CNEP 6370
ADVANCED QUANTITATIVE ANALYSIS
Texas A & M University – Corpus Christi
Department of Counseling & Educational Psychology

INSTRUCTOR INFORMATION:

Instructor: Richard S. Balkin, Ph.D., LPC-S, NCC
Office Hours: The instructor is accessible for out-of-class advisement and professional consultation relative to course performance and academic achievement:

Monday 2:00 – 6:00
Tuesday 2:00 – 4:00
& by Appointment
Office: ECDC 151

Address: Texas A&M University-Corpus Christi
Department of Counseling & Educational Psychology, Unit 5834
ECDC 151, Corpus Christi, TX 78412

Telephone: (361) 825-2739 (Office)
E-mail: Richard.balkin@tamucc.edu

I. CATALOG DESCRIPTION OF THE COURSE
CNEP 6370. Advanced quantitative analysis. Three semester hours.

This class will focus on expanding each student’s knowledge of research design and statistical analysis beyond CNEP 6360 and EDLD 6392. Specific topics will include general linear model approaches to analysis of variance and regression analysis. Students will utilize SPSS to complete regularly assigned problems in order to demonstrate their competence. In addition, a special emphasis will be placed on the development of advanced quantitative skills needed to evaluate programs and student processes within a counselor educator model.

II. Rationale
This is a research course, emphasizing techniques in analyzing data, computing statistical results, and using statistical software. Outcomes include the ability to develop hypotheses, execute statistical tests, analyze the results, and communicate the results.

III. State Adopted Proficiencies
Coursework may be applied toward LPC licensure in the State of Texas.

IV. CACREP Standards and Additional Competencies
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 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. Understanding statistical concepts appropriate for analyzing data from different research designs

8. The student will understand and apply:
   a. design and implementation of quantitative research and methodology
   b. 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 correlational 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:
  o How data is collected and how observations are quantified during the scientific and research process.
  o How observations are represented and stored in a data file.
  o The structure of a data file.
  o The scaling and coding of data.
  o The appropriate application and interpretation of various inferential statistical procedures including ANOVA, factorial ANOVA, Repeated measures ANOVA, and regression.

Student Learning Outcomes

1. Students will design, identify, and evaluate research designs through examination, projects, and homework assignments focused on univariate parametric and nonparametric statistics.

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 focused on univariate parametric and nonparametric statistics and will demonstrate appropriate application through examination, homework assignments, 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 focused on univariate parametric and nonparametric statistics in examination, project, and homework assignments.

VI. Course Topics
1. ANOVA
2. Model assumptions
3. Statistical power
4. Effect size
5. Factorial ANOVA
6. Repeated measures ANOVA
7. Regression

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

VIII. Evaluation and Grade Assignment
Examinations (150 points, 75 points each): Examinations include 2 parts: (a) an in-class quiz (think of it as a little quizziepoo) focusing on notes and theory and (b) a take-home section focusing on SPSS and data analysis.

Homework assignments (90 points): You are encouraged to work in groups to complete your homework. Students tend to perform better in this class when small study groups are used for homework and exam preparation. While each student is required to turn in homework, working together is permissible and encouraged. However, exams are to be done individually. Students who work together on their exam have committed a serious infraction and will be referred to the graduate school, consistent with university policy, if cheating is suspected.

For all homework, a point value 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.

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

**GRADING POLICIES:** Finally, your grade will be assigned based on the following schemata:

- **A** = 297-330
- **B** = 264-296
- **C** = 231-263
- **D** = 198-230
- **F** = 197 & BELOW

**IX. Course Schedule and 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.

My attendance policy:

1. Upon your third absence, you will have a 10% deduction in your grade.
2. Four absences will result in an administrative drop or failing grade.

**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.

**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.

**Academic Integrity/Plagiarism**
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 12, 2013 is the last day to drop a class with an automatic grade of “W” this term.
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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/biostatstimetime.html -- History timeline for statistics

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

http://research.ed.asu.edu/siip/ -- Many resources for statistics, including databases.


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://wwwpsycho.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.tamu.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.
Review

Identify and define the scales of measurement.

What does statistically significant mean?

What is type I error?

What is type II error?

What is more problematic: type I or type II error?

What does practically significant mean?

Is there a difference between statistical significance and practical significance?

What is power?
Homework 1 (20 points)

1. Chapter 14 Study Questions: 1 – 3. (3 points: 1 point each)

2. Go to http://www.prenhall.com/greensalkind and download the data files. A researcher wishes to know whether blonds truly have more fun and has obtained a sample of (1) blonds, (2) brunettes, and (3) redheads. Using Lesson 25, Exercise File 1 conduct the following analysis below at the .10 level of significance.

