

# Econ 151a – Statistical Modeling with R for Economics and Finance

Brandeis University

Summer 2022

Syllabus

Instructor: Yaxuan Wen (yaxuanwen@brandeis.edu)

Class Format: Online Asynchronous

Summer Session 0: June 7 to August 15, 2022

Office Hours: by appointment, via Zoom

## I. Course Description:

This course builds on the introductory statistics knowledge and emphasizes their applications in economics and finance using R. Instructional content includes hand-on interactive coding exercises, short recorded lectures, lecture notes, reading assignments, forum discussions, and student projects. We will also discuss best practices in managing empirical research.

The course does not replace Econ 184b Econometrics and is not designed for students who have extensive prior experience in programming and statistical modeling.

## II. Prerequisite:

Econ 83a Statistics for Economic Analysis or equivalent. You need to be familiar with statistics concepts such as summary statistics, normal distribution, hypothesis testing, and linear regression. You should have basic knowledge of R, as introduced in Econ 83a; however, we will start with a refresher to R so that everyone has a solid foundation.

## III. Course Materials:

- 1) *“Reproducible Research with R and RStudio Second Edition”*, by Christopher Gandrud (CG). You can access the e-book for free through the Brandeis Library.
- 2) *“Practical Statistics for Data Scientists”*, by Peter Bruce, Andrew Bruce, and Peter Gedeck (BBG). You can access the e-book for free through the Brandeis Library.
- 3) DataCamp. I will send you an invitation to enroll in DataCamp for free (for six months). DataCamp exercises will be assigned weekly throughout the semester for hands-on learning. DataCamp is a leading platform for learning data science, and you are encouraged to explore other materials on the site in addition to the assignments.
- 4) Course Pack from Harvard Business Publishing. You will need to purchase cases using this link: <https://hbsp.harvard.edu/import/938912>

5) Other readings and resources will be shared on the course LATTE site.

#### IV. Communications

- 1) LATTE is the main course site. You should check this site frequently. I will post important announcements via the LATTE “Course Announcements” forum, which you will also receive email notifications for.
- 2) Emails. Please include the course number “Econ 151a” in all email communications to ensure attention. The teaching staff will make our best effort to respond to emails within 24 hours on weekdays; if you do not hear from us during this time frame, feel free to resend the email.
- 3) Zoom. Video communications will be through Zoom. Zoom link is posted on LATTE.
- 4) Slack. Please join the course slack channel to connect with each other.
- 5) Optional study groups. You may miss study groups and interactions with your classmate: we can create the same experience! I will send out a survey about your schedule and willingness to participate in study groups at the beginning of the semester. Then I will assign 3-5 person groups based on your preferences such as schedule and location. The idea is that the groups will organize study sessions autonomously. This is optional and serves as an opportunity for you to form some friendship, find accountability and a sounding board.

#### V. Assignments and Evaluation

##### Overview of Grading:

Assignment Type	% Grade (points X number of assignments)	Due Day/Date
Weekly Quizzes	10 (1 X 10)	Mondays
Weekly Reflections	10 (1 X 10)	Mondays
DataCamp Assignments	35 (3.5 X 10)	Mondays
Projects (3 total)	30 (3 X 10)	#1: July 4 #2: July 25 #3: August 15

Peer Review of Projects 1 and 2	10 (2 X 5)	#1: July 11 #2: August 1
Participation	5	

Assignments are due at 11:59 pm ET on each due date.

<b>Weekly Learning Sequence</b>	
<p>There are three regular weekly assignments that are due on Mondays at 11:59 pm ET: (1) DataCamp assignments, (2) Quiz, (3) Self-reflection. The strict deadlines are set to be Mondays to give you flexibility in time management; however, I strongly recommend that you spread out the work throughout the week. In addition to weekly assignments, there are a few additional deliverables, as outlined in the syllabus.</p> <p>Each week, you will move through a regular sequence of learning around problem sets.</p>	
<b>Monday</b>	Assignments from the previous week are due at 11:59 PM. (1) DataCamp assignments, (2) Quiz, (3) Self-reflection
<b>Tuesday</b>	Finish this week's readings and posted resources on LATTE. Start DataCamp assignments.
<b>Wednesday-Saturday</b>	Continue DataCamp assignments. I recommend that you spend about 0.5 - 1 hour daily on these interactive exercises.
<b>Sunday</b>	You should try to finish DataCamp by now and attempt the quiz.

- 1) Weekly quizzes (10%). Due every Monday. Quizzes are timed and can be attempted once. You are welcome to use any resources, but you are not permitted to seek assistance from another individual. These quizzes are designed to be completed at the end of each week for concept checks. Most questions are multiple choices and short answers.
- 2) Weekly self-reflections (10%). Due every Monday. Self-reflections are submitted in a forum format, where students can view and comment on each other's posts. In addition to the weekly prompt, students should feel free to raise additional thoughts, questions, and concerns here. You should answer each question succinctly, with up to a short paragraph.

