

STATISTICS 102A: INTRODUCTION TO COMPUTATIONAL STATISTICS WITH R

Winter 2021

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Course Description:

Introduction to computational statistics through numerical methods and computationally intensive methods for statistical problems. Topics include intermediate to advanced programming techniques in R, root finding, simulation, randomization testing, and bootstrapping.

Office Hours:

I welcome you to contact me outside of class and the scheduled office hours. You may email me or make an appointment with me. Please use the [link](#) for office hours. You can also find it on the Site info of CCLE.

Course Pages:

All important information pertaining to the course will be posted on <https://ccle.ucla.edu>. Course announcements, schedule changes, homework and any other miscellaneous information will be posted on the site.

Lectures:

All classes, discussion sections, and office hours are held online with [zoom app](#). Please follow the link, [registration link](#), to register in advance for the online lecture. After registering, you will receive a confirmation email containing information about joining the lecture. You should attend every class, but extenuating circumstances arise that may make this difficult. If you cannot attend classes, please let me know and make sure you follow up on the class progress with the lecture recordings.

Required Textbook:

None. Course notes will be provided on CCLE.

Discussion Forum:

We will be using Campuswire for all class Q&A and discussions. Please use it to ask any class-related questions. The instructor and TA will check Discord frequently and answer unresolved questions, but you are also encouraged to collaborate (level 1) with each other and answer each other's questions. Please use <https://campuswire.com/p/G719EB90C> to sign up (Class Code 0611).

Reference (Optional) Textbooks:

- Wickham, H., Advanced R, 2nd Edition, CRC Press, 2019.
- Jones, O., Maillardet, R., and Robinson, A., Introduction to Scientific Programming and Simulation Using R, CRC Press, 2009.
- Chang, W., R Graphics Cookbook, O'Reilly, 2012.
- Zieffler, A. S., Harring, J. R., Long, J. L., Comparing Groups: Randomization and Bootstrap Methods Using R, Wiley, 2011.

Tentative Course Outline:

WEEK	TOPIC	LECTURE NOTES
1	Basic data structure, subsetting, control statements, functions	Chapter 1
2	R environment and scopes	Chapter 2
3	Introduction to the Tidyverse	Chapter 3
4	Object-oriented programming in R	Chapter 4
5	String manipulation and regular expression	Chapter 5
6	Floating point arithmetic	Chapter 6
7	Root finding algorithm/Numerical optimization	Chapter 7
8	Randomization and permutation tests	Chapter 8
9	Bootstrap tests	Chapter 9
10	Data visualization with ggplot2	Chapter 10

Required Software:

- Programming Language/Software: R version 3.6.0
Free to download at <https://cran.r-project.org>
- Integrated Development Environment: RStudio
Free to download at <https://www.rstudio.com/>

R and RStudio are preinstalled on all computers in all CLICC laptops.

Grading Policy:

- 8% Quiz
- 45% Homework
- 12% Midterm Exam (50 minutes)
- 35% Final Exam (2 hours)

Final grades typically follow an absolute scale (90% is an A, 80% is a B, etc.), but the cutoffs can be flexible to accommodate score distributions that do not fit that very well. Plus and minus cutoffs will be determined at the end of the quarter. **If everyone does well, everyone will get a good grade.**

Quiz:

There will be 4-5 online timed quizzes posted on CCLE. The quizzes will be posted 3 days in advance.

Homework:

There will be 5 or 6 homework assignments depends on our progress. The assignments will be posted on the course website and due by 11:00 PM on the specified due date. Please include your first and last name, and student ID on every homework assignment. It is your responsibility to verify that your homework assignment successfully uploaded by the deadline. Every homework will also specifies the format of the submission in more detail.

Online Exams:

There will be two exams. Every student must have UCLA ID, a webcam, and make sure the Respondus LockDown Browser is available on your computer. The exams will be closed-book and closed-notes, but you will be allowed one “formula sheet” (front and back) during each exam, and please don’t share your formula

sheet with others during the exams. **Please do not make any travel plans on the specified dates of exams.** If you foresee any difficulty in taking the exams at the scheduled time, speak with the instructor immediately.

- Midterm: The exam will be available from 11:00 AM Feb 10 to 11:00 AM Feb 11. The time limit is 50 minutes.
- Final Exam: The exam will be available from 8:00 AM March 15 to 6:00 PM March 16. The time limit is 2 hours.

Course Policies:

Academic Integrity Agreement Please upload the signed integrity agreement before the due of the first assignment. No work would be graded without a signed agreement.

Email Policy:

Any email to the instructor or TA must include **your UID, your enrolled lecture and discussion section number** (e.g., “Stats 102A Dis 3A”) in the subject heading.