Using SPSS: (8 points)
a) What is SSB?
b) What is SSW?
c) What is dfB?
d) What is dfW?
e) What is MSB?
f) What is MSW?
g) What is the F-value?
h) What is F_cri if alpha is .10?
i) Is this test significant?
j) How many post hoc pairwise comparisons can be performed?
k) Conduct a Tukey post hoc analysis for each of the pairwise comparisons. Identify which, if any, of the post hoc analyses, are significant.
l) What is the effect size? What does this value mean?
m) For each pairwise comparison report a Cohen’s $d$ (must be done by hand). What does these values mean?
n) Report power

Report the results in APA style (12 point font, Times New Roman, double spaced). (3 points)

Recompute the ANOVA by hand (5 points)

3. Using Lesson 25, Exercise File 2 conduct an ANOVA at the .05 level of significance.
a) What does the HOV test tell us about our data? (2 points)
b) How would you follow-up? Why? (2 points)

HW #2: Factorial ANOVA (40 points)

Go to http://www.prenhall.com/greensalkind and download the data files. Page 208 in the Green & Salkind text provides a description of the data.

I. Using Lesson 26, Exercise File 2 conduct the following analysis below at the .05 level of significance.

a. Identify SSA, SSB, SSAB, SSW, MSA, MSB, MSAB, MSE, and F values., p-values (7 points)
b. Evaluate model assumptions. What did you find? (3 points)
c. Is there an interaction? Create a graph that explains your answer. (2 points)
d. What are your results? Conduct the appropriate follow-up analyses. (4 points)
e. Write a results section in APA style. (4 points)
II. Use the following data set

A school counselor wishes to know whether journaling is helpful in counseling students with depression, and if these methods differ based upon sex. Sixty students were divided into equal groups, 30 males (1) and 30 females (2). Ten males and females received counseling via individual counseling and journaling (1), journaling only (2), or individual counseling only (3). Determine whether or not statistically significant differences are evident based on sex and counseling method at the .05 level of significance. For the significant interaction, analyze the simple effects first by comparing by sex and then again by group. Provide an appropriate graph for each analysis.

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Write a results section in APA style. Make sure you address the following points:

a. Model assumptions (3 points)
b. Interaction and necessary effects. Include a graph that explains your answer. (6 points)
c. Appropriate follow-up analyses. (4 points)
d. Effect sizes appropriate test of statistical significance (3 points)
e. Power—sensitivity analysis (2 points)
f. The differences in your results for each analysis of simple effects (2 points)
Homework 3 (10 points)

1. Begin review for test. Be prepared to discuss theory, SPSS output, methods, results, and calculate effect size.

2. Using lesson 29 exercise file 2 from Green and Salkind, run a one way repeated measures design at the .05 level of significance using SPSS: (5 points)
   a. Be sure to check model assumptions.
   b. Write an APA results section. (5 points)

Homework 4 (20 points)

Using Lesson 34 Exercise File 1: A statistics teacher has identified that math aptitude scores appear to be better predictors of performance than math GPA. The teacher has decided to investigate this.
   a. Conduct a simple regression with Math GPA as the predictor variable (5 points).
   b. Conduct a regression analysis to evaluate the relative importance of math aptitude and math GPA in predicting exam scores at the .05 level of significance. Be sure to report statistical significance of the model (F), practical significance of the model (R-squared), unique contributions by each predictor variable in APA style (10 points)
   c. How was Math GPA affected when it was grouped with math aptitude in Part B as opposed to being alone in Part A? Explain why this change occurred. (5 points)

Homework 5 (10 points)

1. Review the scenario on p. 311 Lesson 35 Exercise file 1 in Green and Salkind (do not do the problems).

2. Conduct a logistic regression (6 points)

3. Write a results section in APA style. (4 points)

Homework 6 (10 points)

1. p. 231 Green and Salkind, do problems 5 and 6.

2. Make sure you (a) ran a MANOVA, (b) a discriminant analysis post hoc, and (c) reported power using a sensitivity analysis. (6 points, 2 points each)

3. Make sure your results are written in APA style. (4 points)
Homework 7

1. Use the HSB data set available on my website and the following scenario:
   You would like to examine the relationship between literacy and self-esteem. Two measures were used to evaluate literacy: (a) reading and (b) writing. Two measures were utilized to evaluate self-esteem: (a) self-concept and (b) locus of control. Higher scores on reading and writing indicate higher achievement. Higher scores on self-concept indicate stronger self-concept. Higher scores on locus of control indicate more internal locus of control.

2. Perform a canonical correlation exploring the relationship between self-esteem and literacy. (4 points)

3. Write a results section in APA style. (6 points)
## Final Project Rubric (90 Points)

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<td><strong>Introduction (x1) (8 points)</strong></td>
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<td>Completeness of literature review</td>
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<td><strong>Discussion (x2) (24 points)</strong></td>
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<td>Conclusion</td>
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<td><strong>Style (APA, mechanics, format, citations, etc.) (x10) (20 points)</strong></td>
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