- 3) DataCamp assignments (35%). Due every Monday. Applied statistics requires learning by doing. You will receive full credit if assignments are completed on time every week; half credit if completed late but by August 15. Each week's assignment is worth 3.5%. I recommend that you spend about 30 min - 1 hour daily on these interactive exercises, rather than cramming it in before the deadline.
- 4) Projects x 3 (30%). Projects can be completed individually or in groups of up to 3 students. If you work in groups, you are expected to fairly distribute the workload among yourselves, and every student will receive the same project grade. You can form different groups for each project.
- Expected output of each project include:
- An R Markdown file. The Rmd file should include your codes, output, comments to briefly explain code blocks, and any assumptions you made.
  - A recorded presentation of 8-10 minutes, where you discuss (1) objective of this project, (2) methods and approach you took, (3) main results, (4) challenges and how you addressed them. The video should be recorded with Zoom and saved on the cloud, so that you can submit a link to the video.
    - a. Project 1 (10%). Due on July 4. Data acquisition, cleaning, and exploratory analysis.
    - b. Project 2 (10%). Due on July 25. Web scraping, data cleaning and merging, and data visualization.
    - c. Project 3 (10%). Due on August 15. Monte Carlo simulation and portfolio risk analysis.
- 5) Peer review of projects (10%).  
For Projects 1 and 2, you/your group will be randomly assigned to review a peer's project output, for which you will comment on and provide suggestions. The peer review should be completed within one week after the project's due date. The purpose of this exercise is to facilitate learning from each other and practicing professional written communications. The peer review will be graded on clarity and constructiveness. Your peer review will be shared with the project group and you can choose to do so anonymously if you wish.
- 6) Participation (5%).  
You will receive credit for attending Zoom meetings and posting on Slack and LATTE. An active learning community is so important to have a good experience in an asynchronous learning environment, and I want to encourage you to contribute and be present for each other.

**Extension Policy:**

Due to the short semester and interdependence of the course material, extensions are generally not granted. If you anticipate delay, please discuss with the instructor when an assignment is made available. Late extension requests are not considered. Late submissions will be subject to 50% grade reduction.

## **VI. Other Information**

### **Accommodations**

Brandeis seeks to welcome and include all students. If you are a student who needs accommodations as outlined in an accommodations letter, please talk with me and present your letter of accommodation as soon as you can. I want to support you.

In order to provide test accommodations, I need the letter more than 48 hours in advance. I want to provide your accommodations, but cannot do so retroactively. If you have questions about documenting a disability or requesting accommodations, please contact Student Accessibility Support (SAS) at 781.736.3470 or [access@brandeis.edu](mailto:access@brandeis.edu).

### **Academic Integrity**

Every member of the University community is expected to maintain the highest standards of academic integrity. A student shall not submit work that is falsified or is not the result of the student's own effort. Infringement of academic integrity by a student subjects that student to serious penalties, which may include failure on the assignment, failure in the course, suspension from the University or other sanctions. Please consult [Brandeis University Rights and Responsibilities](#) for all policies and procedures related to academic integrity. Students may be required to submit work via TurnItIn.com or similar software to verify originality. A student who is in doubt regarding standards of academic integrity as they apply to a specific course or assignment should consult the faculty member responsible for that course or assignment before submitting the work. Allegations of alleged academic dishonesty will be forwarded to the Department of Student Rights and Community Standards. Citation and research assistance can be found at [Brandeis Library Guides - Citing Sources](#).

### **Classroom Health and Safety**

On the Brandeis campus, all students, faculty, staff and guests are required to observe the university's policies on physical distancing and mask-wearing to support the health and safety of all classroom participants. Review up to date [COVID-related health and safety policies](#)

### **Communications**

Please include the course number "Econ 151a" in all email communications to ensure attention. The teaching staff will make our best effort to respond to emails within 24 hours on weekdays; if you do not hear from us during this time frame, feel free to resend the email.

LATTE is the Brandeis on-line course website. Course related announcements and any and all syllabus changes will be communicated via LATTE. <http://latte.brandeis.edu>. Login using your UNET ID and password.

Due to the logistics of online meetings, office hours will be on appointment basis. I will share calendar links for you to make an appointment; when doing so, please confirm your time slot at least 24 hours in advance. Note that I will not be able to address all questions related to course materials via email; instead, please plan to meet me via Zoom as this is usually a more effective way to discuss.

### **Course Materials/Books/Apps/Equipment**

In this course, the minimal set of hardware, software and course supplies needed to be successful in this course are computer and WiFi connection to access course materials and complete homework.

If you are having difficulty purchasing course materials, please make an appointment with your Student Financial Services or Academic Services advisor to discuss possible funding options, including vouchers for purchases made at the Brandeis Bookstore.

### **LATTE**

[LATTE](#) is the Brandeis learning management system. Login using your UNET ID and password. For LATTE help, contact [Library@brandeis.edu](mailto:Library@brandeis.edu).

### **Library**

[The Brandeis Library](#) collections and staff offer resources and services to support Brandeis students, faculty and staff. Librarians and Specialists from Research & Instructional Services, Public Services, Archives & Special Collections, Sound & Image Media Studios, MakerLab, AutomationLab, and Digital Scholarship Lab are available to help you through consultations and workshops.

### **Student Support**

Brandeis University is committed to supporting all our students so they can thrive. If a student, faculty, or staff member wants to learn more about support resources, the [Support at Brandeis](#) webpage offers a comprehensive list that includes these staff colleagues you can consult, along with other support resources:

- [The Care Team](#)
- [Academic Services](#) (undergraduate)
- [Graduate Student Affairs](#)
- Directors of Graduate Studies in each department, School of Arts & Sciences
- Program Administrators for the Heller School and International Business School
- [University Ombuds](#)
- [Office of Equal Opportunity](#).

**Workload Statement**

Success in this four-credit course is based on the expectation that students will spend a minimum of 12 hours of in-class and outside-of-class study time per week (e.g., doing the reading, reviewing lecture notes, working on assignments).