EDUC/PSY 6600 – Fall 2018

Research Design and Analysis I
CRN: 44779/44777
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Course Description
Welcome to Quant I! Research design and statistical concepts for research in education, human services, and psychology, with emphasis on the selection and interpretation of statistical analyses. This class will be an in depth introduction to descriptive and inferential statistics for the behavioral sciences. Fear not, this class will cover a theoretical, structural, and *applied* overview of the statistics in the behavior and social sciences. The ultimate purpose is for you to utilize the material in all aspects of your life; academic, professional, and personal.
Students will learn how to differentiate and appropriately select the best statistical methods for use in various research designs and analytical problems.
This course will mostly focus on basic statistical techniques and several forms of the ANOVA model, which can be used by themselves or serve as building blocks for more advanced techniques in other courses. Students will also learn how to use the R statistics programming environment to analyze data and interpret/communicate results of analyzes.

Prerequisites
EDUC/PSY 6570, passing score on 6600 Pretest via WebCT, and permission of instructor.

Course Materials
Cohen, B. H. (2008). Explaining psychological statistics. John Wiley & Sons.
NOTE: Do not buy this book unless you really want to. You can view and read it online FREE at this link.

Course Structure
This is a lecture and applied skills course. Students will be expected to demonstrate their learning via classroom participation, assignments, and examinations. The purpose of class lectures is to elaborate on interesting or difficult material presented in the text, conduct skill-building exercises and demonstrations, and to provide a forum for discussion.

Preparation and Attendance
The nature of this course requires regular class attendance and participation. The student is therefore expected to read assigned chapters BEFORE each class session in order to be prepared for classroom activities and discussion (see 'Summaries' below). Please note that this is a 3-credit course in a 15-week period, requiring an average of approximately 9 HOURS of time outside of class EVERY WEEK devoted to reading and homework for students who are adequately prepared for this course. Students should not miss class lectures as some material covered in class will not be covered in the text. All information covered in the text and lectures is fair game for examination questions. The instructor encourages all students who have or anticipate attendance difficulties to discuss these issues with them as soon as possible.

Course Requirements
R: You will develop a proficiency in R. This software will make computing statistics easy, understand the process of data structures, grant you the ability to recognize patterns in the data, and interpret statistical output (i.e. graphs and tables). This will be a big portion of your lab assignments and exams. Instructions for downloading R and getting started with RStudio and necessary packages can be found here. We will also work through this process within the first two weeks of class.

Unit Homework: There will be 6 Unit Assignments, each worth 80 points. The design of the units build upon each. For example, the material from Unit 1 will be crucial for success on Unit 2, and so on. Assignments will include questions to assess your conceptual understanding of the topic, formulations, and ability to apply the material. A typical lab will ask you to compute a statistic by hand, understand what happens to the statistic when aspects of the data are changed, infer what can be concluded from the data, and apply necessary techniques via R. The units can be tedious and take some time to complete. Do not wait until the last minute to try complete an entire assignment. Be sure to give yourself the appropriate time to complete everything. Also, technology is not perfect. Canvas or internet access could very well experience an outage, which would hinder your plans to procrastinate to the last minute useless. In addition, you may experience an issue with R. While most issues with R are easily resolved, it would be best to have additional time to work through the issues and reduce your stress/worry.

Summaries: There will be 12 summaries due, each worth 10 points. These are spaced out throughout the semester (see tentative course schedule) and are to be posted on Canvas. You are to write a 1-2 paragraph summary of the assigned chapter from the text. In these summaries, I would like you to reflect on what you learned, what you would like more information on, and what you were confused about. I will review these comments before class and address the points made at the beginning of class. These will help structure the lecture in order to get the most out of our time together.

Exams: Four exams will be given. The exam will consist of multiple-choice questions, short answer, and applied analytical interpretations. Each exam will be worth 100 points. All exams will be taken via Canvas. Exams can only be completed once. You will have an entire class period to take the exam.

Grades: Total points earned in the course will determine grades. Total points will be computed by adding up your 6 unit assignments (480 pts total), summaries (120 pts total), exam grades (400 pts total), and any extra credit you may have earned.

Criteria for assigning grades are as follows:

Grade	**% of Possible Points**	**Total Points**
A	93-100%	930+
A-	90-92.$\bar{9}$%	900-929.$\bar{9}$
B+	88-89.$\bar{9}$%	880-899.$\bar{9}$
B	83-87.$\bar{9}$%	830-879.$\bar{9}$
B-	80-82.$\bar{9}$%	800-829.$\bar{9}$
C+	78-79.$\bar{9}$%	780-799.$\bar{9}$
C	73-77.$\bar{9}$%	730-779.$\bar{9}$
C-	70-72.$\bar{9}$%	700-729.$\bar{9}$
D+	68-69.$\bar{9}$%	680-699.$\bar{9}$
D	60-67.$\bar{9}$%	600-679.$\bar{9}$
F	<60%	0-599.$\bar{9}$

These criteria are fixed and will not be changed during the semester.

