Course Information:
PSYC 6340 – Advanced Statistics and Design
Fall 2025
Wednesday 9:30am – 12:15pm

Instructor Information:
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Office: HPR 237
Office Hours: 8:00-9:30am, 12:30-2:00pm on Wednesdays or by appointments on Fridays
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Course Catalog Description:
Includes aspects of complex experimental designs, statistical hypothesis testing, decision theory, multiple regression analysis, ANOVA, distribution-free techniques, and factor analysis.

Student Learning Outcomes: As a result of this course, successful students will be able to:
- Identify and articulate the theoretical underpinnings of inferential statistics and experimental design.
- Articulate basic principles of statistical analyses, including measures of central tendency, variability, sampling distributions and hypothesis testing.
- Accurately choose and conduct statistical data analyses, using R software, emphasizing the basic assumptions, appropriate uses, and the interpretation of each.
- Employ qualitative, quantitative, and single-case research methods.

Required Text:
- Learning statistics with R: A tutorial for psychology students and other beginners (Version 0.6) by Danielle Navarro. Available for free:
    o Online version here: https://learningstatisticswithr.com/book/
    o Downloadable pdf here: https://learningstatisticswithr.com/lsr-0.6.pdf

Other texts that are <u>not required</u>, but could be useful resources for anyone looking for more or different ways of explaining these concepts include:
- R for Data Science by Garrett Grolemund and Hadley Wickham (2nd edition). Available for free here: https://r4ds.hadley.nz/
- Discovering Statistics Using R by Andy Field, Jeremy Miles, and Zoë Field (2012). ISBN 13: 9781446200469 (1st edition).

A student at UT-Tyler is not under any obligation to purchase a textbook from a university- affiliated bookstore. The same textbook may also be available from an independent retailer, including an online retailer.

Required Software:
- R (https://www.r-project.org/)
- R Studio (https://posit.co/download/rstudio-desktop/)

Grading: 400 points total
Weekly Video Assignments – 5%
Homework Assignments and Quizzes – 40%
Professionalism – 5%
Midterm Exam – 20%
Final Exam – 30%

Assignment type	Points per assignment	Number of assignments	Brief description
Weekly Video Assignment:	2 points	10	Watch video lecture before assigned course period and prepare questions
Homework Assignments and Quizzes	16 points	10	Individual oral quiz for each separate topic
Professionalism:	20 points	1	Participation, timeliness, and effort
Midterm Exam:	80 points	1	Exam with multiple choice and short answer questions
Final Exam:	120 points	1	Final Data Project
Ethical Violation:			Will result in significant loss of points & possible failure

Grading Scale
90 – 100%   A   360-400 points
80 – 89%   B   320-359 points
70 – 79%   C   280-319 points
60 – 69%   D   240-279 points
0 – 59%   F   0-239 points

Teaching Strategy: This course will use a "flipped" format in which most of the lectures will be recorded and posted as videos on Canvas. You will be expected to watch all posted videos before the designated week and prepare questions to bring to the in-person class period. By completing the lecture portion between classes, this will allow us to spend scheduled meeting times focusing on answering questions, experiential activities with R/RStudio, problem solving any issues, and engaging in discussions about the analyses and interpretation of results. The flipped format will be used to facilitate comprehension for presented topics. Graded assignments will be used to create opportunities for experiential learning for select a range of analytic strategies and further support comprehension along with the flipped format.

In all aspects of your transition from student to professional, I will be supporting you and challenging you to expand your knowledge base, to increase your breadth and depth of skill, and to improve your attitudes and dispositions related to your work. To provide structure to this assessment the following points have been assigned to portions of your performance. It is my expectation that you can earn an "A" in this class if you demonstrate mastery of the appropriate skills, complete assignments in a timely fashion, demonstrate an awareness and adherence to ethical decision-making processes, and demonstrate an attitude of seeking excellence in your analytic skills.

Weekly Video Assignment: Video lectures will be posted approximately one week before the designated week when that topic will be covered. You will be expected to watch the full video in advance and prepare any questions beforehand. This is essential to keep pace with the course schedule and to maximize the in-person class meeting times. You will also be expected to write any code demonstrated in the video on your own computer. You will submit your replicated code each week on Canvas as proof that you viewed and engaged with the video (2 points per week; 20 total).

