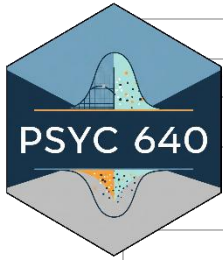


Graduate Statistics (PSYC 640)



INSTRUCTOR	Dustin Haraden, PhD
E-mail/Office	dxhgsh@rit.edu EAS – 3378
Office Hours	Tuesdays 10am – 12:00pm or By Appointment
Class Times	Thursdays 9:30am – 12:20pm Eastman 3379
Class Website	https://dharaden.github.io/psyc640/

COURSE DESCRIPTION: This course reviews critical concepts and data analysis methods in descriptive and inferential statistics. Basic and advanced material will be presented on topics that include measurement, descriptive and inferential data analyses for single and multiple group designs, and computer applications. There will be an emphasis on Open Science practices, especially reproducibility. Course content will be taught through lectures, discussion, and applied data analysis exercises. Throughout the course, I will try to maintain an emphasis on both the basic theory behind the statistics and its practical application to data sets.

COURSE MATERIALS: We will be using R and JAMOVİ for all data wrangling, visualization, and analysis. You may use other statistical programs in this course, but the examples in class (and what I am most familiar with) will be in R and JAMOVİ. Students must have the latest version of R and it is strongly recommended that students also download the RStudio GUI, both can be found [here](#). JAMOVİ can be downloaded [here](#). All software here is free.

We will primarily be referring to chapters in the following textbooks:

- [Regression and Other Stories](#) (Gelman, Hill & Vehtari, 2024)
- [Learning Statistics with R](#) (Navarro)
- [R for Data Science \(2e\)](#) (Wickham, Çetinkaya-Rundel, & Grolemund, 2023)
- [Modern Statistics with R \(2e\)](#) (Thullin, 2025)
- [Statistical Thinking](#) (Poldrack, 2024)

These textbooks are available for free online and able to be downloaded. You may choose to purchase a paper copy if you wish, but it is not required. *All additional readings will be provided by the instructor.*

Note: Readings on the schedule will need to be completed prior to the course they are listed for. We will build on the concepts you read about in that specific class period, so it is important that you have read.

EVALUATION AND GRADING:

Your grade is a reflection of your consistent effort, active engagement with the material, and ability to apply new concepts. The components are designed to build on one another, leading to a comprehensive understanding of data analysis.

Component	Weight
Labs & In-Class Checks	35%
Journal Entries	10%
Participation & Engagement	10%
Midterm Project	20%
Final Project	25%

Labs & In-Class Checks

These are your primary opportunity to build models and, more importantly, to interpret what they tell you. Each lab is built around interpretation and judgment, not just producing code that runs: I will often give you output (a model summary, a set of residual plots, a JAMOV result) and ask you to explain what it means, decide whether you would trust it, identify which assumption a diagnostic plot implicates, and justify the next analysis. You will also write and modify R to reproduce and extend these results. The interpretation questions are often answered by the assigned readings, in the authors' own framing, so the readings (not an AI chatbot) are your fastest and most reliable path through the lab. Labs are submitted as Quarto/R Markdown files, and your lowest score will be dropped. Labs are due Tuesday nights (11:59pm). This category also includes the short in-class checks described below. Together, the labs (take-home) and the checks (in-class) are two windows on your skills regarding choosing, running, interpreting, and explaining an analysis.

Journal Entries

Each week, you will submit a short, reflective journal entry. This is a space for metacognition (i.e., thinking about your own learning). Prompts can include questions like, "What was the clearest concept this week, and why did it click?" or "What was the 'muddiest' point for you, and what question would you ask about it?". They can also take the form of just a general reflection. I want to get to know you and your learning throughout this process. This can also include anything related to your personal life or mental health that you would like for me to know, such as whether you are struggling to balance classes and research, having trouble creating a workspace at home, or whether you can balance time spent on campus and off. This can also be completely random things, like a news article you can't stop thinking about, or a favorite TV show, movie or book that you just love (especially if it is LOTR, Cosmere or Dungeon Crawler Carl related). The content of what you write has *no impact* on your grade. In addition, what you write will be kept confidential.

The purpose of this "assignment" is to help facilitate communication between you and me. I have found other instructors using this and I would like to be able to develop supportive relationships with students, so I decided to implement this. Other instructors reported that they found that many students were more comfortable discussing questions and concerns in their journal assignments rather than through email. There will be approximately 1 per week (we will have some weeks that we skip) and they will be due at the beginning of the week (Mondays at 11:59pm)

In-Class Engagement & Activities

Our class is a workshop, and your active participation is key. This portion of your grade is earned by being present and engaged. This includes participating in group discussions, engaging with the readings, working with peers on problems, and completing the small, hands-on exercises we'll do together or in small groups in class. Roughly every two to three weeks this also includes a short (about 20-minute) in-class check at the start of our meeting involving interpreting a piece of output, fixing a small bug in a scaffolded script, and/or choosing and justifying a test. These are open-notes, open-readings, open-past-labs, and done in class rather than at home. Their purpose is not to trick you or be a huge challenge; it is to give you (and me) an honest read on where your understanding actually is, and to make the readings pay off. This is a low-stress grade based on your consistent effort and collaboration.