Assignment Policies:

All assignments must be turned in through the respective submission portals on CCLE. Email submissions will not be accepted: **Do not attach assignments to email.**

A **3** hour grace period will be granted for any late submissions. Assignments submitted after the grace period will receive a **10%** penalty for each 12 hour period or portion thereof after the submission deadline. Exceptions to the late penalty are considered on a case-by-case basis to accommodate extenuating documented circumstances.

Submissions must be reasonably presentable, properly indented, well-formatted, and easily readable to the grader. **Any submissions that are difficult for the grader to read will receive a penalty for style/readability.** For guidance on best practices for readable code: <https://code.tutsplus.com/tutorials/top-15-best-practices-for-writing-super-readable-code-net-8118>

All submitted work must be independently written by each student and adhere to the university policy on academic integrity. **Searching for, finding, and/or using solutions online is considered academically dishonest.**

Collaboration between students on any submission, whether in draft or final form, to meet course requirements will be considered unauthorized unless explicitly stated in the assignment in question, or expressly permitted by the instructor or TA.

Regrade Policy:

Requests for regrades on homework should be sent to the TA and the instructor. TA will liaise with the grader in addressing the grading concern. Homework submissions will be regraded in their entirety, and any grade adjustments (whether an increase or decrease) will be considered final.

Homework extensions:

I will grant a **72-hour** reprieve from the late penalty for homework submissions if the homework is accompanied with documentation. **The documentation must be uploaded onto CCLE with the homework submission.**

Homework settings on CCLE will be adjusted to accept multiple file submissions. Submit a PDF or photograph of the documentation showing the date and reason for your inability to submit the homework on time. **Do not email the professor your documentation.** Extensions beyond 72 hours will be granted in only the most extreme circumstances, and will only be granted in person by the instructor.

Course Grade Changes:

It is the student's responsibility to check grades on CCLE in a timely manner so that any grade issues (e.g., missing or incorrect grades) are resolved well before the quarter is over. All grades are considered final 24 hours after the final exam and cannot be appealed.

After course grades have been submitted to the Registrar, grades are final. Grade changes will only be considered if there has been a clerical or procedural mistake. Students have one quarter to make requests for a grade change. Graded exams and other materials will be kept for one quarter. After one quarter, course grade changes will not be made.

University Policy:**Academic Integrity**

As a student and member of the University community, you are here to get an education and are, therefore, expected to demonstrate integrity in your academic endeavors. All students must uphold University of California Standards of Student Conduct as administered by the Office of the Dean of Students. Students are subject to disciplinary action for several types of misconduct, including but not limited to: cheating, multiple submissions, plagiarism, prohibited collaboration, facilitating academic dishonesty, or knowingly furnishing false information. You may have assignments or projects in which you work with a partner or with a group. For example, you are welcome, and even encouraged, to work with others to solve homework problems. Even though you are working together, the assignment you submit for a grade must be **IN YOUR OWN WORDS**, unless you receive specific instructions to the contrary. For more information about academic integrity, please go to <http://www.deanofstudents.ucla.edu>.

In addition, each student is the sole owner of their code and work and must **NOT**:

- Submit work that is not original.
- Publish code or solutions online.
- Post the course questions on forums other than the designated course discussion forum. This means students cannot post questions on places like stack overflow or other similar places.
- Submit someone else's work, or a modification of that work, with or without that person's knowledge.
- Allow someone else to submit their work, or a modification of their work.
- Contract course work out to others.
- Plan or execute with another student some form of cheating during an exam.
- Make use of unauthorized material during an exam.

Accessible Education

Students needing academic accommodations based on a disability must contact the Center for Accessible Education (CAE) at (310) 825-1501 or present in person at Murphy Hall A255. As the professionals delegated authority from the campus to determine reasonable disability accommodations, CAE will assess all requested accommodations and communicate appropriately with faculty. In the event that a student has approval for proctoring arrangements during exams, please inform your respective professors and/or Teaching Assistant(s) before date of exam(s). When possible, students should contact the CAE within the first two weeks of the term as reasonable notice is needed to coordinate accommodations. For more information visit www.cae.ucla.edu.

Title IX

Title IX prohibits gender discrimination, including sexual harassment, domestic and dating violence, sexual assault, and stalking. If you have experienced sexual harassment or sexual violence, you can receive confidential support and advocacy at the CARE Advocacy Office for Sexual and Gender-Based

Violence, 1st Floor Wooden Center West, CAREadvocate@caps.ucla.edu, (310) 206-2465. In addition, Counseling and Psychological Services (CAPS) provides confidential counseling to all students and can be reached 24/7 at (310) 825-0768. You can also report sexual violence or sexual harassment directly to the University's Title IX Coordinator, 2241 Murphy Hall, titleix@conet.ucla.edu, (310) 206-3417. Reports to law enforcement can be made to UCPD at (310) 825-1491. Faculty and TAs are required under the UC Policy on Sexual Violence and Sexual Harassment to inform the Title IX Coordinator should they become aware that you or any other student has experienced sexual violence or sexual harassment.