Homework Assignments and Quizzes: Homework and quizzes will be assigned for each core topic (10 total) to assess comprehension across the semester. Students will be provided with prompts and will be expected to submit their assignment as a rendered word document or pdf that includes the code for analysis (written in RStudio) and an APA style write-up of results. Each student may elect to initiate the quiz at any point during the in-person class period before the deadline (listed on Canvas for each quiz). All quizzes will be an individual oral exam in which each student will be responsible for verbally describing their analysis and results. The quiz will also include answering a series of questions and engaging in discussion with the instructor, which is aimed to assess full comprehension of each topic.

Professionalism: You are expected to attend all classes, complete all assignments in a timely manner, participate in all activities and discussions, and follow instructions and guidelines (e.g., AI policy). Additionally, ethical violations and/or unprofessional behavior will result in course failure, an incomplete grade, or other appropriate action. Remediation will be determined by the instructor who will consult with a peer and meet with the student to determine the appropriate response.

Midterm Exam: The midterm exam will include multiple choice questions and short answer questions on the topics covered up to the date of the exam.

Final Exam: The final exam will be a data project that will involve using learned concepts to develop a research hypothesis, test that hypothesis, produce code for all analysis using RStudio, and write a method and results section using APA style. Students may choose to complete this project independently or with a partner. Partner projects must be approved by the instructor and the partners must clearly outline distinct responsibilities in advance.

Tentative Topical Outline (subject to change):

Calendar	Week	Topic
8/27	1	Introduction: R and Measurement

- In-class Lecture: RStudio & Measurement
- Readings: Chapter 2.1 & 2.2
- DUE: Download/install R & RStudio

Calendar	Week	Topic
9/3	2	Exploring Data and Descriptive Statistics

- Video Lecture #1
- Readings: Chapter 5.1–5.4, & 5.10
- DUE: Initial dataset collection

9/10	3	Computing Scores and Reliability

- Video Lecture #2
- Readings: Chapter 2.3 & Chapter 5.6
- DUE: Homework Assignment #1 – Descriptives

9/17	4	[OFF] Intro to Graphs: ggplot2

- Video Lecture #3
- DUE: Homework Assignment #2 – Computing Scores and Reliability

9/24	5	Research Designs and Tests of Differences

- Video Lecture #4
- Readings: Chapter 2.5, Chapter 11.1–11.7, Chapter 13.1–13.7
- DUE: Homework Assignment #3 – Graphs

10/1	6	Correlations and Effect Sizes

- Video Lecture #5
- Readings: Chapter 5.7, Chapter 13.8
- DUE: Homework Assignment #4 – Comparing Means

10/8	7	Tests for Nominal Data; Midterm Prep

- Video Lecture #6
- Readings: Chapter 12.1–12.6
- DUE: Homework Assignment #5 – Correlations

10/15	8	Midterm Exam (in class)

- DUE: Homework Assignment #6 – Nominal Data

10/22	9	ANOVA (one-way) and Factorial ANOVA

- Video Lecture #7
- Readings: Chapter 14.1–14.7, 16.1–16.5, 16.7, 16.8

10/29	10	Linear Regression

- Video Lecture #8
- Readings: Chapter 15.1, 15.2, 15.4–15.10, Chapter 16.6
- DUE: Homework Assignment #7 – ANOVA

11/5	11	Multiple Linear Regression

- Video Lecture #9
- Readings: Chapter 15.3
- DUE: Homework Assignment #8 – Linear Regression

11/12	12	Logistic Regression

- Video Lecture #10
- Readings: TBD
- DUE: Homework Assignment #9 – Multiple Linear Regression

11/19	13	Final Project Workshop
		• DUE: Homework Assignment #10 – Logistic Regression
11/26	14	OFF (THANKSGIVING BREAK)
12/3	15	Final Project Workshop
12/10	16	FINALS WEEK
		• Final Data Project DUE

Course Policies and Requirements

Late Policy: All assignments must be turned in on time to receive full credit. Points will be deducted for everyday a submission is late.

Artificial Intelligence (AI) Policy: UT Tyler is committed to exploring and using artificial intelligence (AI) tools as appropriate for the discipline and task undertaken. We encourage discussing AI tools' ethical, societal, philosophical, and disciplinary implications. All uses of AI should be acknowledged as this aligns with our commitment to honor and integrity, as noted in UT Tyler's Honor Code. Faculty and students must not use protected information, data, or copyrighted materials when using any AI tool. Additionally, users should be aware that AI tools rely on predictive models to generate content that may appear correct but is sometimes shown to be incomplete, inaccurate, taken without attribution from other sources, and/or biased. Consequently, an AI tool should not be considered a substitute for traditional approaches to research. You are ultimately responsible for the quality and content of the information you submit. Misusing AI tools that violate the guidelines specified for this course (see below) is considered a breach of academic integrity. The student will be subject to disciplinary actions as outlined in UT Tyler's Academic Integrity Policy.

