Statistics provide portraits of phenomena that help one to "see what was invisible before."

Strategic Goal: This course is designed to help students learn to think like "post-modern" research statisticians who are able to make reasonable and responsible judgments about data that enhance understanding of phenomena. Thinking like statisticians requires students to learn and employ frameworks for analyzing and interpreting patterns that exist within data sets and to communicate clearly to others the meaning of these patterns.

This course approaches statistics from a problem-solving perspective as emphasis is placed on selecting appropriate statistical techniques for various research designs and on interpreting and reporting data analyses results. Computer data analysis (using the windows 16.0 version of the Statistical Package for the Social Sciences (SPSS) will be a primary focus of the course to further illustrate the use and interpretation of statistics in research.

Course Structure
All course documents and assignments, including discussion questions, will be posted on Blackboard. Although a hybrid course structure was used for the Spring 2009 Semester, I have decided it might work out best if the course was structured in a more traditional manner for Summer Semester. However, a difference from what has been presented in the past is that students will be asked to have all assigned readings completed and all discussion and application assignments completed prior to each class session (see the course schedule on pp. 4-5).

The course content is organized into four main modules, some of which are broken down into sub modules. The content of the modules, and sub modules, are designed to provide a foundation...
for understanding how statistics can be applied to help understand phenomena of interest to the researcher. The modules are organized as follows:

**Module 1: Research Design and Hypothesis Testing**
- Module 1A: Overview of Statistics for Quantitative Research
- Module 1B: Sampling Distributions and Inferential Parametric Statistics
- Module 1C: An Introduction to Hypothesis Testing

**Module 2: Research Designs for Measuring Group Differences**
- Module 2A: The t-test for a Single Sample Design
- Module 2B: The t-test for Two Independent Samples
- Module 2C: The t-test for Two Dependent or Related Samples
- Module 2D: Hypothesis Testing for One-way and Two-way Designs

**Module 3: Research Designs for Determining Relationships and Prediction Models (Correlation and Regressions Analyses)**

**Module 4: Non Parametric Statistics for Determining Association (Chi-square)**

When we meet for class we will focus on the application of content learned through the online portion of the course. For the most part, each class session will allow you to use SPSS to analyze various data bases in order to answer research questions of interest. Please know I am willing to work with anyone individually or in small groups as needed. If you are feeling anxious about the content, please do not hesitate to contact me (earlier is better than later so you don't fall behind in the class). You can either call or email me.

*I sincerely hope you enjoy the course.*

**Course Goals**
Overall, this course is designed to enable students to learn how to:
1. Formulate research questions and corresponding statistical hypotheses that can enhance understanding of a given phenomena
2. Create or use existing databases to seek answers to research questions or to test hypotheses
3. Select appropriate statistical techniques for a given question or hypothesis statement
4. Apply statistical procedures to test hypotheses using SPSS
5. Interpret SPSS computer printouts
6. Communicate findings verbally and in written format

*Note: Each module includes objectives specific to that module.*

**Course Evaluation**
Grades for the course will be based on:
1. Participation in online discussions (10%)
2. Module Application Questions (20%)
3. SPSS lab exercises (25%)
4. Course "Final Application Exam" online (20%)
5. Statistics project (25%)
**Course Texts**