Midterm Project

This is a comprehensive analysis of a dataset I will provide. You will be asked to clean and visualize the data, formulate a research question, build an appropriate regression model, check its assumptions, and write a concise report of your findings. This project assesses your mastery of the first half of the course.

Final Project

For your final project, you will choose a dataset (either your own research data that is not your thesis or from a list of options), develop your own research questions, and conduct a full analysis from start to finish. You will present your work in a short, manuscript-style report and a brief "lightning talk" to the class in our final meeting. This is your capstone assignment to demonstrate your independent data analysis skills.

Late Policy

"A Wizard is never late, nor are they early. They arrive precisely when they mean to." 🧙‍♂️

Thanks Gandalf. Super helpful. Unfortunately, we are not wizards and late penalties will be applied to work that is not on time. There will be a 10% deduction each day and will not be accepted after 5 days.

Grade Scheme

A	A-	B+	B	B-	C+	C	C-	D	F
93+	90-92	87-89	83-86	80-82	77-79	73-76	70-72	60-69	< 60

COURSE OUTLINE

This schedule is subject to change. Please check the course site/myCourses for all updates.

[Regression and Other Stories](#) → ROS

[Learning Statistics with R](#) → LSR

[R for Data Science \(2e\)](#) → R4DS

[Modern Statistics with R \(2e\)](#) → MSR

[Statistical Thinking](#) → ST

Week	Date	Topic	Prepare	Due
1	08-27	Getting set up + R Basics LSR Chapter 3	Chapter 1 & 2 - LSR Chapter 1 - ROS	
2	09-03	R Foundations + Data Wrangling	Chapters 2-4, 6 & 28 - R4DS Chapter 2 - MSR	Lab 1 Lab 2
3	09-10	Descriptives, Visualizations + Communication	Chapter 5 - MSR Chapters 3 & 4 - ST Chapter 1 - R4DS	Lab 3
4	09-17	Design, Sampling + Inference Chapter 9 - ST	Navarro Blog Post Chapters 2-4 - ROS Chapter 3 - MSR (focus on 3.3, 3.7, 3.10 & 3.11)	Lab 4
5	09-24	Simple Regression: The Linear Model (correlation & effect size folded in)	Chapter 14.1 - ST Chapter 6 - ROS Chapter 11 - LSR	
6	10-01	Comparing Groups as Regression (t-test & ANOVA as lm)	Chapter 15 - ST	Lab 5
7	10-08	Variability & Model Fit (R^2 ; partitioning variance)	Chapter 8 - ROS Chapters 5 & 14.5 - ST Chapter 15.4 - LSR	Lab 6
8	10-15	Multiple Regression I: Adding Predictors	Chapter 10 - ROS	
9	10-22	Multiple Regression II: Categorical Predictors & Interactions	Chapter 14.3 - ST Chapter 8.1 - MSR	Lab 7
10	10-29	Assumptions + Model Diagnostics	Chapter 11 - ROS Chapter 14.5 - ST Chapter 15.8 & 15.9 - LSR	Lab 8
11	11-05	Missing Data + Model Building/Comparison	Chapter 15.10 - LSR Chapter 17 - ST Chapters 17.3 - 17.7 - ROS Chapter 8.7 - MSR	Lab 9
12	11-12	Logistic Regression (binary outcome)	Chapter 13 - ROS Chapter 8.3 - MSR	Lab 10
13	11-19	Mixed / Multilevel Models (conceptual awareness)	Chapter 8.8 - MSR Chapter 15.8 - ST	Lab 11
14	11-26	THANKSGIVING – No Class	—	
15	12-03	Making R Work for You; Final Project Lightning Talks	Chapter 18 - ST	

Note: All readings must be completed prior to the class. For example on 9/10, you should have already read Chapter 5 of Modern Statistics with R, Chapters 3 & 4 of Statistical Thinking, and Chapter 1 of R for Data Science.

GENERAL COURSE POLICIES

STATEMENT ON REASONABLE ACCOMMODATIONS: RIT is committed to providing academic adjustments to students with disabilities. If you would like to request academic adjustments such as testing modifications due to a disability, please contact the Disability Services Office. Contact information for the DSO and information about how to request adjustments can be found at www.rit.edu/dso. After you receive academic adjustment approval, it is imperative that you contact me as early as possible so that we can work out whatever arrangement is necessary.