For this course, I expect all work students submit for this course to be their own. I have carefully designed all assignments and class activities to support your learning. Doing your own work, without human or artificial intelligence assistance, is best for your efforts in mastering course learning objectives. For this course, I expressly forbid using ChatGPT or any other artificial intelligence (AI) tools for any stages of the work process, including brainstorming and writing R code. Deviations from these guidelines will be considered a violation of UT Tyler's Honor Code and academic honesty values.

The instructor reserves the right to make any changes to the course schedule, content, or assignments as deemed necessary. Students will be notified of any changes to the course immediately.

University Policies
UT Tyler Honor Code: Every member of the UT Tyler community joins together to embrace: Honor and integrity that will not allow me to lie, cheat, or steal, nor to accept the actions of those who do.

Students Rights and Responsibilities: To know and understand the policies that affect your rights and responsibilities as a student at UT Tyler, please follow this link: http://www.uttyler.edu/wellness/rightsresponsibilities.php

Campus Carry: We respect the right and privacy of students 21 and over who are duly licensed to carry concealed weapons in this class. License holders are expected to behave responsibly and keep a

handgun secure and concealed. More information is available at
http://www.uttyler.edu/about/campus-carry/index.php

UT Tyler a Tobacco-Free University: All forms of tobacco will not be permitted on the UT Tyler main campus, branch campuses, and any property owned by UT Tyler. This applies to all members of the University community, including students, faculty, staff, University affiliates, contractors, and visitors. Forms of tobacco not permitted include cigarettes, cigars, pipes, water pipes (hookah), bidis, kreteks, electronic cigarettes, smokeless tobacco, snuff, chewing tobacco, and all other tobacco products. There are several cessation programs available to students looking to quit smoking, including counseling, quit lines, and group support. For more information on cessation programs please visit www.uttyler.edu/tobacco-free.

Grade Replacement/Forgiveness and Census Date Policies: Students repeating a course for grade forgiveness (grade replacement) must file a Grade Replacement Contract with the Enrollment Services Center (ADM 230) on or before the Census Date of the semester in which the course will be repeated. (For Fall, the Census Grade Replacement Contracts are available in the Enrollment Services Center or at http://www.uttyler.edu/registrar. Each semester's Census Date can be found on the Contract itself, on the Academic Calendar, or in the information pamphlets published each semester by the Office of the Registrar.

Failure to file a Grade Replacement Contract will result in both the original and repeated grade being used to calculate your overall grade point average. Undergraduates are eligible to exercise grade replacement for only three course repeats during their career at UT Tyler; graduates are eligible for two grade replacements. Full policy details are printed on each Grade Replacement Contract.
The Census Date is the deadline for many forms and enrollment actions of which students need to be aware. These include:

- Submitting Grade Replacement Contracts, Transient Forms, requests to withhold directory information, approvals for taking courses as Audit, Pass/Fail or Credit/No Credit.
- Receiving 100% refunds for partial withdrawals. (There is no refund for these after the Census Date)
- Schedule adjustments (section changes, adding a new class, dropping without a "W" grade)
- Being reinstated or re-enrolled in classes after being dropped for non-payment
- Completing the process for tuition exemptions or waivers through Financial Aid

State-Mandated Course Drop Policy: Texas law prohibits a student who began college for the first time in Fall 2007 or thereafter from dropping more than six courses during their entire undergraduate career. This includes courses dropped at another 2-year or 4-year Texas public college or university. For purposes of this rule, a dropped course is any course that is dropped after the census date (See Academic Calendar for the specific date). Exceptions to the 6-drop rule may be found in the catalog. Petitions for exemptions must be submitted to the Enrollment Services Center and must be accompanied by documentation of the extenuating circumstance. Please contact the Enrollment Services Center if you have any questions.

