SYLLABUS FOR STATISTICS C173/C273
APPLIED GEOSTATISTICS
WINTER QUARTER 2020

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Office hours: MTWRF 15:00 - 17:00

Lecture	Day	Class Time	Location
Lecture 1	MWF	11:00 - 11:50	Dodd Hall 161

Materials:
In-class handouts can be accessed at
`http://www.stat.ucla.edu/~nchristo/statistics_c173_c273`.

Software: `R`, `RStudio`.

Outline

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 real spatial data.

COURSE POLICIES:
Please remember to turn off cell phones. You may use electronic devices for note-taking. Students needing academic accommodations based on a disability should contact the Center for Accessible Education (CAE) at (310) 825-1501 or in person at Murphy Hall A255. For more information visit `http://www.cae.ucla.edu`.

ACADEMIC INTEGRITY:
You are expected to adhere to the honor code and code of conduct. 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/`.

COURSE GRADES:
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. Homework assignments, labs, and projects must be uploaded on `ccle` (`https://ccle.ucla.edu`). Late homework or labs will not be accepted and make-up exams will not be given. Being in class on time and fully participating is important for your understanding of the material and therefore for your success in the course. The dates for the exams are shown below.

Final Project:
Each student will select a spatial data set from an area of interest to analyze using the techniques learned in class. You are advised to find a data set as early as possible.

The course grade will be based on the calculation:
$\texttt{Final score} = 0.15 \times \texttt{Homework/Labs} + 0.15 \times \texttt{Project} + 0.30 \times \texttt{Midterm} + 0.40 \times \texttt{Final}$

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, 06 January.
Last lecture: Friday, 13 March.
Holidays: Monday, 20 January (Martin Luther King, Jr.) and Monday, 17 February (Presidents' Day).

EXAMS:
Midterm: Week 6
Final exam: Tuesday, 17 March, 08:00-11:00

Good Luck !!!