EDU 7043: Educational Research Statistics: Descriptive and Comparative[1]
Fall 2018 Course Syllabus

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Office Hours/Availability: Please contact me if you would like to meet outside class time

Class Location/Meeting Times
DT campus, Frio Street Bldg., 3.412; Thursdays 6:00 – 8:45pm

Final Exam Time:
Thursday, December 13th at 6:00-8:30pm

Course Textbooks

Recommend Textbooks
Wickham, Hadley and Garrett Grolemund (2017). *R for Data Science: Import, Tidy, Transform, Visualize, and Model Data.* O'Reilly Media. ISBN-13: 978-1491910399.

Teetor, Paul (2011). *R Cookbook.* O'Reilly Media. ISBN-13: 978-0596809157.

Other readings may be provided and will be available through Blackboard Learn.

Course Software
We will be using the statistical software package R. I have chosen to use this software package because it is 1) Free; 2) widely supported via online forums; and 3) it is quickly becoming industry standard and can be very valuable given tight budgets in non-profit/not-for-profit environments.

Students will be required to access https://cran.r-project.org/ to download R. Students are also highly encouraged to install and use R-Studio (https://www.rstudio.com/products/RStudio/#Desktop). Note that you must first install R for R-Studio to properly work. We will also be installing R-packages throughout the course.

Students are also strongly encouraged to sign up for a http://github.com account. I will be posting code to the github for this course. Also, students can easily post their code to github for the purposes of fulfilling weekly assignments.

Detailed Course Description/Purpose

This course provides a foundation in descriptive statistics and inferential statistics covering t-tests, ANOVA, simple linear regression, and Chi Square. At the end of this course you will be able to select the appropriate statistical tool for analysis, based on knowledge of assumptions underlying those tools, as well as interpret and report the results of your efforts.

[1] This syllabus has been adapted from Vanessa A. Sansone's EDU 7043 syllabus

The statistical methods you learn in this course will help you gain the analytical skills necessary to conduct the first steps in quantitative research. These steps play a critical role in the scientific process by *describing* trends and variations in populations, samples, and data quality, which help researchers to understand and interpret the story that the data are telling. This course will focus on the application and interpretation of statistics with less emphasis on theory. Although theory is an important factor to any serious investigation, I want to be able to equip you with the necessary tools to complete first-class research.

Data examples used in this class will primarily include the use of K-12 and higher education and Census data sources. However, at times, data sources outside these areas may be used. For the purpose of your mid-term and final paper, you may need to furnish your own data.

Lastly, this class is intended to provide students with the knowledge to learn critical quantitative skills. These skills will help you come away with an understanding of how descriptive statistics are interpreted and used in educational policy at different levels (e.g. classroom, district, state, federal, etc.).

As a result of taking this class you will also be prepared for more advanced coursework in statistics.

Course Objectives

At the end of the course you should be able to:

1. Use and understand descriptive statistics to aid yourself and others in understanding about the information collected in your research.
2. Use and understand basic comparative analyses – t-tests, ANOVA, chi square, and nonparametric tests – to analyze data.
3. Use and understand basic correlational and simple regression analyses to understand bivariate relationships.
4. Determine what statistical analysis is appropriate for specific research designs – this involves knowing about the assumptions underlying the statistical analyses.
5. Conduct an independent, quantitative research project.
6. Express the results using standard APA style so that colleagues can clearly understand what you did, what your results were, and what the implications of the results are.
7. Critique the research and statistical analyses used by others.
8. Use R to conduct the descriptive and inferential statistics presented in class and in the texts and to manage datasets in order to conduct those tasks.
9. Use and understand critical quantitative methods.

Components of Class and Grading

1. **Take-Home Learning Exercises** (35%) – There will be seven learning exercises assigned throughout the course. Each exercise will be worth 5% of your grade. These exercises will be composed of problems and essays focused on information concerning the material covered in class.
2. **Mid-term** (30%) – The mid-term exam will consist of detailed data analysis of a real data set along with accompanying write-up of the results. The mid-term will be given out on . The mid-term is designed as an accountability structure to make sure you are making adequate progress on your individual research project.

