Syllabus

Texas A & M University – Corpus Christi
Department of Counseling & Educational Psychology
CNEP 6360, RESEARCH DESIGN AND STATISTICS
Fall 2011
Thursday 7:00– 9:30

INSTRUCTOR INFORMATION:

Instructor: Richard S. Balkin, Ph.D., LPC, NCC

Office Hours: Wednesday 2:00 – 5:00
Thursday 1:00 – 4:00
& by Appointment
Office: ECDC 232

Address: Texas A&M University-Corpus Christi
Department of Counseling & Educational Psychology, Unit 5834
ECDC 232,
Corpus Christi, TX 78412

Telephone: (361) 825-2451 (Office)
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I. CATALOG DESCRIPTION OF THE COURSE
This course is designed as a doctoral level survey of Research Design and Statistics. The major
focus will involve an examination of the theoretical assumptions underlying various research
designs and the use of inferential statistics. Special emphasis will be placed on the selection of
appropriate design for specific applications in counseling and educational contexts. The course
will involve both theoretical exploration and instruction of computer-based statistical tools
(SPSS).

II. Rationale
This course has four goals: (a) to increase your understanding of research concepts and
procedures, (b) to develop your appreciation of the importance of research in education, (c) to
develop your skills in data analysis and interpretation, (d) to develop your skills in preparing a
research manuscript.

This course is the first course in a doctoral studies research curriculum. There are several stages
in conducting research: planning, piloting, data collecting, data analyzing, and reporting. This
class will not cover all of these areas but will provide the blueprint for these areas, which will be
elaborated upon in your future course work.
III. State Adopted Proficiencies
Coursework may be applied toward LPC licensure in the State of Texas.

IV. CACREP Standards
1. Understands univariate and multivariate research designs and data analysis methods. (E1)

2. Demonstrate the ability to formulate research questions appropriate for professional research and publication in counseling (F1)

3. Demonstrate the ability to create research designs appropriate to quantitative and research questions (F2)

4. Demonstrates professional writing skills necessary for journal and newsletter publication (F3).

5. Understand various quantitative methods for evaluating counseling effectiveness (G2)

6. Understand the procedures for reviewing research literature

7. Understand sampling procedures

8. Understanding statistical concepts appropriate for analyzing data from different research designs

9. The student will understand and apply:
   a. research ethics
   b. design and implementation of quantitative research and methodology
   c. uses and limitations of statistical software (SPSS®).

V. Course Objectives/Learning Outcomes

Course Objectives
Students will have the knowledge and understanding of the following:

- research ethics
- models and methods of assessment and use of data
- univariate and multivariate research designs and data analysis methods
- formulate research questions appropriate for professional research and publication in counseling
- create research designs appropriate for professional research and publication in counseling
- Each student will develop and be able to demonstrate an understanding of the following:
  - How data is collected and how observations are quantified during the scientific and research process.
  - How observations are represented and stored in a data file.
  - The structure of a data file.
The scaling and coding of data.
- Frequency distributions; how data can be represented visually, and the strengths and weakness of such representation.
- Methods of appropriately describing the central tendencies of various distributions.
- Variability and how to quantify variability.
- The reasoning and assumptions underlying the inferential statistical process.
- Correlation, z-tests, t-tests and ANOVA
- The appropriate application and interpretation of various inferential statistical procedures.

Student Learning Outcomes
1. Students will design, identify, and evaluate research designs through examination, projects, and homework 3 and 4.
2. Students will formulate research questions specific to counseling research as evidenced by performance on exams and project.
3. Students will differentiate between descriptive, experimental, and correlational designs and will demonstrate appropriate application through examination, homework 3 and 4, and project.
4. Students will conduct a research project consistent with guidelines for publication relevant to the counseling profession in the project component of the class.
5. Students will apply quantitative evaluations specific to counseling effectiveness through completion of a research project and examination.
6. Students will complete a literature review on a counseling-related topic as evidenced by completion of a research project.
7. Students will identify differences in quantitative sampling procedures through examination, homework, and project.
8. Students will utilize statistical concepts appropriate for descriptive, experimental, and correlational designs in examination, project, and homework assignments.
9. Students will complete CITI training on research ethics, design a quantitative research project, and use SPSS in examinations and homework assignments.