Course Policies

Late assignments/Make-Ups: No late assignments or make-ups will be accepted. No exceptions. If you know ahead of time that you will be miss a deadline for an assignment/exam due to a University sanctioned activity, professional development, or significant life event (significant life event will be determined at the professor's discretion), you may be able to submit work after the scheduled due. HOWEVER, you must let me know beforehand in order to arrange a time to do so. In all cases, I must be notified before the missed due date to possibly allow an extension.

Extra Credit: You may earn up to 50 extra credit points on the 1000-point scale of this course by participating in authorized experiments conducted by the Psychology Department. Opportunities can be found via SONA.

You will first need to request an account and then you will be able to see any ongoing research project.

You must be aware that there are no guarantees you will be able to receive any extra credit in this manner. The research activity of Psychology Department faculty and students vary; so, projects will not necessarily be available to you. When available, research participation is a chance for you to gain at least some insight into the research process. You are strongly encouraged to take advantage of these learning opportunities.

During some semesters, other kinds of extra credit opportunities may also be made available to you. These might include extra class work, random attendance points (I may take roll and give points for those who have attended), or some service activity approved by your instructor (e.g., contribution to a university-wide blood drive), to mention a few of the possibilities.

Canvas: I use Canvas to post any material related to lecture (handouts, PowerPoints, lecture recordings, etc.), announcements, and any other relevant documents/information. It is your responsibility to make use of Canvas and are receiving the announcements I send out.

Technology is not flawless. As result, leave yourself enough time to complete any assignments. In addition, this course is designed to be used with scaffolding knowledge. In non-technical terms, you need to understand the first concept well before you can understand the second concept and so-forth.

Calculators: You are welcomed to use a calculator. However, you should note that basic calculators (like the ones on your phone, tablet, computer, etc.) cause issues. This is due to the ease of plugging in formulas incorrectly so that the order of operations messes things up. If possible, use scientific calculators, Excel, or R. Examples will be provided on how you can utilize Excel and R to obtain the statistic of interest.

Academic dishonesty: Academic dishonesty will not be tolerated in this class. Copying a fellow student's work, copying an outside source and claiming it as your own, and turning in work written for another class all constitute academic dishonesty. Students caught cheating in this course may receive an "F" on the assignment, in the class, and/or reported to the dean.

Sexual Harassment: Sexual harassment is defined by the Affirmative Action/Equal Employment Opportunity Commission as any "unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature." If you feel you are a victim of sexual harassment, you may talk to or file a complaint with the Affirmative Action/Equal Employment Opportunity Office located in Old Main, Room 161, or call the AA/EEO Office at 797-1266

Students with special needs: If you are in need of accommodations due to a disability of any sort, please do not hesitate to talk to me, as well as the Disability Resource Center (DCR) in Room 101 of the University Inn, 797 – 2444, or toll free at (800) 259 – 2966. Another available (and free) resource is the Academic Resource Center. Their mission is to foster and enhance learning skills, study strategies, and personal attitudes conducive to academic success. They are located in THC 305 and can be reached at 435-797-1128.

These resources are free to students and they can help you succeed, but you need to be proactive and seek out the help yourself.

Withdrawal Policy and "I" Grade Policy: Students are required to complete all courses for which they are registered by the end of the semester. In some cases, a student may be unable to complete all of the coursework because of extenuating circumstances, but not due to poor performance or to retain financial aid. In such cases an 'I' will be submitted as the grade for the semester. The term 'extenuating' circumstances includes:

1. incapacitating illness which prevents a student from attending classes for a minimum period of two weeks,
2. a death in the immediate family,
3. financial responsibilities requiring a student to alter a work schedule to secure employment,
4. change in work schedule as required by an employer, or

5. other emergencies deemed appropriate by the instructor.

General Considerations
There are a number of objectives in this course. Of greatest importance is to help you gain a broad, basic foundation in statistics. I would like you to enjoy the class and to do well in it. While demanding, I also will make every effort to be fair. For example, we will computer score the multiple-choice questions and examine the class performance on each exam. If statistical analyses reveal an item to be grossly unfair, that item will be dropped and your exam score increased. Statistics is your friend, not your enemy.

