



PSYC 5340: Advanced Statistics and Design

Samantha Estrada PhD

Fall 2023

- **Section:** PSYC 5340.001
- **Meeting Times:** Wednesdays 11:00AM to 1:45PM
- **Location:** BEP Bldg Room 00213
- **Instructor:** Samantha Estrada PhD
- **Email:** sestrada@uttyler.edu

Office Hours

- **What are office hours?** These are times where I will be in my (virtual) office and you can come and ask me anything class related.
- My office hours are Wednesdays 2-5 via Zoom *by appointment*.
- You can find the Zoom link and passcode in the homepage of **Canvas**.
- To schedule an appointment use this **calendly** link: <https://calendly.com/sestrada>
 - I use these times for consulting with faculty and students, thus having each their separate link keeps things tidy that's why I request you use calendly.
 - You don't have to email me, **calendly** will notify me. I only ask you to make an appointment through this app because it makes the sharing of zoom links easy plus it goes straight to my calendar so I don't forget!
 - You can also cancel if needed through the app.
 - If the available in **calendly** hours don't work for you then please email me we can work something out.

Required Texts

- Navarro DJ and Foxcroft DR (2019). Learning Statistics with jamovi: A Tutorial for Psychology Students and other Beginners. (Version 0.70). DOI: 10.24384/hgc3-7p15 You can download it here: <https://www.learnstatswithjamovi.com/>
- Publication Manual of the American Psychological Association (7th Ed.).(2020).Washington, DC: American Psychological Association.

Required Software

- We will be using a free and open-source software for our data projects called **jamovi**. You can download the software here: <https://www.jamovi.org/> and you can watch a tutorial installation here: <https://www.youtube.com/watch?v=syx0f4xCxpk>
- We will also use the free and open-source software **G*Power** which can be downloaded here: <https://www.psychologie.hhu.de/arbeitsgruppen/allgemeine-psychologie-und-arbeitspsychologie/gpower.html>
- Both **jamovi** and **G*Power** are available on the virtual desktop.

Why not SPSS? Mainly because my objective is to provide a quality course where the content is free and accessible to everyone. SPSS is not a free software, a student license is around > \$180. And this price will only go up once you graduate. Students often tell me that “everyone is using SPSS in their field” this is not true. Please read these two blog posts as to why SPSS is on decline <https://lindeloev.net/spss-is-dying/> and <http://r4stats.com/articles/popularity/>. Know that **jamovi** is a user-friendly version of R which is now becoming the most popular statistical software.

Course Catalog Description: Includes aspects of complex experimental designs, statistical hypothesis testing, decision theory, multiple regression analysis, ANOVA, distribution-free techniques, and factor analysis.

Required Prerequisites: PSYC 2354 and PSYC 2331 (or equivalent undergraduate statistics and research methods courses at another institution) and consent of instructor.

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 **jamovi** statistical software, emphasizing the basic assumptions, appropriate uses, and the interpretation of each.
- Employ qualitative, quantitative, and single-case research methods.

Data Projects

- There will be a data assignment (roughly) for each of the topics we cover. The due date for these assignments will be Sundays 11:59 PM for the week each topic is covered.
- You can pair up with another student to complete the assignment (pairs means *two* people).
 - You will sign-up for a partner in Canvas.
 - Teams may meet online or face to face.
 - I will create the the “team” in Canvas so that only one of you has to submit in Canvas.
 - Unless you find your partner is discriminatory, abusive, intimidating, it is **your** responsibility to communicate with your partner on how to best complete the assigned projects.
- Submission should be made in pdf (I find this distorts student’s APA styled graphs the least)
- Label your assignments as: **LastNamePartner1.LastNamePartner2.AssignmentName.pdf**.
- All assignments **MUST** be turned in on time to receive full credit.
- You will get to drop one assignment no questions asked without it affecting your grade.
- **Homework Data Projects are submitted Sundays of each week at 11:59 PM**

I have gotten a lot of pushback from students in the past regarding teams, to this I have three responses:

- Having people pair up in teams allows me to give more detailed feedback rather than a lot of short, quick feedback
- Do not ask me to write a recommendation letter to PhD programs if you cannot work as part of a team.
- Laptops/Computers inevitably fail at some point in the semester. It's always easier when you have a partner.
- A quote from @deetjen2020: *We may idealize the independent researcher that secures their own funds, does their own experiments, writes their own articles and reaps the awards. But effective researchers don't really operate in such isolation. They understand that they accomplish more as part of a research team. Or more broadly, they recognize that their work depends on the previous labors of other scientists.*

Jigsaw Activity

A jigsaw activity is a cooperative learning technique where students work in groups to teach each other something. There will be 4-5 articles related to ethics in statistics and research design available in Canvas.

- Each student will sign up for 1 article.
- Students will gather in a group and teach each other about their selected article.
- Submit a 1 page handout.
 - This handout needs to be submitted in Canvas.
 - This handout needs to contain the reference of the article in APA Style.
 - You can share this handout with your classmates on paper/digital form.