VI. Course Topics
- Course Orientation
- Research overview and ethics
- Scaling, reliability, validity
- Experimental Design
- Frequencies, Measures of Central Tendency & Variability, Standard Scores
- Distributions & Hypothesis testing
- Correlational design
- Non-parametric statistics

VII. Instructional Methods and Activities
Lectures, Homework, SPSS Exercises, Computations, Exams, and a Research Project

VIII. Evaluation and Grade Assignment
All assignments due for a given day will be collected at the beginning of class. Any assignment not turned in at the time of collection will be considered late. All late assignments receive a letter
grade deduction. No late assignment will be accepted one week after due date. Any assignments not turned in by the last day of class will not be graded.

I understand that unforeseen circumstances occur. Stay on top of your work. Life events happen, computers break down, etc. If your plan is to print a document on its due date, you are taking increased risks. Please take care of yourselves in this regard.

RUBRICS/Writing Assignments:

To get full credit on written assignments, use American Psychological Association Publication Manual (6th Ed.) guidelines. All written assignments should use 12 point font, Times New Roman, 1” margins on top and bottom; 1” to 1.25” (default on MS Word) for left and right margins.

Research project (90 points)--This paper (approximately 4000 words, not including title page, abstract, and references) will be written in APA style. It will include a brief literature review on a topic of your choosing, a methods section, analysis, and discussion. Include all facets of an APA style paper: 12 point font, Times New Roman, double-spaced, title page, abstract, literature review, methods section, discussion. You may use data from any data set you wish or find your own data and select a statistical analysis discussed in this class. Beware of research ethics if you decide to use data from another source or collect data on your own.

For all written assignments, Content, Structure, and Style weighted equally. Review the rubric in the appendix of this syllabus.

For all homework, a point values is given for each graded section. Partial credit is possible for all computations and written responses (e.g., short essay, open-ended questions). Partial credit will be awarded when minor errors due to computation or a qualified understanding of a concept is noted. No credit is given when several minor errors or major errors/omissions are apparent.

GRADING:
Assignments........100 points
Exams..................150 points
Project...............90 points
Total....................340 points

306 - 340 POINTS - "A"
272 - 305 POINTS - "B"
238 - 271 POINTS - "C"
204 – 237 POINTS - "D"
203 & BELOW       - "F"
IX. Course Schedule and Policies

### Tentative Schedule

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<thead>
<tr>
<th>Date</th>
<th>Reading</th>
<th>Assignment/Presentation</th>
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<tbody>
<tr>
<td>8/26</td>
<td>APA Manual</td>
<td>Course Orientation</td>
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<td>Research overview and ethics</td>
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<td>9/2</td>
<td>QRE: Ch. 1-3</td>
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<td><em>Assign HW 1</em></td>
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<td><a href="http://research.tamu.edu/rcr.html">http://research.tamu.edu/rcr.html</a></td>
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<td>9/16</td>
<td>Ch. 4-5</td>
<td>Experimental Design, Part I, Measures, sampling, design, and experimental validity</td>
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<td>Ch. 4-5</td>
<td>Experimental Design, Part II, Models and experimental validity</td>
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<td>Ch. 6</td>
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<td>10/21</td>
<td>Ch. 7-8</td>
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<td><em>Take home exam due</em></td>
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<td>Ch. 7-8</td>
<td>Distributions &amp; Hypothesis testing</td>
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<td>Ch. 10</td>
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<td>Ch. 10-11</td>
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<td><em>Assign HW 4</em></td>
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<td>11/18</td>
<td>Ch. 12</td>
<td>Non-parametric statistics</td>
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<td><em>Assign Take Home Exam II</em></td>
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<td>Final Exam</td>
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### COURSE POLICIES

