Graduate Statistics (PSYC 640)

INSTRUCTOR	Dustin Haraden, PhD
E-mail/Office	dxhgsh@rit.edu EAS – 3378
Office Hours	Wednesdays 9 – 11:00am or By Appointment
Class Times	Mondays 8:00 – 10:50am Wallace 3140
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 for all data wrangling, visualization, and analysis. You may use another statistical program in this course, but I will only be providing examples in R. 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. Both types of software are free.

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

- *Introduction to Modern Statistics (2e)* (Cetinkaya-Rundel & Hardin, 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)
- *Data Analysis: A Model Comparison Approach to Regression, ANOVA, and Beyond (3rd ed.)*

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
Weekly Labs	30%
Journal Entries	10%
Participation & Engagement	15%
Midterm Project	20%
Final Project	25%

Weekly Labs
These are hands-on R assignments that directly reinforce the concepts from the week's class. They are your primary opportunity to practice coding, build models, and interpret results. Labs will be submitted as R Markdown files, and your lowest score will be dropped.

Journal Entries
Each week, you will submit a short, reflective journal entry. This is a space for metacognition—thinking about your own learning. Prompts will 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 or Cosmere 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.

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 coding exercises we'll do together or in small groups in class. This is a low-stress grade based on your consistent effort and collaboration during our classes.

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 and will be due before the first class after Fall Break.

Final Project

For your final project, you will choose a dataset (either your own research data 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 an initial 15% deduction for the first day and an additional 5% deduction for each day thereafter.

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

Rochester Institute of Technology
Department of Psychology

PSYC 640
FALL 2025

ANTICIPATED COURSE OUTLINE

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

Introduction to Modern Statistics (2e) –> IMS
Learning Statistics with R –> LSR
R for Data Science (2e) –> R4DS
Modern Statistics with R (2e) –> MSR
Statistical Thinking –> ST
Data Analysis: A Model Comparison Approach to Regression, ANOVA, and Beyond (3rd ed.) –> DA

Week	Date	Topic	Prepare	Slides In-Class
1	08-25	Getting set up + R foundations	Install R/RStudio; bring a laptop	
2	09-01	LABOR DAY	Chapter 1 & 2 - ST Chapter 2 - MSR	
3	09-08	Descriptives, Visualizations + Communication	Chapter 5 - LSR Chapter 1 & 3 - R4DS	
4	09-15	Design, Sampling + Inference	Chapter 2 - IMS Chapter 3 - MSR Chapter 7 - ST	
5	09-22	Correlation + Effect Sizes	Chapter 5.1 & 13 - ST Chapter 11 - LSR	
6	09-29	Comparing Groups	Chapter 9 & 10 - ST Chapter 13 - LSR	
7	10-06	Simple Linear Regression	Chapter 14.1.1 - 14.1.4 - ST Chapter 7.1 - 7.2.4 - IMS Chapter 8.1.1 & 8.1.2 - MSR	
8	10-13	FALL BREAK	Work on your midterm project	
9	10-20	Variability & Model Fit	Chapter 5 & 14- ST Chapter 7.2.5 - IMS	
10	10-27	Multiple Regression I: Adding Predictors	Chapter 15.3 - 15.5 - LSR Chapter 8 - IMS	
11	11-03	Multiple Regression II: Categorical Predictors	Chapter 9 - IMS Chapter 8.3	
12	11-10	Assumptions + Model Diagnostics	Chapter 7.3 - IMS Chapter 14.5 - ST Chapter 8.1.4 - MSR Chapter 15.8 - LSR	
13	11-17	Expanding Regression	Chapter 14.2 & 14.3 - ST	
14	11-24	Model Building + Comparison	Chapter 15.8 - 15.10 - LSR	
15	12-01	Making R Work for You	Chapter 17 & 18 - ST	
16	12-08	Wrapping Up + Workshop		

Note: All readings must be completed prior to the class. For example on 9/22, you should have already read Chapter 5 of Statistical Thinking and Chapter 11 of Learning Statistics with R.

Updated: 8/20/2025

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:

- You must **personally review, edit, and take ownership** of all submitted work.
- 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 resume, 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.

If I suspect that the work that you have turned in is using AI, 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.

RIT COVID-19 Safety Plans

RIT is committed to the safety of the RIT community and beyond. Because the situation is still in a rapid state of change, checking the RIT Ready website, and specifically the RIT Safety Plan for the most up to date information is recommended: https://www.rit.edu/ready/rit-safety-plan.

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.