EDRE 8304.01
Advanced Quantitative Research

INSTRUCTOR: RALPH CARLSON
TERM: SPRING 2018
PHONE: (956) 665-3487/3466
EMAIL: ralph.carlson@utrgv.edu
OFFICE LOCATION: EEDU 1.208
OFFICE HOURS: MONDAY, TUESDAY, THURSDAY, FRIDAY 1:30-4:30 PM

CLASS TIME AND LOCATION: WEDNESDAY 4:40-7:30 PM EEDU 2.222

Textbook and/or Resource Material
Required Text:

Course Description and Prerequisites
The purpose of advanced quantitative research is to develop a deeper understanding of quantitative designs, data collection and data analysis. Prerequisite: EDRE 8300 and EDRE 8302. EDRE 8304 Advanced Quantitative Methods will include: Fisher’s Zr Transformation, comparison of correlation coefficients for one sample case, two independent samples case, and two dependent samples case; regression analysis, all possible regression/model of best fit; general linear model; one factor and two factors repeated measures ANOVA; between subjects and within subjects ANOVA; introduction to nested/hierarchical analysis, analysis of covariance, and effect size/practical/functional significance: partial eta squared and Cohen’s d.

Methods of Instruction (teaching)

A. Direct (expository) teaching
1. Lecture method of presentation of content (topic or concept):
   gestalt → parts → gestalt →
2. modeling
3. demonstrations
4. guided practice

This syllabus subject to change in order to better meet course objectives per discretion of instructor.
5. independent practice
6. measurement and evaluation

B. Activities
1. homework (independent practice)
2. class discussion
3. review

C. Methods of Learning for Students
1. mnemonic system(s)
2. elaboration of meaning
3. actively thinking about one’s thinking
4. management of self and information (content or skills to be acquired)

D. Methods of Measurement and Evaluation
1. grading of homework
2. tests (there will be one tests during the semester)

†CROSSWALK COURSE
This course satisfies: Intellectual, professional, and academic development for graduate students, masters and doctoral, and faculty.

Learning Objectives/Outcomes for the Course
Student Learning Outcomes

After instruction/teaching:

1. Students will be able to utilize and engage rational thought and data.
2. Students will know what some of the criteria might be for knowing/science.
3. Students will know what some of the characteristics are for knowledge/science.
4. Students will know and understand the logic system for hypothesis testing.
5. Students will be able to partition variance and covariance into its various sources and error term(s).
6. Students will understand what statistical significance means and what it does not mean.
7. Students will be able to specify the criteria and conditions for falsifying, debunking, or deleting their most cherished hypotheses, ideas, and theories (Sir Francis Bacon).
8. Students will be able to interpret effect size/practical/functional/substantive significance: partial eta squared and Cohen’s d.
9. Students will be able to use exploratory and confirmatory data analysis side by side (Tukey, 1977).

Course Technology

Tools: SPSS (Statistical Package for the Social Sciences)

UTRGV University Policies

UTRGV Policy Statements

The UTRGV disability accommodation, mandatory course evaluation statement and sexual harassment statement are required on all syllabi. Additional policy statements are optional, such as those covering attendance, academic integrity, and course drop policies.

STUDENTS WITH DISABILITIES: Required on all syllabi. Do not modify.
If you have a documented disability (physical, psychological, learning, or other disability which affects your academic performance) and would like to receive academic accommodations, please inform your instructor and contact Student Accessibility Services to schedule an appointment to initiate services. It is recommended that you schedule an appointment with Student Accessibility Services before classes start. However, accommodations can be provided at any time.

Brownsville Campus: Student Accessibility Services is located in Cortez Hall Room 129 and can be contacted by phone at (956) 882-7374 (Voice) or via email at ability@utrgv.edu.

Edinburg Campus: Student Accessibility Services is located in 108 University Center and can be contacted by phone at (956) 665-7005 (Voice), (956) 665-3840 (Fax), or via email at ability@utrgv.edu.

MANDATORY COURSE EVALUATION PERIOD:

Students are required to complete an ONLINE evaluation of this course, accessed through your UTRGV account (http://my.utrgv.edu); you will be contacted through email with further instructions. Students who complete their evaluations will have priority access to their grades. Online evaluations will be available:

ATTENDANCE:
Students are expected to attend all scheduled classes and may be dropped from the course for excessive absences. UTRGV’s attendance policy excuses students from attending class if they are participating in officially sponsored university activities, such as athletics; for observance of

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religious holy days; or for military service. Students should contact the instructor in advance of the excused absence and arrange to make up missed work or examinations.

Spring Mandatory Course Evaluation Period

| February 14 - February 20 | Spring 2018 Module 1 |
| April 11 - April 17      | Spring 2018 Module 2 |
| April 11 - May 2         | Spring 2018 (Full Semester) |

SCHOLASTIC INTEGRITY: Recommended on all syllabi.
As members of a community dedicated to Honesty, Integrity and Respect, students are reminded that those who engage in scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and expulsion from the University. Scholastic dishonesty includes but is not limited to: cheating, plagiarism, and collusion; submission for credit of any work or materials that are attributable in whole or in part to another person; taking an examination for another person; any act designed to give unfair advantage to a student; or the attempt to commit such acts. Since scholastic dishonesty harms the individual, all students and the integrity of the University, policies on scholastic dishonesty will be strictly enforced (Board of Regents Rules and Regulations and UTRGV Academic Integrity Guidelines). All scholastic dishonesty incidents will be reported to the Dean of Students.