#### Attendance

In the past, successful students have found it useful to be on time and prepared for each class. This is accomplished by:

1. Attending each class
2. Having all assigned readings completed
3. Participation in class discussions.
Students are responsible for all information disseminated in class (even if the student is absent). You are adults and have adult lives and responsibilities. If an emergency arises, take care of yourself and your family. You cannot learn if you are distracted by emergencies. Only family emergencies are considered excused absences. I encourage you to strike a balance between your education and family life. You are responsible for obtaining missed material from fellow classmates.

**Late Work**

All late assignments receive a letter grade deduction. No late assignment will be accepted one week after due date. Any assignments not turned in by the last day of class will not be graded.

**Civility**

The demonstration of courtesy may be more of a reflection of an individual than feelings toward others. Civility, therefore, is a reflection of one’s professionalism and ethics. When breaches in civility occur (e.g., cell phones, texting, email, talking, etc.), both the learning environment and professional environment may be compromised. I strongly encourage personal and professional boundaries with regards to civility in a graduate class. For many of you, this is the last opportunity to be a student. Enjoy the learning process. While respect may vary toward peers, and even the instructor, respect for the academic environment and the credential pursued should be acknowledged.

**ACADEMIC INTEGRITY**


University students are expected to conduct themselves in accordance with the highest standards of academic honesty. Academic misconduct for which a student is subject to penalty includes all forms of cheating, such as illicit possession of examinations or examination materials, forgery, or plagiarism. (Plagiarism is the presentation of the work of another as one's own work.)

Disciplinary action for academic misconduct is the responsibility of the faculty member assigned to the course. The faculty member is charged with assessing the gravity of any case of academic dishonesty, and with giving sanction to any student involved.

Penalties that may be applied by the faculty member to individual cases of academic dishonesty include one or more of the following:

1. Written reprimand;
2. Requirement to re-do work in question;
3. Requirement to submit additional work;
4. Lowering of grade on work in question;
5. Assigning grade of "F" to work in question;
6. Assigning grade of "F" for course;
7. Recommendation for more severe punishment, such as dismissal from the program or from the University.

If the faculty member determines that assigning a grade of "F" to the course is the appropriate penalty and this disciplinary action occurs prior to the deadline for dropping courses, the student forfeits his/her right to drop the course in question.
If the faculty member recommends more severe punishment, such as dismissal from the program or from the University, the faculty member will notify the appropriate chair/college dean, who in turn will notify the Office of Student Affairs. If dismissal from the University is recommended, the Office of Student Affairs will follow its procedure for such cases.

The faculty member must file a record for each case of academic dishonesty, including a description of the disciplinary action taken, along with any materials involved, with his or her college dean, who will forward a copy to the Office of Student Affairs. The office of the academic dean of the college in which the offense took place will maintain records of all cases of academic dishonesty reported for a period of five years. The Office of Student Affairs will also maintain records of such cases for a period of five years. The Office of Student Affairs will inform the Graduate Dean as appropriate.

Any student who has been penalized for academic dishonesty has the right to appeal the judgment or the penalty assessed. Students who wish to appeal an academic dishonesty decision should contact the Office of Student Affairs for guidance.

**Dropping a Class**

I hope that you never find it necessary to drop this or any other class. However, events can sometimes occur that make dropping a course necessary or wise. Please consult with me before you decide to drop to be sure it is the best thing to do. Should dropping the course be the best course of action, you must initiate the process to drop the course by going to the Student Services Center and filling out a course drop form. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class. **April 1, 2011** is the last day to drop a class with an automatic grade of “W” this term.

**X. Textbook(s)**


**SOFTWARE**: SPSS® Graduate Pack V.17.0 or higher

Software is also loaded on several computers on campus.