3. **Individual Research Project w/ Written Report** (35%) – Your research project must include AT LEAST THREE RESEARCH QUESTIONS AND THE APPROPRIATE STATISTICAL ANALYSES FOR EACH QUESTION. There is no set page limit on the final written report of the research project, however, in the past the median length has been 15 pages and the maximum has been 25.

    a. **Brief Literature Review** pertaining to topic **(10% of grade)** – summarize no less than 8 research articles that pertain to the topic you've chosen in APA style throughout the review and include a References section. **1-2 pages.**
    b. **Introduction, Research Questions and Hypotheses (10% of grade)** – state your research topic, rationale for selecting the topic, including a brief description of why you chose the topic, research questions, and hypotheses based on literature. **1-2 pages.**
    c. **Methodology (10% of grade)** – describe briefly how you plan to collect data (i.e. what is your source of data?), sample, variables (i.e. which IVs and DVs will be used?), and a preliminary discussion of how the data will be analyzed. **1-2 pages.**
    d. **10-minute Presentation of Completed Research Project (20% of grade) –** a presentation of the research project that includes introductory information, research questions and hypotheses, method/procedures used to carry out the project, results and conclusions/discussion. Model this presentation around a SUMMARY of the written report (see below).
    e. **Written Report of Research Project (50% of grade)**
        i. Introduction – a brief summary of:
            1. Intro/Purpose of Study (see NOTE, below)
            2. Research Questions – there should be a research question EACH of the analyses you perform.
            3. Null and Alternate Hypotheses – there should be null and alternate hypotheses for each analysis you perform.

            NOTE: a formal, extensive, literature review is not necessary, but you should consider a few articles (original research or peer-reviewed articles) that set the context for the study.
        ii. Methodology – Where did the data originate? Who were the participants and how were they selected? How were participants assigned to different groups, etc.? What variables are you using to conduct the analyses?
        iii. Results – Start with the descriptive statistics, then proceed to each research question and the analysis associated with it; make sure to include the values of the test statistic, degrees of freedom, the p-value obtained, and a statement as to statistical significance. Also, you MUST include an indication of the effect size of each result, and a narrative that includes your evaluation of the "practical significance" of the results.
        iv. NOTE: APA Style is required for all components of the paper – narrative and any tables and/or figures you use.
        v. NOTE: you MUST turn in the R code for all analyses that you conducted – as an attachment to your research report.

Determination of Course Grade

Each course requirement (above) will be graded on a 100-point scale. I will enter those grades and multiply each by the weights (percentages/proportions) above. The resulting total grade will therefore be on a 100-point scale, and the course grade will be assigned as below: A = 90 or higher B = 80 to below 90 C = 70 to below 80 D = 60 to below 70 F = Below 60

Tentative Course Schedule of Assignments

Date(s)	Material to be Covered	Readings/Assignments/Exercises/Etc.
Aug 23	• Introduction to Course	Install R/R-Studio; Sign Up for GitHub
Aug 30	• R Basics • Central Tendency	Assignment #1 "Deracializing Social Statistics" by Tukufu Zuberi from *White Logic, White Methods: racism and Methodology*
Sept 6	• Describing data numerically and graphically (distribution, central tendency and variation)	Assignment #2
Sept 13	• Probability and probability distributions	
Sept 20	• Probability and probability distributions continued • Research Design and Inferential Statistics	Assignment #3
Sept 27	• Research Design and Inferential Statistics continued • Single sample t-test	Assignment #4 **Brief Literature Review Report Due by 6:00pm**
Oct 4	• Confidence intervals and statistical testing	**Mid-Term Handed Out**
Oct 11	**Fall Break**	**Mid-Term Handed Due by 8:30pm**
Oct 18	• Comparison of continuous variables (central tendency) across groups (k=2) (t-test, U-Test)	
Oct 25	• Comparison of a continuous variable across multiple (k>2) groups (ANOVA, Kruskall-Wallis)	Assignment #5 **Introduction, Research Questions and Hypotheses Report Due by 6:00pm**
Nov 1	• Comparison of a discrete variable across multiple groups (Cross-tabulation and Contingency table analysis, chi square tests)	Assignment #6 "Causation and Race" by Paul W. Holland from *White Logic, White Methods: racism and Methodology*
Nov 8	• Correlation and Bivariate Regression	**Methodology Report Due by 6:00pm**
Nov 15	• Intro to Regression Analysis (Ordinary Least Squares principle, association between variables) • Intro to Multiple Linear Regression continued	Assignment #7
Nov 22	**THANKSGIVING**	
Nov 29	**Presentations of Research Papers**	
Dec 6	**Presentations of Research Papers**	
Dec 13	**Written Research Report Due** Thursday, December 13th at 6:00-8:30pm	

