

# **STAT 102B**

## **Introduction to Computation and Optimization for Statistics**

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**Office:** 9432 Boelter Hall

**Office Hours:** Wed 1:00-3:00 pm and by appointment

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**TA Office Hours:** TBD

### **Course Description:**

Introduction to modern **optimization methods** widely used in statistical and machine learning modeling.

Topics include first order methods (gradient descent and its variants such as stochastic gradient descent, proximal gradient descent, coordinate descent), momentum methods, second order methods, as well as concepts from machine learning such as loss and likelihood functions, regularization, cross validation for tuning parameters. etc. The optimization methods will be illustrated in various statistical and machine learning models including linear regression, logistic regression, neural networks, support vector machines, dimension reduction methods, etc.

### **Course Material:**

All important information pertaining to the course will be posted on **BruinLearn**. Lecture notes, homework, sample exam questions, course announcements, schedule changes, and any other miscellaneous information will be posted on the site.

## Software:

Programming Language/Software: R/Python (your choice, will post sample code for the core algorithms in both languages)

## Grading Policy:

- 40%: Home works (four assignments, none are dropped)
- 20%: Exam 1 (in class)
- 20%: Exam 2 (in class)
- 20%: Take Home Project

Final grades typically follow an absolute scale (95+% is an A+, 90-95% is an A, 85-90 an A- and so forth), but the cutoffs can be flexible to accommodate score distributions that do not fit the above precisely. Plus and minus cutoffs will be determined at the end of the quarter.

Note: [If everyone does well, everyone will receive a good grade.](#)

## In Class Exams:

1. Exam 1: in class on Thursday May 1
2. Exam 2: in class on Thursday May 29

## Homework Due Dates:

HW 1	Fr 4/14 at 4 pm
HW 2	Fr 4/28 at 4 pm
HW 3	Fr 5/19 at 4 pm
HW 4	Fr 6/2 at 4 pm

**Take Home Project:** It will posted on June 3 and I will discuss it during the last in class lecture. It will be due on Thursday June 12 at 5 pm.

Zoom lectures: The lecture on Tuesday June 3 will be delivered on Zoom. All other lectures will be in person.

## Course Policies:

### Email Policy:

Any email to the instructor or TA must include your enrolled lecture and discussion section number (e.g., "Stats 102B Dis 4A") in the subject heading. Any emails without this information may be ignored without warning.

### Assignment Policies:

All assignments must be turned in through the respective submission portals on Gradescope on Bruinlearn. Email submissions will not be accepted: Do not attach assignments to email. **No grace period will be granted for late submissions.**

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.

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. 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 BruinLearn together with the homework submission. Submit a PDF or photograph of the documentation showing the date and reason for your inability to submit the homework on +me. Do not email the instructor or TA 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 BruinLearn 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

72 hours after the final project is due 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 CODE AND 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.

**Zero Tolerance Policy:**

Any and all issues of potential academic dishonesty will be reported to the Dean of Students without warning.

**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](http://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](mailto: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, [tleix@conet.ucla.edu](mailto:tleix@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.