**Required:**
- Module Packages designed by Sandra Wilson (presented on Blackboard)

**Optional (but strongly recommended):**

**Course Calendar**

<table>
<thead>
<tr>
<th>Dates</th>
<th>Reading Assignments</th>
<th>Application Assignments</th>
<th>Online Discussion</th>
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<tr>
<td>Session # 1  &lt;br&gt; June 23</td>
<td>Read online postmodern research articles (see links posted on Blackboard assignments)  &lt;br&gt; <strong>Read Module 1A &amp; 1B</strong> (and corresponding reading assignments in SPSS and Hinkle et al texts)</td>
<td>Module 1 Lab:  &lt;br&gt; a. SPSS introduction  &lt;br&gt; b. Descriptive stats  &lt;br&gt; c. Confidence inter</td>
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<td>Session # 2  &lt;br&gt; June 30</td>
<td><strong>Read Module 1C &amp; 2A</strong> (and corresponding reading assignments in SPSS and Hinkle et al texts)</td>
<td>Module 1 Application Questions (submit via email or bring to class)  &lt;br&gt; <strong>Module 2 Lab:</strong>  &lt;br&gt; a. Single sample t-test  &lt;br&gt; b. Dependent t-test</td>
<td>Response to Discussion Question 1 due by June 28</td>
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<td>Session # 3  &lt;br&gt; July 7</td>
<td><strong>Read Module 2B &amp;2C</strong> (and corresponding reading assignments in SPSS and Hinkle et al texts)</td>
<td>Module 2 SECTION I Application Questions (submit via email or bring to class).  &lt;br&gt; <strong>Module 2 Lab (cont):</strong>  &lt;br&gt; a. Independent t-test  &lt;br&gt; b. Dependent t-test</td>
<td>Non due</td>
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<td>Session # 4  &lt;br&gt; July 10</td>
<td><strong>Read Module 2D</strong> (and corresponding reading assignments in SPSS and Hinkle et al texts)</td>
<td>Module 2 SECTION II Application Questions (submit via email or bring to class).  &lt;br&gt; Outline for your FINAL STATS PROJECT due  &lt;br&gt; <strong>Module 2 Lab (cont.)</strong>  &lt;br&gt; a. Oneway ANOVA  &lt;br&gt; b. Twoway ANOVA</td>
<td>Respond to Discussion Question 2 by July 8</td>
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<td>Read Module 3</td>
<td>Module 3 Application Questions (submit via)</td>
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<td>(and corresponding reading assignments for SPSS and Hinkle et al texts) email or bring to class</td>
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<td><strong>Module 3 Lab</strong></td>
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<td>b. Regression</td>
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<td>July 21</td>
<td><strong>Read Module 4</strong></td>
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<td><strong>Module 4 Application Questions</strong> (submit via email or bring to class)</td>
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<td>July 28</td>
<td><strong>Review all modules and other readings</strong></td>
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<td>Review all application questions</td>
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<td><strong>Complete Final Exam</strong></td>
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**DUE DATES FOR FINAL DRAFTS**

1. The Final Application Exam (submitted online)
   a. The exam will be posted on Blackboard by July 14. Your responses are to be submitted online by July 28.
   b. You may confer with other students in the class regarding your responses to the Final Application Exam questions prior to submission.

2. Your statistics project is due in my office by August 1. You may need to mail your project to me given I will need to see your SPSS computer printouts.

3. Your SPSS lab exercises are due in my office by August 1 (your answers may be submitted online or you can mail them to me).

4. Any revisions you have made in your responses to the Module Application Questions you will need to resubmit these changes to me by August 1 (otherwise, your grade will be based on what has been submitted prior).

**Module 1 Lab:**

a. SPSS introduction
b. Descriptive stats
c. Confidence inter
Non due

**Session # 2 June 30**

Read Module 1C & 2A
(and corresponding reading assignments in SPSS and Hinkle et al texts)
Module 1 Application Questions (submit via email or bring to class)
Module 2 Lab:
a. Single sample t-test
b. Dependent t-test
Response to Discussion
Question 1 due by June 28

Session # 3 July 7
Read Module 2B &2C
(and corresponding reading assignments in SPSS and Hinkle et al texts)
Module 2 SECTION I Application Questions (submit via email or bring to class).
Module 2 Lab (cont):
a. Independent t-test
b. Dependent t-test
Non due

Session # 4 July 10
Read Module 2D
(and corresponding reading assignments in SPSS and Hinkle et al texts)
Module 2 SECTION II Application Questions (submit via email or bring to class).

Outline for your FINAL STATS PROJECT due
Module 2 Lab (cont.)
a. One-way ANOVA
b. Two-way ANOVA
Respond to Discussion Question 2 by July 8

Session # 5 July 14
Read Module 3
(and corresponding reading assignments for SPSS and Hinkle et al texts)
Module 3 Application Questions (submit via email or bring to class)
Module 3 Lab
a. Correlation
b. Regression
Non due

Session # 6 July 21
Read Module 4
Module 4 Application Questions (submit via email or bring to class)
Module 4 Lab
a. Chi-square
Respond to Discussion Question 3 by July 19
Session # 7 July 28
Review all modules and other readings
Review all application questions
Review all labs
Complete Final Exam (submit your answers via email or deliver a hard copy)