

# PSYC 6341 Multivariate Statistics

## Spring 2022

Samantha Estrada PhD

### Course Information

- Course Information: PSYC 6341.001 Thursdays 9:30AM - 12:15AM
- Classroom: HPR 248

### Contact Me

- *Email*: [sestrada\[at\]uttyler.edu](mailto:sestrada[at]uttyler.edu)
- Thursdays R 12:20-2:30 via Zoom. You can find the Zoom link and passcode in the homepage of Canvas.
- Make an appointment through my calendly link: <https://calendly.com/sestrada>
  - You don't have to email me, calendly will notify me.
  - If the available times in calendly definitely don't work for you then please email me.

### Required Texts:

- *Using R With Multivariate Statistics* 1st Edition by Randall E. Schumacker ISBN-13: 978-1483377964 ISBN-10: 1483377962
- *R for Data Science* by Garrett Golemund and Hadley Wickham Available here: <https://r4ds.had.co.nz/>

**Recommended Text:** Publication Manual of the American Psychological Association (7th Ed.).(2020).Washington, DC: American Psychological Association.

### Required Software

We will be using free and open source software for this class:

- R (<https://www.r-project.org>)
- R Studio (<https://rstudio.com/>)
- jamovi (<https://www.jamovi.org/>)
- G\*Power (<https://www.psychologie.hhu.de/arbeitsgruppen/allgemeine-psychologie-und-arbeitspsychologie/gpower.html>)

### Course Catalog Description

Includes study and application of complex multivariate research designs and multivariate statistical analyses including MANOVA/MANCOVA, discriminant function analysis, canonical analysis, structural equation modeling and factor analysis.

**Required Prerequisites:** PSYC 6340.

Student Learning Outcomes: As a result of this course, successful students will be able to:

- Identify and articulate the theoretical underpinnings of multivariate statistical models and designs.
- Articulate advanced principles of multivariate statistical analyses, including multivariate distributions, hypotheses and analytic methods
- Accurately choose and conduct multivariate statistical data analyses, using SPSS statistical software, emphasizing the assumptions, appropriate uses, and the interpretation of each.
- Write about the results of multivariate statistical analyses in journal format
- Design multivariate research studies for use with clinical populations

## Grading

50% - Class Projects

20% - Final Exam

30% - Critiques, Jigsaw & Tidyverse Presentations

## Grading Scale

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

## Data Projects

- There will be data assignment for each of the topics we cover. The due date will be one week after each topic is covered. You should have one week for each assignment.
- Your reports for these data projects need to be clearly labeled as LastName.FirstName.AssignmentName.docx (or .doc).
- All assignments **MUST** be turned in on time to receive full credit. I will deduct 2 points for everyday a submission is late (from a total of 10 points). You will get to drop one assignment no questions asked without it affecting your grade.

## Critique, Jigsaws, Tidyverse presentation

- **Critique** You are to review one article, preferable in your field of study, which utilize multivariate statistics tools we have discussed in class. Your critique will be shared with the class. Think of this as a round-table presentation at a conference
- **Jigsaw** Sign up for each jigsaw on Canvas. See schedule for due dates.
  - *Article* Each of you will read an article relevant to the practice of statistics in research. You are to summarize the article for the class.
- **Tidyverse** presentation. Prepare a short 15 minute presentation on two topics/procedures on data visualization and data management. You may select these topics from Nordmann (2021), the author also has example datasets you can use for this presentation.

## Final Exam

- The final exam will have two parts: a open-ended section over conceptual material, and an applied section over the R skills.
- The final exam will be *cumulative*.

## Class COVID Policies

Students are expected to wear face masks covering their nose and mouth in public settings (including classrooms and laboratories). The UT Tyler community of Patriots views adoption of these practices consistent with its Honor Code and a sign of good citizenship and respectful care of fellow classmates, faculty, and staff.

Students who are feeling ill or experiencing symptoms such as sneezing, coughing, digestive issues (e.g. nausea, diarrhea), or a higher than normal temperature should stay at home and are encouraged to use the UT Tyler COVID-19 Information and Procedures website to review protocols, check symptoms, and report possible exposure. Students needing additional accommodations may contact the Office of Student Accessibility and Resources at University Center 3150, or call (903) 566-7079 or email saroffice@uttyler.edu.

- **University Policies** You can read the university policies here: <https://www.uttyler.edu/links/>

## Topics & Tentative Schedule

Week 01, 01/13 Introduction to R

Week 02, 01/20 Matrix Algebra

Week 03, 01/27 Multivariate Statistics Assumptions + Data Screening

Week 04, 02/03 Hotelling's  $T^2$ : A Two-Group MANOVA

Week 05, 02/10 Multivariate Analysis of Variance

Week 06, 02/17 Multivariate Analysis of Covariance

Week 07, 02/24 Dirty Data & Tidyverse

Week 08, 03/03 Jigsaw Presentation

Week 09, 03/10 Spring Break

Week 10, 03/17 Discriminant Analysis

Week 11, 03/24 Canonical Correlation

Week 12, 03/31 Exploratory Factor Analysis

Week 13, 04/07 Principal Components Analysis

Week 14, 04/14 Structural Equation Modeling: Confirmatory Factor Analysis

Week 15, 04/21 Structural Equation Modeling: Path Analysis & Multivariate Paper Critique Presentations

Week 16, 04/28 Finals Week!