Course & UTSA Policies/Services

Turning in Assignments
All written work for this course must conform to the American Psychological Association Style Manual, 6th Edition. Grades on all assignments will be affected by your ability to conform to the APA style guidelines.

All course assignments will be turned-in as attachments to emails sent to my email address.

Formats for Assignments:

Word Documents for all materials – use "docx" versions, please – if at all possible.

- 1" margins, 12 pt. Times New Roman font, include page numbers, header
- TITLE your documents in the following way:
    - YourLastname_YourFirstname_Assignment_#.docx
    - Example: using my name as if I were a student
        - **Martinez_Matthew_Assignment_#1. docx**

Classroom Etiquette
It is expected that all students be on-time for class and behave with courtesy and respect for the instructor and all fellow students during class. Should behavioral disruptions occur which interfere with the general learning environment, the student may be reported to the Office of Student Judicial Affairs in accordance with section 202 of the Student Code of Conduct (http://www.utsa.edu/OJSA). With respect to cell phones, I ask that you turn yours OFF prior to the beginning of class.

Attendance
Because of our limited meeting schedule and because it is your professional responsibility, you are expected to attend all classes. In understanding that emergencies come up, the instructor will permit one unexcused absence. After that, for each class you miss, three points will be deducted from your final numerical grade, unless the absence results from and is verified in writing for one of the following reasons: (i) participation in a required/authorized university activity, (ii) verified illness, (iii) death in the student's immediate family, or (iv) religious holy day occurrence. All assignments are due on the date assigned, regardless of your presence in class. If you know that you will be absent on the day of a due assignment, please plan accordingly.

Campus Carry
Pursuant to HOP 9.48, Carrying of Concealed Handguns on Campus, **MY PRIVATE OFFICE IS A DESIGNATED EXCLUSION ZONE**. As set out in Section 30.06, Penal Code (trespass by license holder with a concealed handgun), a person licensed to carry a Concealed Handgun under Subchapter H, Chapter 411 Government Code (handgun licensing law), may not enter this property/office with a concealed handgun.

De conformidad con HOP 9.48, Llevar Armas de Fuego Encubiertas en el Campus, mi oficina privada es una zona designada de exclusión. Conforme a la sección 30.06 del código penal (trespasar portando armas de fuego) personas con licencia bajo del sub-capitulo H, capitulo 411, codigo de gobierno (ley de portar armas), no deben entrar a esta propiedad portando un arma de fuego.

Counseling Services
Counseling Services provides confidential, professional services by staff psychologists, social workers, counselors and psychiatrists to help meet the personal and developmental needs of currently enrolled students. Services include individual brief therapy for personal and educational concerns, couples/relationship counseling, and group therapy on topics such as college adaptation, relationship concerns, sexual orientation, depression and anxiety. Counseling Services also screens for possible learning disabilities and has limited psychiatric services. Visit Counseling Services at http://utsa.edu/counsel/ or call (210) 458-4140 (Main Campus) or (210) 458-2930 (Downtown Campus).