**Recommended**


In addition, a number of supplementary articles may be discussed during the course. These will be used to supplement the texts and to exemplify how certain examined statistical methods are used in psychological research. Each of these supplementary readings will be made available by the instructor.

**XI. References/Resources**


[http://www.anselm.edu/homepage/jpitocch/biostatstime.html](http://www.anselm.edu/homepage/jpitocch/biostatstime.html) -- History timeline for statistics

[http://www.psychstat.smsu.edu/introbook/sbk00.htm](http://www.psychstat.smsu.edu/introbook/sbk00.htm) A very good on-line text for introductory statistics.


http://www.statistics.com/ -- Information about statistics software (major packages like SAS, SPSS and S-PLUS, shareware and smaller packages too), as well as about statistics analysis, data analysis and short courses in statistics.

http://www.dartmouth.edu/~chance/ -- The Chance Database; includes videos and audio on topics related to chance, statistics, probability, randomness, etc. An excellent site.

http://nilesonline.com/data/ -- Where to find data on the Internet; many sources, from agriculture to education to economics and more.

http://www.fedstats.gov/ -- More than 70 agencies in the United States Federal Government produce statistics of interest to the public. The Federal Interagency Council on Statistical Policy maintains this site to provide easy access to the full range of statistics and information produced by these agencies for public use.

Other sources of data may be found at the following:

http://lib.stat.cmu.edu/

http://lib.stat.cmu.edu/datasets/

http://lib.stat.cmu.edu/DASL/DataArchive.html

http://www.graphpad.com/quickcalcs/index.cfm

http://www.psycho.uni-duesseldorf.de/aap/projects/gpower/

http://www.psychstat.missouristate.edu/ASPX/default.aspx

http://www2.chass.ncsu.edu/garson/pa765/statnote.htm

http://core.ecu.edu/psyc/wuenschk/StatsLessons.htm

XII. Grade Appeals

As stated in University Rule 13.02.99.C2, Student Grade Appeals, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Rule 13.02.99.C2, Student Grade Appeals, and University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules.
Web site at http://www.tamucc.edu/provost/university_rules/index.html. For assistance and/or guidance in the grade appeal process, students may contact the Office of Student Affairs.

XIII. Disabilities Accommodations

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please call or visit Disability Services at (361) 825-5816 in Driftwood 101. If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816.

Appendix

University IRB Review

Not all protocols require a review by the full board. Studies can be exempt from IRB review, expedited, or require full review. The IRB protocol contains information regarding when a study may be exempt. The need for a full review may be dependent upon the following items:

- How is the researcher affiliated with the institution?
  - Why should the institution be vested in this study if the researcher is not on faculty or a student?
  - If the researcher is a student, is there a faculty member serving as a point of contact?
- Is the protocol new or a continuation?
  - Law allows one continuation without further review. IRB approvals are generally for one year.
- Are the subjects in a protected population--if so, there will be a full review. Protected population includes the following:
  - Minors
  - Prisoners
  - individuals of a diminished capacity
- Is there any risk in the study?
  - physical risk--physical exertion, drawing blood, etc.
  - damaging questions or information
- How is confidentiality going to be maintained?
  - Can the study be rendered anonymous?
- Is the study adequate for the risk?
- Are the risks identified in the consent form?
- Is the informed consent complete?
  - Is there consent?
Homework 1

Complete the IRB training and print your certificate to submit for a grade (10 points). Save a copy for your records, as you will need to demonstrate completion of this training prior to obtaining IRB approval.

Submit a 1-2 page review (12 point font, Times new Roman, double spaced, 1” margins) on the attached protocol. In your review, evaluate each of the eight bullet points described above and make a recommendation: (a) approve the protocol or (b) revise the protocol with specific suggestions of what needs to be revised). (10 points: 1 point per bullet point; 2 points for APA style).

