Course Syllabus

Registrar Information

Course #	EC ENGR 131A
Course title	Probability and Statistics
Instructor	Lara Dolecek
Class time and location	Tuesday and Thursday 10 am – 11.50 am, 1102 Perloff Hall.
Final day and time	Thursday 3/16/23 10-11.50 am (in class)
Course units and description	Lecture, four hours; discussion, one hour; outside study, 10 hours. Introduction to basic concepts of probability, including random variables and vectors, distributions and densities, moments, characteristic functions, and limit theorems. Applications to communication, control, and signal processing. Introduction to computer simulation and generation of random events. Letter grading.
Course prerequisite or requisites	Requisites: course 102 (not enforced), Mathematics 32B, 33B.

Course Materials

- *Required textbooks*: Probability, Statistics, and Random Processes for Electrical Engineering, Third Edition by Alberto Leon-Garcia.

Important Dates

- Exam1: Thursday 1/26/23 10-11.50 am (in class)
- Exam2: Thursday 2/16/23 10-11.50 am (in class)
- Final: Thursday 3/16/23 10-11.50 am (in class)
- MATLAB project due: Week 11

Discussions

- Discussion 1A: 12-12.50 pm, Thursday, 5272 Boelter
- Discussion 1B: 3-3.50 pm, Friday, 5280 Boelter
- Discussion 1C: 4-4.50 pm, Friday, 5273 Boelter
- Discussion 1D: closed by Dept

Course Schedule/Outline

Course Content

Week 1	Sample space. Set properties. Axioms of probability. HW 1 out.
	Counting methods. Combinatorics. Permutations and Combinations.
Week 2	Conditional probability. Bayes rule. **HW 1 due,** HW 2 out.
	Discrete RVs. PMF. Expectations.
Week 3	Discrete RVs, Experiments. **HW 2 due,** HW 3 out.
	EXAM 1
Week 4	Continuous RVs, PDF, expectation, variance, higher-order moments.
	CDF, PDF. **HW 3 due**, HW4 out.
Week 5	Important discrete and continuous RVs.
	Functions of RVs. **HW 4 due,** HW 5 out.
Week 6	Transform methods. Characteristic function.
	EXAM 2
Week 7	Markov and Chebyshev inequalities. Computer methods. **MATLAB PROJECT out. HW 5 due**, HW 6 out.
	Pairs of RVs. Marginal and conditional PDFs. Joint CDF.
Week 8	Functions of two RVs.

	HW 6 due, HW 7 out.
	Jointly Gaussian RVs.
Week 9	Sums of RVs. Law of large numbers. Central limit theorem. **HW 7 due,** HW 8 out.
	Chi-square test. Statistics.
Week 10	Statistics & Random Processes. **HW 8 due.**
	FINAL EXAM (IN CLASS)
Week 11	**FINAL PROJECT DUE**

Course Policies

Demo / Discussion

Additional demo problems will be provided to you to work on. Your TAs will go over some of them in the discussion section. You don't have to turn in demo problems but you should use them for further practice.

Project

As a complement to homework exercises, a part of the course will be devoted to a programming project with a goal of deepening your intuition and giving you a hands-on experience in solving probability problems.

Homework Submission

We will use Gradescope for homework submission in the course. Please upload your homework through the Gradescope link embedded in Canvas (present in the left in the scroll-down menu option). Please upload a single PDF containing your solutions. You may either type or scan your handwritten solutions. If you scan your solutions, make sure, after the scan, that your work is clear and discernible.

Collaboration Policy

You should first attempt to solve each homework problem by yourself. If you get stuck, I encourage you to discuss the problem with fellow students, with the TAs, or with me. Clearly acknowledge any outside help.

Grading policies

- Homework: There are 8 homework assignments. Your lowest homework grade will be replaced by your highest homework grade.
- Late-work: Solutions will be promptly posted online for you to access. Weekly homework is due by 11.59 pm PST on Gradescope on the indicated dates. No late homework will be accepted.
- Make-up work: Death in family/severe illness require a proof for consideration. Let's hope none of that happens. In all other cases, no makeup exams allowed so please don't ask for it.
- Regrade Policy: If you request a regrade on any portion of your exam, your entire exam will be regraded, potentially resulting in losing points. All requests for regrade must be submitted within a week of the grading. No exceptions.

Grade Breakdown

- Weekly Homework: 15%
- Exam 1: 20%
- Exam 2: 20%
- MATLAB Project: 20%
- Final Exam: 25%

Technical Requirements

- Browsers: You will need to use a browser as your primary method of accessing this course. The Canvas mobile apps should only be used as a supplement. To learn about browser compatibility with Canvas, visit the **Supported Browsers** ⤷ **(https://community.canvaslms.com/t5/Canvas-Basics-Guide/What-are-the-browser-and-computer-requirements-for-Canvas/ta-p/66)** page.

