SYLLABUS FOR STATISTICS C183/C283 - LECTURE 1
STATISTICAL MODELS IN FINANCE
FALL QUARTER 2025

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Course website: UCLA Bruin Learn - `http://bruinlearn.ucla.edu`
Office hours: MWF 15:00 - 17:00, TR 13:00 - 15:00

Lecture	Day	Class Time	Location
Lecture 1	MWF	14:00 - 14:50	Royce Hall 190

Hello Everyone! My name is Nicolas Christou and I have been a faculty member of the UCLA Department of Statistics & Data Science since 2000. I am honored to be part of your UCLA journey, and I look forward to having you in Statistics C183/C283!

OFFICE HOURS:
Office hours are offered every day and some weekends. Do not hesitate to come to office hours if you have any questions. It will be great to see you! The weekend office hours will be announced by email every Friday. The office hours during the week are MWF 15:00 - 17:00, TR 13:00 - 15:00. I can also meet by appointment outside of the office hours. Please let me know and we will schedule a meeting.

RESOURCES:
Handouts can be accessed on UCLA Bruin Learn: `http://bruinlearn.ucla.edu`.
Software:
`R`, can be downloaded freely from `https://cran.r-project.org`.
`RStudio`, can be downloaded freely from `https://www.rstudio.com`.
Statistics Online Computational Resource (SOCR): `http://www.socr.ucla.edu`.
Textbooks (optional):
Options Futures and Other Derivatives by John Hull, Prentice Hall 6th Edition, 2006.
Modern Portfolio Theory and Investment Analysis, by Elton, Gruber, Brown, Goetzmann, Wiley 6th Edition, 2003.

COURSE PREREQUISITES:
Statistics 100B.

POLICIES AND PROCEDURES
Please be on time and remember to turn off or silent your cell phone. You may use electronic devices for note-taking.

OUTLINE

In this course students will be exposed to several statistical techniques used in investment theory and get hands on experience by applying the various models on real stock market data. The course consists of two major parts.

Part I:

This part of the course will be devoted to portfolio management. The topics are listed below:

1. Combining individual stocks into portfolios (risk and expected return of a portfolio).

2. Maximizing return given risk, or minimizing risk given return.

3. Properties of the minimum variance set (efficient frontier).

4. The single index model (with and without short sales allowed).

5. Constant correlation model (with and without short sales allowed).

6. Multigroup and multi-index models (short sales allowed).

7. Portfolio performance.

Part II:

This part of the course will discuss topics on options pricing and investment strategies:

1. Investing strategies using options.

2. Binomial model.

3. Weiner and Markov processes.

4. Ito's lemma.

5. Log-normal property of stock prices.

6. Black-Scholes-Merton model.

7. "The Greeks".

8. Implied volatility, simulations.

9. Value at Risk (VaR).

ACCOMODATIONS

Students needing academic accommodations should contact the Center for Accessible Education (CAE): http://www.cae.ucla.edu) or call (310) 825-1501.

STUDENT RESOURCES

- COVID-19. You can find information for students related to COVID-19 here: https://covid-19.ucla.edu/information-for-students/.

- Counseling and psychological services (CAPS): https://www.counseling.ucla.edu .

- Resources on Equity, Diversity, and Inclusion: https://equity.ucla.edu/know/.

- Undocumented Student Program (USP): https://www.usp.ucla.edu .

- Students can embrace their identities - LGBTQ Center: https://www.lgbt.ucla.edu .

COURSE GRADES:
We will maintain the academic rigor of an upper division/graduate course in statistics while being flexible in student assessment. There will be two midterm exams,, weekly homework, a final exam, and a final project.

1. Final exam (35%): The final exam is scheduled on Tuesday, 12/09, 08:00 - 11:00.

2. Midterm 1 (20%): Week 4, Monday, 10/20, 18:00 - 20:00.

3. Midterm 2 (20%): Week 8, Monday, 11/17, 18:00 - 20:00.

4. Weekly homework (10%). All homework assignments will be uploaded on `Gradescope` (`https://www.gradescope.com`).

5. Project (15%). The project is required and parts of the project will be due weekly. The last part of the project (portfolio performance) is due during week 6. The project will also be uploaded on `Gradescope` (`https://www.gradescope.com`).

Project:
For the project, students will select 30 stocks from 5 industries. Using the models discussed in class, students will construct efficient portfolios and analyze their performance over time. This on-going project will be discussed regularly with the instructor on its progress. You will have $1,000,000 to invest in these 30 stocks using different models and assumptions. The last part of the project (portfolio performance) is due during week 6.

The course grade will be based on the calculation:

$$
\begin{aligned}
\text{Final score} \quad = \quad & 0.10 \times \text{Homework} + 0.15 \times \text{Project} \\
+ \quad & 0.20 \times \text{Midterm1} + 0.20 \times \text{Midterm2} + 0.35 \times \text{Final}
\end{aligned}
$$

IMPORTANT DATES:
First lecture: Friday, 26 September.
Last lecture: Friday, 05 December.
Holidays: Tuesday, 11 November (Veterans day), Thursday-Friday, 27-28 November (Thanksgiving holiday).

EXAMS:
Midterm 1: Monday, 20 October, 18:00 - 20:00.
Midterm 2: Monday, 17 November, 18:00 - 20:00.
Final exam: Tuesday, 09 December, 08:00 - 11:00.

Good Luck !!!