Final Thoughts

Keep in mind that the IRB process is not a quick process. It is not uncommon for the entire review process to take a month or longer, especially if there are concerns or a revision is requested.

Homework 2 (20 points)

1. Complete the intro to SPSS tutorial from my website: http://web.me.com/rsbalkin/Site/Research_Methods_and_Statistics.html

2. Download the SPSS data from the following website: http://www.prenhall.com/greensalkind and open Lesson 21, Data File 1 (be sure it does not say Exercise File 1 or Exercise File 2)

3. Create a frequency distribution and bar graph for high school GPA. (4 points)

4. Create a grouped Frequency distribution by hand using interval of .5. (5 points)

5. Using Lesson 21 Exercise File 1, transform the anxiety scores to Z-scores and T-scores using SPSS. (5 points)

6. Dimitrov Chapter 6 study questions: 1, 2, 3, 4, 5, and 7 (6 points: 1 point each)

Homework 3 (20 points)
I. Using Lesson 21, Exercise File 1 (be sure it does not say Exercise File 2 or Data Set File 1), from the Green and Salkind data, complete the following:

1. Compute the mean, median, mode, range, variance, and standard deviation by hand. (6 points: 1 point each).

2. Conduct a univariate analysis using SPSS as demonstrated in class and reviewed in the Green and Salkind text on p. 150 (you will need to click on the plots option). (2 points)

3. Narratively describe your findings related to the statistics presented and the box plot by addressing (a) skewness of the distribution, (b) kurtosis of the distribution, (c) presence of outliers. (3 points: 1 point each).

4. Create a table in APA style that displays the mean, standard deviation, and sample size of the variable. (2 points)

II. Using Green and Salkind: Read pages 257-264. On p. 264:

1. do problems 1 through 4. (4 points: 1 point each)

2. Conduct a Pearson $r$ via hand computation between rating_1 and rating_2. Show your work. (3 points)

Homework 4 (30 points)

I. Use the following Green and Salkind dataset: Lesson 24, Exercise File 1 and use the scenario at the top of page 181 in the Green and Salkind text. Conduct the following:

1. Identify the following: (a) type of design (i.e. pre-experimental, quasi-experimental, true experimental), (b) independent and dependent variables, (c) research question. Write this in APA style. (3 points)

2. This study is a between-subjects post-test only model. What are the limitations/threats to experimental validity? (2 points)

3. Conduct an independent $t$-test using SPSS. In the output identify the following (5 points):
   a. Result of the normality assumption
   b. Result of the homogeneity of variance assumption
   c. Means and standard deviations for each group
   d. Result of the $t$-test
   e. $p$-value

4. Compute the following (i.e. hand calculations):
   a. $t$-test using descriptive statistics (i.e. means and standard deviations) (2 points)
   b. Cohen’s $d$ (1 point)

5. Write an APA results section. (2 points)
II. Use the following Green and Salkind dataset: Lesson 23, Exercise File 2 and use the scenario on page 174 in the Green and Salkind text, complete the following:

1. Conduct a dependent *t*-test using SPSS. In the output identify the following (5 points):
   a. Result of the normality assumption
   b. Result of the homogeneity of variance assumption
   c. Means and standard deviations for each group
   d. Result of the *t*-test
   e. *p*-value

2. Compute a Cohen’s *d* (1 point)

3. Write an APA results section. (2 points)

4. Using the raw scores, conduct the dependent *t*-test by hand. (7 points)

   **Sample results section**

   A non-directional, independent *t*-test was conducted between males and females based on test scores. An alpha level of .05 was utilized. Groups were normally distributed for males and females (*p* > .01) and variances were homogeneous, *F*(1, 8) = .670, *p* = .437). No statistically significant difference between males and females on test scores was evident, *t*(8) = .498, *p* = .632. Effect size was small, *d* = .33, indicative of minimal differences between the groups.
# Final Project Rubric (90 Points)

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<td>Evidence of original and critical thinking</td>
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