University Policies and Support for Students

Academic Integrity

UCLA is a community of scholars. In this community, all members including faculty, staff and students alike are responsible for maintaining standards of academic honesty. 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. You are evaluated on your own merits. Cheating, plagiarism, collaborative work, multiple submissions without the permission of the professor, or other kinds of academic dishonesty are considered unacceptable behavior and will result in formal disciplinary proceedings usually resulting in suspension or dismissal. See the **Dean of Students website (https://deanofstudents.ucla.edu/)** for more information.

Accommodations for Students with Disabilities

If you are already registered with the Center for Accessible Education (CAE), please request your Letter of Accommodation in the Student Portal. If you are seeking registration with the CAE, please submit your

request for accommodations via the CAE website. Students with disabilities requiring academic accommodations should submit their request for accommodations as soon as possible, as it may take up to two weeks to review the request. For more information, please visit the **CAE website (https://cae.ucla.edu)** , visit the CAE at A255 Murphy Hall, or contact us by phone at (310) 825-1501.

Resources for Students

UCLA provides resources if you are feeling overwhelmed and need personal and/or academic assistance.

Please see the **Red Folder (https://studentincrisis.ucla.edu/file/39679e1c-a57d-48d0-83a2-a906c1e53669)** for more information.

Title IX and Equity, Diversity and Inclusion

Advocacy and Confidential Services:

Please note that 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, 205 Covel Commons, Los Angeles, CA, 90095, care@careprogram.ucla.edu, (310) 206-246 5. Counseling and Psychological Services (CAPS) provides confidential counseling to all students and can be reached 24/7 at (310) 825-0768.

Reporting and Non-confidential Services:

Your professor is required under the UC Policy on Sexual Violence and Sexual Harassment to inform the Title IX Coordinator should he become aware that you or any other student has experienced sexual violence or sexual harassment. In addition, You can also report sexual violence or sexual harassment directly to the University's Title IX Coordinator, 2255 Murphy Hall, titleix@equity.ucla.edu , (310) 206-3417. Reports to law enforcement can be made to UCPD at (310) 825-1491.

Engineering EDI Resources:

There are a number of specific resources on Equity, Diversity, and Inclusion available to students in the Samueli School of Engineering, including trained faculty officers in each department who can be consulted if you have a question on EDI issues and are not sure where else to turn. Please see **https://samueli.ucla.edu/equity-diversity-and-inclusion (https://samueli.ucla.edu/equity-diversity-and-inclusion)** for information.

Course Summary:

Date	Details	Due
Tue Jan 17, 2023	📝 **Homework 1** (https://bruinlearn.ucla.edu/courses/154196/assignments/1353372)	due by 11:59pm
Tue Jan 24, 2023	📝 **Homework 2** (https://bruinlearn.ucla.edu/courses/154196/assignments/1360212)	due by 11:59pm
Thu Jan 26, 2023	📝 **Exam 1** (https://bruinlearn.ucla.edu/courses/154196/assignments/1366586)	due by 11:59pm
Thu Feb 2, 2023	📝 **Homework 3** (https://bruinlearn.ucla.edu/courses/154196/assignments/1363120)	due by 11:59pm
Thu Feb 9, 2023	📝 **Homework 4** (https://bruinlearn.ucla.edu/courses/154196/assignments/1367283)	due by 11:59pm
Thu Feb 16, 2023	📝 **Exam 2** (https://bruinlearn.ucla.edu/courses/154196/assignments/1373209)	due by 11:59pm
Tue Feb 21, 2023	📝 **Homework 5** (https://bruinlearn.ucla.edu/courses/154196/assignments/1369845)	due by 11:59pm
Tue Feb 28, 2023	📝 **Homework 6** (https://bruinlearn.ucla.edu/courses/154196/assignments/1373838)	due by 11:59pm
Tue Mar 7, 2023	📝 **Homework 7** (https://bruinlearn.ucla.edu/courses/154196/assignments/1376769)	due by 11:59pm
Tue Mar 14, 2023	📝 **Homework 8** (https://bruinlearn.ucla.edu/courses/154196/assignments/1379377)	due by 11:59pm
Thu Mar 16, 2023	📝 **Exam 3** (https://bruinlearn.ucla.edu/courses/154196/assignments/1387066)	due by 11:59pm
Thu Mar 23, 2023	📝 **Project** (https://bruinlearn.ucla.edu/courses/154196/assignments/1379786)	due by 11:59pm