STATEMENT ON TITLE IX: RIT is committed to providing a safe learning environment, free of harassment and discrimination as articulated in our university policies located on our governance website. RIT's policies require faculty to share information about incidents of gender-based discrimination and harassment with RIT's Title IX coordinator or deputy coordinators when incidents are stated to them directly. The information you provide to a non-confidential resource which includes faculty will be relayed only as necessary for the Title IX Coordinator to investigate and/or seek resolution. Even RIT Offices and employees who cannot guarantee confidentiality will maintain your privacy to the greatest extent possible.

If an individual discloses information during a public awareness event, a protest, during a class project, or advocacy event, RIT is not obligated to investigate based on this public disclosure. RIT may however use this information to further educate faculty, staff and students about prevention efforts and available resources.

If you would like to report an incident of gender based discrimination or harassment directly you may do so by using the online Sexual Harassment, Discrimination and Sexual Misconduct Reporting or anonymously by using the Compliance and Ethics Hotline. If you have a concern related to gender-based discrimination and/or harassment and prefer to have a confidential discussion, assistance is available from any of RIT's confidential resources (listed below).

RIT Counseling and Psychological Services

585-475-2261 (V)

585-475-6897 (TTY)

www.rit.edu/counseling

RIT Student Health Center

585-475-2255 (V)

www.rit.edu/studentaffairs/studenthealth

RIT Ombuds Office

585-475-7357

585-475-6424

585-286-4677 (VP)

www.rit.edu/ombuds/contact-us

NTID Counseling and Academic Advising

585-475-6400

www.ntid.rit.edu/counselingdept

Center for Religious Life

585-475-2137

www.rit.edu/studentaffairs/religion

Academic Integrity Statement

As an institution of higher learning, RIT expects students to behave honestly and ethically at all times, especially when submitting work for evaluation in conjunction with any course or degree requirement. The Department of Psychology encourages all students to become familiar with the [RIT Honor Code](#) and with [RIT's Academic Integrity Policy](#). RIT's policy on academic integrity requires the instructor to investigate of any suspected breach of academic integrity. If the preponderance of evidence indicates a

breach of academic integrity, the student who did so may incur a consequence up to and including failure for the entire course.

About Generative AI

You may use generative AI tools (such as ChatGPT, Grammarly, or CoPilot) as a **support** for your work in this course. However:

- Any use of AI must be **acknowledged in a brief note** at the end of the assignment (e.g., *"I used ChatGPT to generate initial bullet points for my introduction, which I then revised and expanded."*) as well as being properly cited ([RIT Library Citation Infoguide](#))
- AI tools may **not** be used to generate entire assignments without your input or to misrepresent your work. Submitting unedited or minimally edited AI output as your own is considered academic dishonesty.
- In professional contexts, you will be expected to present work that is authentically your own — this course is practice for that. A practical note, not a threat: your thesis defense and your first job talk will both be oral, in real time, with no chatbot in the room. A lab you cannot explain out loud is a preview of a defense you cannot survive. The honest path through this course by leaning on the readings and your own reasoning, is also the one that actually prepares you for those moments. That is why the labs are built around interpretation and why we do short in-class checks: not to police you, but to make sure the understanding is really yours before the stakes are high.

If I suspect that the work that you have turned in is using AI, you will receive a preliminary 0 on the project and we will have to have a conversation to determine the next steps. Turning in AI work is considered plagiarism, and you may be asked to re-do the assignment, or possibly receive a 0 on the assignment. Your information may also be submitted to the university as a Breach of Academic Integrity.

Psychological Orientation Statement

Psychology is the study of the mind and behavior. Psychologists study universals as well as group and individual differences. In human beings, these groups can include, but are not limited to, those characterized by age, race, ethnicity, nationality, national origin, immigration status, political orientation, language, disability, sex, gender, sexual orientation, gender identity, socioeconomic status, religion, and culture. Understanding variations in thinking and behavior, and the broader factors that may shape such variety, is essential to understanding psychology and aligns with [professional standards](#) in teaching psychology. Thus, all psychology classes discuss group patterns in thinking and behavior. By remaining in this course, students consent to be exposed to, learn about, discuss, complete assignments relating to, and otherwise engage with this content.

Changes to the Syllabus

I have provided this syllabus as a guide to our course and have made every attempt to provide an accurate overview of the course. However, as instructor, I reserve the right to modify this document during the semester, if necessary, to ensure that we achieve course learning objectives. You will receive advance notice of any changes to the syllabus through myCourses/email.

Additional Resources:

[*Introduction to Modern Statistics \(2e\)*](#)

[*Data Analysis: A Model Comparison Approach to Regression, ANOVA, and Beyond \(3rd ed.\)*](#)