Exams

This class will have a midterm exam and a final project.

Midterm

You will have two midterm activities:

- A data project utilizing applied concepts using `jamovi` to replicate a published study.
- You will analyze data from an open source journal and replicate a published study analysis.
- Perform a sensitivity (or power analysis)
- Report your statistical analyses findings in APA Style.

Final Project

In a group of your choosing, you will work to design and test a hypothesis using one of the provided real data sets posted on Canvas. The final product will consist of a detailed poster/infographic and paper. Part of this final project will consist of:

- Complete a poster or infographic.
- Publishable quality report
- You will participate in a peer review of the literature review for this project.
- You will grade other team members on their level of participation and engagement with the project.
- More information in Canvas.

Non-optional meeting with Dr. Estrada

- In order to be able to “course correct” you should schedule a meeting with me via **calendly** if you:
 - Score below 70 on a midterm.
 - Miss two or more data projects or score low (< 6 pts) in multiple data projects.

Grading

Midterm	20%
Final Data Project	20%
Homework Data Projects	40%
Discussion Board	20%

Grading Scale

90 - 100%	A
80 - 89%	B
70 - 79%	C
60 - 69%	D
0 - 59%	F

Email Netiquette

- I will respond to emails Monday to Friday from 8-5 pm.
- Make sure your question isn't addressed in this syllabus.
- When you email me, identify what course you are in. State what section, day, and time you are in. I teach more than one statistics class, and more than one section every day.
- Address me as Dr. Estrada. Do not begin your email with “hey.” I'm also not Ms. Estrada.

I am usually quick to respond to student e-mails. However, student e-mails tend to do several things that try my patience. I have a new policy, effective Fall 2019, that outlines why I will not respond to certain e-mails students send. Multiple rationales follow.

- The student could answer their own inquiry by reading the syllabus.
- Do not email me inquiring about your final grade or to help you predict your final grade.
- Grades will be available on Canvas and you should know what you need to pass the course.
- The student should use his/hers UTT email at all times. Do not email me from your private account (eg. coolguy23@gmail.com). If you email me from a personal email, I will NOT respond.
- The student missed class for which there was no exam. I do not need to know the exact reason for a missed class. Students with excusable absences are responsible for giving me a note in hard copy that documents the reason for the missed class. An e-mail is unnecessary unless the impromptu absence involved missing a midterm or final.
- The student wants to know what topics they missed during a class they skipped. The answer is always “you missed what was on the syllabus.”
- The students wants to know how many classes they missed at some point during the semester. I assume the student has a better answer to that question than me until the end

- The student is requesting an extension on an assignment for which the syllabus already established the deadline. The answer is always “no”.
- The student is “grade grubbing” or asking to round up a grade. The answer is always “no”.
- The student is asking for an extra credit opportunity. PSYC 5340 is a master’s level course there is no extra credit.

When to contact the Teaching Assistant (TA):

- TAs change semester by semester. To find their information more accurately you can look in the homepage of our class Canvas.
- For question regarding discussion board grades.
- Questions regarding tutoring or review sessions.

Make-up exams and assignments: To be eligible for a make-up exam or assignment that was missed due to an absence, you will have to bring in some kind of official documentation for that absence (doctor note, work note, etc). This same policy applies to late work. The only late assignments accepted will have appropriate documentation. You are not to submit a late assignment without first providing documentation (remember you can drop ONE assignment without it affecting your grade). In general, I have a 20% deduction for every day an assignment is late and once an assignment is late it will receive minimum feedback. After five days it’s an automatic zero.

Data Analysis with R Programming

- As part of this course you will enroll in a microcredential course part of Google Data Analytics Professional Certificate: Data Analysis with R Programming
- The course is structured for five weeks. However, you have until the end of the semester to complete it. I have added tentative deadlines to the schedule for you to complete sections of the course. You are welcome to work ahead.
- You will receive an invitation to the course in your UTTyler Patriots email.
- You should submit your certificate in **Canvas**
- The topics covered are:
 - Module 1: Programming and data analytics
 - Module 2: Programming using RStudio
 - Module 3: Working with data in R
 - Module 4: Data visualization
 - Module 5: Documentation and reports

Tentative Schedule & Topics

Week 01, 08/23: Data Entry & Importing Data, Graphs

Textbook: @navarro2019 Chapter 3 (pgs.43 – 55): Getting started with **jamovi**.

Textbook: @navarro2019 Chapter 5 (pgs.85 – 96): Drawing Graphs.

Discussion Board: Introduction & Replication in Psychology.

Quiz Syllabus & Introduction to **jamovi**.

jamovi installation.

G*Power installation.

Week 02, 08/30: Descriptive Statistics, Recoding and Computing Variables

Data Project: Data Entry & Graphs.

