

**SYLLABUS FOR STATISTICS C173/C273
APPLIED GEOSTATISTICS
WINTER QUARTER 2015**

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Office hours: MTWRF 15:00 - 17:00

Lecture	Day	Class Time	Location
Lecture 1	MWF	11:00 - 11:50	KINSEY PAVILION 1200B

Materials:

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

Software: R, GRASS

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. This course has two goals: First to give students the opportunity to acquire knowledge that can be used to analyze real spatial data problems. Second, to connect Geostatistics with Geographic Information Systems (GIS), an area that has become very popular in the recent years. It is often very helpful to display spatial data onto geographic maps and GIS is a tool that can work side-by-side with geostatistics.

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. Extensive use of the R packages `geor` and `gstat` to analyze real spatial data.

COURSE POLICIES:

Please remember to turn off cell phones. The use of laptop computers will not be permitted in class. You are expected to adhere to the honor code and code of conduct. If you have a disability that will require academic accommodation, please contact the UCLA Office for Students with Disabilities (OSD).

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 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 three (3) midterm exams, homework or labs that will be assigned every week, and a final project on a data set of your choice. There will be a final project presentation during the last week of classes. You are required to attend all presentations. Please staple your homework or labs and write your name on them. Late homework or labs will not be accepted. Being in class on time and fully participating is important for your understanding of the material and therefore for your success in the course. You are required to attend all the lectures. Attendance will be taken during the course and it will count for 5% of your grade. The tentative 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

$$\begin{aligned} \text{Final score} &= 0.05 \times \text{Attendance} + 0.10 \times \text{Homework/Labs} + 0.15 \times \text{Project} \\ &+ 0.25 \times \text{Exam1} + 0.25 \times \text{Exam2} + 0.25 \times \text{Exam3} \end{aligned}$$

COMMUNICATION:

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

Important dates:

First day of classes: 05 January.

Last day of classes: 13 March.

Holidays: 19 January (Martin Luther King, Jr.), 16 February (Presidents' Day).

Exams:

Exam 1: Friday, 23 January, 11:00 - 11:50.

Exam 2: Friday, 13 February, 11:00 - 11:50.

Exam 3: Friday, 06 March, 11:00 - 11:50.

Good Luck !!!