SEXUAL HARASSMENT, DISCRIMINATION, and VIOLENCE: Required on all syllabi. Do not modify.
In accordance with UT System regulations, your instructor is a “responsible employee” for reporting purposes under Title IX regulations and so must report any instance, occurring during a student’s time in college, of sexual assault, stalking, dating violence, domestic violence, or sexual harassment about which she/he becomes aware during this course through writing, discussion, or personal disclosure. More information can be found at [www.utrgv.edu/equity](http://www.utrgv.edu/equity) including confidential resources available on campus. The faculty and staff of UTRGV actively strive to provide a learning, working, and living environment that promotes personal integrity, civility, and mutual respect in an environment free from sexual misconduct and discrimination.

COURSE DROPS: Recommended on all syllabi; may be modified by the instructor as long as it is not inconsistent with UTRGV policy.
According to UTRGV policy, students may drop any class without penalty earning a grade of DR until the official drop date. Following that date, students must be assigned a letter grade and can no longer drop the class. Students considering dropping the class should be aware of the “3-peat rule” and the “6-drop” rule so they can recognize how dropped classes may affect their
academic success. The 6-drop rule refers to Texas law that dictates that undergraduate students may not drop more than six courses during their undergraduate career. Courses dropped at other Texas public higher education institutions will count toward the six-course drop limit. The 3-peat rule refers to additional fees charged to students who take the same class for the third time.

Course Policies
Attendance Policy (Refer to UTRGV Policy)

Calendar of Activities

Calendar of Activities
Include in this section a table or list that provides information for students regarding important dates, assignments or activities. The UTRGV academic calendar can be found at http://my.utrgv.edu at the bottom of the screen, prior to login. Some important dates for spring 2018 include:

<table>
<thead>
<tr>
<th>Spring 2018 Term (January 16 – May 10)</th>
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<tbody>
<tr>
<td>Oct. 30 (Mon.)</td>
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<td>Jan. 10 (Wed.)</td>
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<td>Jan. 12 (Fri.)</td>
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<td>Jan. 15 (Mon.)</td>
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<td>Jan. 16 (Tues.)</td>
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<td>Jan. 19 (Fri.)</td>
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<td>Jan 22 (Mon.)</td>
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<td>Jan 29 (Mon.)</td>
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<td>Feb. 5 (Mon.)</td>
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<td>Feb. 12 (Mon.)</td>
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<td>Mar. 12 – Mar. 17 (Mon. – Sat.)</td>
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<td>Mar. 30 – Mar. 31 (Fri. – Sat.)</td>
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<td>April 12 (Thurs.)</td>
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<td>May 3 (Thurs.)</td>
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<td>May 4 – 10 (Fri. – Thurs.)</td>
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<td>May 11 – 12 (Fri. – Sat.)</td>
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<td>May 14 (Mon.)</td>
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This syllabus subject to change in order to better meet course objectives per discretion of instructor. 5
Outline for Intermediate Statistics
Ralph Carlson

I. Correlational Analysis
   1. correlation and covariance
   2. correlation of how X and Y vary independent with how this canary together
   3. bivariate distributions
   4. linear and non-linear bivariate distributions
   5. hypothesis testing in correlational analysis
      a.) $H_0: \rho = 0$, tested with or $t$ distribution
      b.) $H_0: \rho = K$ one sample case $Z$ test, through Fisher's $Z_r$ transformation
      c.) $H_0: \rho, -\rho_2 = 0$ for two independent samples, tested with a $Z_r$
         transformation (a note of caution with the two dependent sample case and
         assumptions
      d.) assumptions
         1. random sampling
         2. bivariate normal or linearity and homoscadasticity
   6. Partial, Part, and multiple correlation

II. Bivariate and Multiple Regression
    1. contrasting correlation and regression analysis
    2. $\hat{y} = b_0 + b_1 (x_1) + b_2 (x_2) + \ldots$
    3. weights or regression coefficients
    4. standardized regression coefficients and partials
    5. multiple regression coefficient
    6. forward and stepwise regression
    7. backward regression
    8. assumptions in regression analysis

III. Linear Models

IV. Power; type I, II, III, IV errors; statistical significance; practical or functional, or
    effect size

V. One-way; two-way and three way factorial ANOVA completely randomized
    independent groups (a review)
    1. hypothesis testing
    2. assumptions
       a.) independent random sampling
       b.) normality of distribution
       c.) homogeneity of variance
    3. multiple comparison
       a.) a-priori
       b.) a-posteriori
       c.) Scheffe
       d.) Bonferroni
4. one-way repeated measures ANOVA
   a.) assumptions
      1. independent random sampling
      2. normality of distribution
      3. homogeneity of the variance covariance matrices
   b.) trend analysis

5. two-way factorial ANOVA with both factors repeated measures

6. two-way factorial ANOVA with the first factor between/among groups and the second factor within groups
   a.) assumptions
      1. independent random sampling
      2. normality of distribution
      3. homogeneity of variance for between factor
      4. sphericity

7. three-way factorial ANOVA with first and second factor between and third factor within

8. three-way factorial ANOVA with first factor between and the second and third factors within
   a.) partitioning of "error" term
   b.) assumptions and Geisser-Greenhouse conservative test

VI. One-way and two-way analysis of covariance
   a.) example of a mathematical/statistical in research
   b.) assumptions

VII. One latin square; two latin squares; Greco-Latin square
    a.) example of experimental controls of sequence effect through counterbalancing

VIII. Hierarchical/Nested ANOVA
      a.) with independent group
      b.) with repeated measures
      c.) partial hierarchical/nested ANOVA

IX. Introduction to MANOVA
    a.) one-way MANOVA
    b.) assumptions
GRADING SYSTEM

1. Tests
   Grade     Criteria
   A         performance on two examinations
   B         performance on analysis of data sets and interpretation below the mean

ATTENDANCE GUIDELINES

A. None Required
B. The student is responsible for any information which is missed during an absence.

TEXTBOOKS


GRADING SYSTEM

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TEXTBOOKS