Discussion Board: Data Quality & Ethics.

Reading: @gelman2018.

Textbook: @navarro2019 Chapter 4 (pgs.59 – 84): Descriptive Statistics.

Textbook: @navarro2019 Chapter 6 (pgs.97 – 117): Pragmatic Matters.

Reading: @wheelan2013garbage.

Week 03, 09/06: Hypothesis Testing & Chi-Square Tests

R Programming: Module 1: Programming and data analytics

Data Project: Data Management & Descriptives.

Final Data Project: Exchange contact information with your team.

Reading: @nimon2012.

Reading: Chapter 9 (pgs. 181-206): Hypothesis Testing.

Textbook: @navarro2019 Chapter 10 (pgs. 211 – 239): Categorical Data Analysis.

- The χ^2 goodness-of-fit test.
- The χ^2 test of independence.
- Effect Size.
- Assumptions of the test(s).

Week 04, 09/13: Comparing Two Means

Data Project: Chi-square Tests.

Jigsaw #1: Ethics

Final Data Project: As a team begin perusing the available datasets in Canvas.

Textbook: @navarro2019 Chapter 11 (pgs.241 – 280): Comparing Two Means.

- Independent Samples t-test (Student test).
- Paired-samples t-test.
- Effect size.

Week 05, 09/20: Correlation and Regression

R Programming: Module 2: Programming using RStudio due

Data Project: Comparing Two Means.

Discussion Board: Discussion Board: Correlation & Regression.

Textbook: @navarro2019 Chapter 12: Correlation and Regression.

Week 06, 09/27: Hierarchical Regression

Reading: @petrocelli2003.

Replication activity.

Week 06, 09/27 Logistic Regression:

Data Project: Correlation and Regression.

Reading: @stoltzfus2011.

Draft of Literature Review, Hypotheses and Research Question(s). DUE at 11:59 PM on 10/03

Week 08, 10/11: Midterm Project

- The exam will open Sunday at 11:59 PM 10/03
- The exam will close Wednesday at 11:59 PM 10/10

Week 09, 10/18: One Way ANOVA & Factorial ANOVA

R Programming: Module 3: Working with data in R due **Data Project:** Logistic Regression.

Peer Review: Check Canvas for Peer Review instructions. DUE at 11:59 PM on 10/17.

Textbook: @navarro2019 Chapter 13 (pgs.327 – 360): Comparing several means (One-Way ANOVA).

Textbook: @navarro2019 Chapter 14 (pgs. 361– 417): Factorial ANOVA.

- Factorial ANOVA 1: balanced designs, no interactions.
- Effect Size.
- Assumption checking.

Week 10, 10/25: Exploratory Factor Analysis

Data Project: ANOVA.

Jigsaw #2: Ethics & Research

Textbook: @navarro2019 Chapter 15 (pgs.419 – 464): Exploratory Factor Analysis.

Reading: @huck2012validity Reliability and Validity chapter.

DRAFT Methods section. No peer review needed for this draft.

Week 11, 11/01: MANOVA

R Programming: Module 4: Data visualization **Data Project:** EFA.

Textbook: Analysis of Covariance ANCOVA (pgs. 384 – 388).

Week 12, 11/08: Non Parametric

Data Project: MANOVA.

Week 13, 11/15: Final Data Project

R Programming: Module 5: Module 5: Documentation and reports

Week 14, 11/22: Turkey Break: No class!

Week 15, 11/29: Final Data Project: Poster Presentation

Poster Presentation.

Peer Evaluation. DUE at 11:59 PM.

Week 16, 12/06:

Paper submission. DUE at 11:59 PM on WEDNESDAY Week 16, 12/06.

Peer Evaluation. DUE at 11:59 PM on WEDNESDAY Week 16, 12/06.

University Policies

- UT Tyler Policies: <https://www.uttyler.edu/links/>
- UT Tyler COVID-19 Information and Procedures: <https://www.uttyler.edu/coronavirus/>
- UT Tyler Technology Support: <https://www.uttyler.edu/it/support/student-support.php>
- Disability Services: <http://www.uttyler.edu/disabilityservices>.
- UT Tyler Writing Center (903.565.5995), writingcenter@uttyler.edu
- UT Tyler Tutoring Center (903.565.5964), tutoring@uttyler.edu
- UT Tyler Counseling Center (903.566.7254)
- The Robert R. Muntz Library: <http://www.uttyler.edu/library/>

I RESERVE THE RIGHT TO MODIFY THIS SYLLABUS AT ANY TIME. THEREFORE, YOUR ATTENDANCE AND ATTENTION TO THE ANNOUNCEMENTS IN CANVAS ARE CRUCIAL BECAUSE IT WILL ASSIST YOU REMAIN CURRENT ON THE MATERIAL AND KNOW WHEN THE SYLLABUS MAY BE MODIFIED.

Readings

Note: All these readings are available in Canvas in PDF form.