

Introduction to R Programming
STSCI 2120/5120
Fall 2024

Course personnel

Instructor

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Course Description

This course covers the basics of R programming for reading and writing data, executing operations on data, performing some analyses, and producing visual graphics. The emphasis will be placed on practical aspects and a solid understanding of fundamental R objects and functions.

Course Objectives

By the end of this course, students will be able to:

1. Read and write data using R.
2. Execute operations on data in R.
3. Perform simple data analyses.
4. Create visual graphics using R.
5. Understand fundamental R objects and functions.

Lecture meeting times

Lecture (Professor): Tues & Thurs 11:40am-12:55pm (Emerson Hall 135)

Prerequisites and textbooks

- Prerequisites: No prior programming experience is required, but a willingness to learn and engage with the material is essential.
- Required textbook: **Hands-On Programming with R**, O'Reilly, 2014 by G.Grolemund. (HOPR) <https://rstudio-education.github.io/hopr/>.
- Supplementary textbook: **R for Data Science**, 2nd Edition, O'Reilly, 2023 by H.Wickham, M.Çetinkaya-Rundel, G.Grolemund. (R4DS) <https://r4ds.hadley.nz/>.

Course Schedule

The following schedule is a general outline that we plan to follow. Depending on the pace of the course, some topics may be explored in greater detail, while others might be adjusted or omitted. Assignments are currently planned to be released on Thursdays of the corresponding week, though this is subject to change.

Week 1: 8/26

- Topic: Introduction to R

Week 2: 9/02

- Topic: R Objects and R Notation
- Assignment: Homework 1

Week 3: 9/09

- Topic: Modifying values and Environments

Week 4: 9/16

- Topic: Programs and S3

- Assignment: Homework 2

Week 5: 9/23

- Topic: Loops and Speed

Week 6: 9/30

- Topic: Working with data
- Assignment: Homework 3

Week 7: 10/07

- Topic: Project

Course materials

The materials for this class will be uploaded on <https://www.nayelbettache.github.io>. All materials listed below will be available online, at this site. It is entirely your responsibility to download them as needed. A brief description of these materials follows.

- The syllabus should be used as a reference throughout the year for important dates, including exams, and for course policies.
- Lecture notes will be posted on this website as the semester progresses. While these notes form the foundation of my lectures, additional insights and details will be provided during class.
- The lecture notes are designed to complement, not replace, the textbook. Their purpose is to guide you through new material more easily. It is your responsibility to thoroughly read both the notes and the corresponding textbook chapters. Ensure you identify the relevant sections and subsections in the textbook that align with the lecture notes. This constitutes your reading assignment for the semester.

Homeworks, exam schedule and grading policy.

Your grade in this class will be based on homeworks and exams, as below.

1. **Homeworks.** You will receive three assignments counting towards 50 % of the grade. The lowest homework score will be dropped, with the remaining two assignments weighted equally.

Late homework submissions will incur a 20% penalty if submitted within 24 hours past the deadline; submissions beyond that will not be accepted.

2. **Final project.** The final project for this course will be a case study analysis of your choice. It will count for 50% of the grade. You will apply concepts learned throughout the course. It is designed to be completed at the end of the semester. The project will require students to work in groups, and the datasets along with specific questions for analysis will be distributed around September 20th. Students are expected to form groups of 3 to 4 members. These groups should be finalized and approved by the instructor no later than October 1st. Any student who have not joined a group by this deadline will be assigned to a group by the instructor.

The final report will be explaining the problem, data and methodology of your analyses. It must be submitted as a PDF file by October 16th. If the report is submitted late, a 20% penalty will be applied if it is received within 24 hours after the deadline; reports submitted after this period will not be accepted. The report should be no longer than 5 pages, formatted in a standard style with a font size of 12.

The project will be graded on the clarity and coherence of the written report. The quality and correctness of the R codes will be assessed. Effectiveness and aesthetics of the visualizations will be taken into account.

There is no curving of grades in this class. Your final grade will be based entirely on your performance.

The correspondence between your final percentage and your final letter grade is as follows:

- 97 or more: A+; [93, 97) A; [90, 93) A-; [86, 90) B+
- [83, 86) B; [80, 83) B-; [76, 80) C+; [73, 76) C; [70, 73) C-
- [66, 70) D+; [63, 66) D; [60, 63) D-; Less than 60: F.

Students with disabilities and exam accommodation

- **Students with Disabilities**

Students with disabilities are encouraged to engage fully in this course, and your access needs are a priority. To ensure that your approved accommodations are arranged in a timely manner, you must request your accommodation letter via the SDS Student Portal by August 31st.

For students who are already registered with the Student Disability Services (SDS), please note that once you request your accommodation letter, it may take up to 48 hours for the letter to be processed and sent to me. If you are not yet registered with SDS, be aware that the process to register and receive new accommodations can take up to three weeks. Once approved, you will be able to request your accommodation letter for this course.

If you are approved for accommodations later in the semester, it is important that you request your accommodation letter as soon as possible to avoid any delays in receiving the necessary support.

- **Students with Exam Accommodations**

Regarding exam accommodations, this course is participating in the Alternative Testing Program (ATP). All exams will be centrally managed by the ATP, and relevant information will be communicated through SDS-testing@cornell.edu and your SDS Student Portal. It is important to stay informed by reading these communications and visiting sds.cornell.edu/atp for additional details about the ATP process.

Starting in Fall 2023, students no longer need to request each individual exam. However, if you have an academic conflict with a scheduled exam time, you must submit an "exam request form" in the SDS Student Portal. All requests for conflict exams must be submitted no later than 10 business days prior to the exam date, and conflict exams will be scheduled at standard times.

For all relevant information and to manage your accommodations, please visit the SDS Student Portal at sds.cornell.edu.

Academic Integrity

Course materials provided in this class are the intellectual property of the instructor. Students are strictly prohibited from buying, selling, or distribut-

ing any course materials without the express permission of the instructor. Engaging in such unauthorized activities is considered academic misconduct and will be treated accordingly.

Every student in this course is expected to adhere to the Cornell University Code of Academic Integrity. All work submitted for academic credit must be the student's own original work. The use of AI resources, including tools like ChatGPT, is strictly prohibited in this class.

Wellness Resources

The material provided below has been thoughtfully compiled by students from the Body Positive Cornell organization. It offers a well-researched and comprehensive list of well-being resources available on campus. For detailed information and guidance, please refer to the following resource:

- Mental Health Resources Guide 2022-23
- Cornell Wellbeing Resources