Disability/Accessibility Services: In accordance with Section 504 of the Rehabilitation Act, Americans with Disabilities Act (ADA) and the ADA Amendments Act (ADAAA) the University of Texas at Tyler offers accommodations to students with learning, physical and/or psychological disabilities. If you have a disability, including a non-visible diagnosis such as a learning disorder, chronic illness, TBI, PTSD, ADHD, or you have a history of modifications or accommodations in a previous educational environment, you

are encouraged to visit https://hood.accessiblelearning.com/UTTyler and fill out the New Student application. The Student Accessibility and Resources (SAR) office will contact you when your application has been submitted and an appointment with Cynthia Lowery, Assistant Director of Student Services/ADA Coordinator. For more information, including filling out an application for services, please visit the SAR webpage at http://www.uttyler.edu/disabilityservices, the SAR office located in the University Center, #3150 or call 903.566.7079.

Student Absence due to Religious Observance: Students who anticipate being absent from class due to a religious observance are requested to inform the instructor of such absences by the second class meeting of the semester.

Student Absence for University-Sponsored Events and Activities: If you intend to be absent for a university-sponsored event or activity, you (or the event sponsor) must notify the instructor at least two weeks prior to the date of the planned absence. At that time the instructor will set a date and time when make-up assignments will be completed.

Social Security and FERPA Statement: It is the policy of The University of Texas at Tyler to protect the confidential nature of social security numbers. The University has changed its computer programming so that all students have an identification number. The electronic transmission of grades (e.g., via e-mail) risks violation of the Family Educational Rights and Privacy Act; grades will not be transmitted electronically.

Emergency Exits and Evacuation: Everyone is required to exit the building when a fire alarm goes off. Follow your instructor's directions regarding the appropriate exit. If you require assistance during an evacuation, inform your instructor in the first week of class. Do not re-enter the building unless given permission by University Police, Fire department, or Fire Prevention Services.

Student Standards of Academic Conduct: Disciplinary proceedings may be initiated against any student who engages in scholastic dishonesty, including, but not limited to, cheating, plagiarism, collusion, the 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.

    i.   "Cheating" includes, but is not limited to:
- copying from another student's test paper;
- using, during a test, materials not authorized by the person giving the test;
- failure to comply with instructions given by the person administering the test;
- possession during a test of materials which are not authorized by the person giving the test, such as class notes or specifically designed "crib notes". The presence of textbooks constitutes a violation if they have been specifically prohibited by the person administering the test;
- using, buying, stealing, transporting, or soliciting in whole or part the contents of an unadministered test, test key, homework solution, or computer program;
- collaborating with or seeking aid from another student during a test or other assignment without authority;
- discussing the contents of an examination with another student who will take the examination;

- divulging the contents of an examination, for the purpose of preserving questions for use by another, when the instructors has designated that the examination is not to be removed from the examination room or not to be returned or to be kept by the student;
- substituting for another person, or permitting another person to substitute for one self to take a course, a test, or any course-related assignment;
- paying or offering money or other valuable thing to, or coercing another person to obtain an unadministered test, test key, home work solution, or computer program or information about an unadministered test, test key, home solution or computer program;
- falsifying research data, laboratory reports, and/or other academic work offered for credit;
- taking, keeping, misplacing, or damaging the property of The University of Texas at Tyler, or of another, if the student knows or reasonably should know that an unfair academic advantage would be gained by such conduct; and
- misrepresenting facts, including providing false grades or resumes, for the purpose of obtaining an academic or financial benefit or injuring another student academically or financially.

ii. "Plagiarism" includes, but is not limited to, the appropriation, buying, receiving as a gift, or obtaining by any means another's work and the submission of it as one's own academic work offered for credit.

iii. "Collusion" includes, but is not limited to, the unauthorized collaboration with another person in preparing academic assignments offered for credit or collaboration with another person to commit a violation of any section of the rules on scholastic dishonesty.

iv. All written work that is submitted will be subject to review by plagiarism software.

Recording of Class Sessions: Class sessions may be recorded by the instructor for use by students enrolled in this course. Recordings that contain personally identifiable information or other information subject to FERPA shall not be shared with individuals not enrolled in this course unless appropriate consent is obtained from all relevant students. Class recordings are reserved only for the use of students enrolled in the course and only for educational purposes. Course recordings should not be shared outside of the course in any form without express permission.

UT Tyler Resources for Students
- UT Tyler Writing Center (903.565.5995), writingcenter@uttyler.edu
- UT Tyler Tutoring Center (903.565.5964), tutoring@uttyler.edu
- The Mathematics Learning Center, RBN 4021, this is the open access computer lab for math students, with tutors on duty to assist students who are enrolled in early-career courses.
- UT Tyler Counseling Center (903.566.7254)