Also, please be considerate of those around you. These days, part of maintaining a productive class environment also requires some basic rules about the use of electronics. Please silence/turn off your cell phones during the class. You should also remember that coming to class should be an opportunity for you to learn the lecture material. This means that "texting" during class and the use of computers for any purpose other than taking notes is incompatible with course objectives. Especially if your use of electronics becomes a distraction to the instructor and thus potentially to other students, you may be asked to stop such activities.

I apologize for having to establish these rules. I am not interested in giving anyone a hard time. However, I am strongly committed to our goal of having you learn basic psychology. In the past, some students have complained about the disturbing behaviors of other nearby students. For that reason, I work hard to ensure that the classroom environment promotes your efforts to learn.

Free Advice
Many of you will learn to appreciate, and may even develop a deep interest in, statistical analysis over the course of our semester together. I hope that you do as the skills you will acquire in this course will benefit you in many ways. You will see that statistical methods are tools in the social scientist's toolkit, which will help you to better interpret and understand the applied research of your given field and will be of great value to you in conducting your own research.

However, I understand that many of you are somewhat "math-phobic". Although statistics is a branch of mathematics, in this applied course we keep the level of mathematics to a minimum – arithmetic and high school algebra. So, please do not let a fear of mathematics prevent you from excelling in this course. Some of you may also fear work on the computer. The practice of modern statistics relies almost exclusively on computer software. I believe that learning a statistical computing language or syntax is key to the learning of statistics. However, you should expect some frustration as you begin to use the statistical software in this course, but as you gain experience you will come to appreciate the power of statistical software as a tool for discovery. So, be patient with yourself and the material, it comes naturally to very few.

A final word of warning: Beware technology misbehaving near deadlines. All summaries and assignments are to be turned in before the strict deadlines. Additionally, most assignments require some use of SPSS or other software to complete them. It never ceases to amaze me how computers seem to sense when you are in a time crunch since they seem to not play nice every time I procrastinate.

Changes to Assignments and Schedule
The instructor reserves the right to make changes to this syllabus at any time. Changes will be announced in class and posted on Canvas. The included schedule and all deadlines are extremely tentative and will be adjusted as needed.

A tentative course schedule can be found below.

Tentative Course Schedule

Date	Day	Chapter	Lecture Topic	Summary Due by 3:30	Assignment Due by 3:30pm
Aug 27	**M**		Syllabus, Introductions, Textbook, APA		
Aug 29	**W**	1	Variables and Scales, Rounding, Summation		
Sep 3	**M**		Labor Day – No Class		
Sep 5	**W**	R	Software, Ihno's Dataset, Data Manipulation		
Sep 10	**M**	2	Data Plots	**Chap 1/2**	
Sep 12	**W**	3	Descriptive Statistics		
Sep 17	**M**	4	Standardized Scores	**Chap 3/4**	
Sep 19	**W**		**Exam 1**		**Unit 1**
Sep 24	**M**	5	Intro to Hypothesis Testing, Central Limit Theorem	**Chap 5**	
Sep 26	**W**		1 sample z-test		
Oct 1	**M**	6	One sample t-test and the t distribution	**Chap 6/7**	
Oct 3	**W**	7	Independent Samples t-test		
Oct 8	**M**	8	Statistical Power and Effect Size	**Chap 8**	
Oct 10	**W**		**Exam 2**		**Unit 2**
Oct 15	**M**	9	Linear Correlation	**Chap 9/10**	
Oct 17	**W**	10	Linear Regression		
Oct 22	**M**	17-18	Multiple Regression	**Chap 17/18**	
Oct 24	**W**				
Oct 29	**M**	11	Matched t-test	**Chap 11**	
Oct 31	**W**		**Exam 3**		**Unit 3**
Nov 5	**M**	12	1-way ANOVA	**Chap 12/13**	
Nov 7	**W**	13	Multiple Comparisons		
Nov 12	**M**	14	Factorial Designs	**Chap 14/15**	
Nov 14	**W**	15	Repeated Measures ANOVA		
Nov 19	**M**				**Unit 4**
Nov 21	**W**		**Thanksgiving – No Class**		
Nov 26	**M**	16	2-Way mixed design ANOVA	**Chap 16**	
Nov 28	**W**	19	The Binomial Distribution		**Unit 5**
Dec 3	**M**	20	Categorical Analyses	**Chap 19/20**	
Dec 5	**W**		Exam 4 Review		
Dec 10	**M**		**Exam 4 – Final**		**Unit 6**
Dec 12	**W**		Finals		