Student Code of Conduct and Scholastic Dishonesty
The Student Code of Conduct is Section B of the Appendices in the Student Information Bulletin. Scholastic Dishonesty is listed in the Student Code of Conduct (Sec. B of the Appendices) under Sec. 203 http://utsa.edu/infoguide/appendices/b.html#sd

Students with Disabilities
The University of Texas at San Antonio in compliance with the Americans with Disabilities Act and Section 504 of the Rehabilitation Act provides "reasonable accommodations" to students with disabilities. Any student with a disability who is requesting an accommodation for this course must provide the instructor with official documentation in the form of a letter from Student Disability Services. Only those students who have officially documented a need for an accommodation will have their request honored. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.utsa.edu/disability or by calling Student Disability Services at (210) 458-4157 (Main) or (210) 458-2945 (Downtown).

Tomás Rivera Center
I encourage you to utilize the Tomás Rivera Center's (TRC) student support services for assistance in study strategies and course content. These services are available to you at no additional cost. For more information regarding these services, please visit the TRC web site at www.utsa.edu/trcss.

- Academic Success Coaching provides one-on-one study skills assistance through Academic Coaching and group study skills assistance through the Expert Learner Series Workshops. Call the office to schedule an Academic Coaching appointment at (210) 458-4694, visit the TRC web site for the Expert Learner Series schedule, or stop by MS 1.02.02.
- Supplemental Instruction (SI) offers student-led study groups using collaborative learning for historically difficult classes. Supported courses and schedules can be found on the TRC web site or check with your class SI Leader for details. You can call the SI office if you have questions or for more information at (210) 458-7251.
- Tutoring Services provides walk-in tutoring in a variety of subjects with several locations to choose from and the Math Assistance Program (MAP) for assistance in College Algebra and Pre-Calculus. Call (210) 458-6783 for more information or visit the TRC web site for tutoring schedules.

If you are taking classes at the DT Campus, the TRC Downtown offers a variety of services to assist you. Stop by the TRC at the Downtown Campus in DB 2.114 or call (210) 458-2838.

Writing Center
At the Judith G. Gardner Center for Writing Excellence, peer tutors help undergraduate and graduate students with any step in the writing process, from brainstorming and understanding an assignment to planning and revising. They can help with all types of writing assignments. In addition to one-on-one tutoring, they offer workshops throughout the semester on documentation and other writing topics. There are two locations: JPL 2.01.12D (main campus) and FS 4.432 (downtown campus). They also

offer online tutoring seven days a week. To learn more about their hours and to make an appointment, visit the website: utsa.edu/twc.

Transitory/Minor Medical Issues
In situations where a student experiences a transitory/minor medical condition (e.g. broken limb, acute illness, minor surgery) that impacts their ability to attend classes, access classes or perform tasks within the classroom over a limited period of time, the student should refer to the class attendance policy in their syllabus.

Copyright and Fair Use
For more information on copyright, see the University of Texas System Office of General Counsel web site. A printed copy is also available at the Reference, Circulation and Multimedia Center service desks in the Library. For local guidance, please contact the UTSA Library at 210.458.7506 and check the information at http://lib.utsa.edu/About/Policies/copyright.html.

The Roadrunner Creed
The University of Texas at San Antonio is a community of scholars, where integrity, excellence, inclusiveness, respect, collaboration, and innovation are fostered.
As a Roadrunner, I will:

- Uphold the highest standards of academic and personal integrity by practicing and expecting fair and ethical conduct;
- Respect and accept individual differences, recognizing the inherent dignity of each person;
- Contribute to campus life and the larger community through my active engagement; and
- Support the fearless exploration of dreams and ideas in the advancement of ingenuity, creativity, and discovery.

Guided by these principles now and forever, I am a Roadrunner!

Changes
This syllabus is provided for informational purposes regarding anticipated course content and schedule of courses. It is based upon the most recent information available on the date of its issuance and is as accurate and complete as possible. I reserve the right to make any changes necessary and/or appropriate. I will make every effort to communicate any changes in a timely manner. Students are responsible for the awareness of these changes.