

**SYLLABUS FOR STATISTICS C173/C273
APPLIED GEOSTATISTICS
WINTER QUARTER 2022**

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Office hours: MTWRF 14:00 - 16:00

Lecture	Day	Class Time	Location
Lecture 1	MW	11:00 - 11:50	Young Hall 2200
	F	11:00 - 11:50	Haines Hall 39

Hello Everyone! My name is Nicolas Christou and I have been a faculty member of the UCLA Department of Statistics since 2000. I am honored to be part of your UCLA journey, and I look forward to having you in Statistics C173/C273!

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 office hours on weekends will be announced by email on Friday. The office hours during the week are MTWRF 14:00 - 16:00. The office hours will be in-person and also on Zoom. You are welcome to join the in-person office hours or join the Zoom meeting. 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 at http://www.stat.ucla.edu/~nchristo/statistics_c173_c273.

Probability and Statistics EBook (freely available at):

<http://wiki.stat.ucla.edu/socr/index.php/EBook>.

Software:

R, RStudio (can be downloaded freely from <http://cran.stat.ucla.edu> and <https://www.rstudio.com>).

COURSE PREREQUISITES:

Statistics 100B, Statistics 100C or equivalent.

POLICIES AND PROCEDURES

- Classes will be held remotely for the first two weeks of the winter quarter. The in-person classes are expected to begin on 18 January.
- All students should still plan to return to campus no later than January 9.
- Students should take a COVID-19 test no more than 72 hours before returning to Westwood.
- Immediately upon returning to campus, students must test again: For the students living in university-owned on-campus or university-owned off-campus housing a free COVID-19 rapid test will be distributed upon check in or at their front desk. Students not living in university-owned housing must come to campus to obtain a free COVID-19 test from a campus vending machines: <https://www.studenthealth.ucla.edu/>.
- All students must take another test three to five days after returning from winter break, but no later than January 13. This test must be obtained from a campus vending machine or distribution center.
- Effective immediately, all students - regardless of vaccination status - must test at least once per week (twice per week is strongly recommended) through the campus testing program for the duration of winter quarter.
- COVID-19 Boosters are required: Eligible UCLA faculty, staff and students must obtain their COVID-19 booster shots as soon as possible. Students must upload proof to the Ashe Student Portal by January 18.
- Daily symptom monitoring survey every day that you are on campus:
https://uclasurveys.col.qualtrics.com/jfe/form/SV_3qRLtouCYKzBbH7.
- Mask use, regardless of vaccination status, is required in all indoor spaces on the UCLA campus, including classrooms. Masks are required during lecture at all times. Please wear your mask properly to cover your mouth and nose.
- Food and drinks are highly discouraged unless for medical reasons. For hydration briefly remove your mask and then wear it again.
- Be on time and remember to turn off or silent your cell phone. You may use electronic devices for note-taking.

COURSE DESCRIPTION AND OBJECTIVES:

Spatial statistics is one of the fastest growing areas of statistics and has applications across a wide range of disciplines. The term geostatistics evolved in mineral exploration and mining. However, geostatistics can be applied to tackle many problems in other disciplines such as hydrology, air and water pollution, epidemiology, economics, geography, waste management, forestry, oceanography, meteorology, agriculture, etc., and in general to every problem where data are observed at geographic locations. The main purpose of the course is to reinforce the importance of Statistics through applications of theory and methods to interesting real problems of spatial data.

COURSE TOPICS

1. Introduction.
2. Variogram.
3. Covariogram.
4. Correlogram.
5. Isotropy, anisotropy.
6. Spatial prediction.
7. Kriging: ordinary kriging, simple kriging, universal kriging, co-kriging, block kriging.
8. Simulations.
9. Cross-validation.
10. Lattice data.
11. Point pattern data.
12. Spatio-temporal data.
13. Extensive use of the R packages **geoR** and **gstat** to analyze spatial data.

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 course in statistics while being flexible in student assessment. There will be a midterm exam, a final exam, homework or labs that will be assigned every week, and a final project on a spatial data set of your choice.

1. Final exam (35%): The final exam is scheduled on Wednesday, 16 March, 11:30-14:30.
2. Midterm (25%): Week 7, Thursday, 02/17, 18:00-20:00.
3. Two take-home quizzes (10%): They will be assigned at 8:00 am on Thursday of week 5 and week 8 and will be due by 10 pm on the same day. The quizzes will be uploaded on **Gradescope** (<https://www.gradescope.com>).
4. Project (15%): Due by week 9.
5. Weekly homework/labs (15%). There is flexibility on the submission due dates. Homework can still be uploaded 24 hours after the due date. All homework assignments will be uploaded on **Gradescope** (<https://www.gradescope.com>).

All exams are open notes. You can use your class notes, handouts, homework, homework solutions, your statistical tables, in general all the material posted on the course website and you can use any calculator or R.

The course grade will be based on the calculation:

$$\text{Final score} = 0.15 \times \text{Homework/Labs} + 0.10 \times \text{Quizzes} + 0.25 \times \text{Midterm1} + 0.15 \times \text{Project} + 0.35 \times \text{Final}$$

COMMUNICATION:

Please keep a current e-mail address with my.ucla.edu in order to receive class announcements and reminders.

IMPORTANT DATES:

First lecture: Monday, 03 January.

Last lecture: Friday, 11 March.

Holidays: Monday, 17 January (Martin Luther King, Jr.) and Monday, 21 February (Presidents' Day).

Good Luck !!!