Spring 2020
UPP 465: Spatial Statistics
Monday 12:00 pm - 2:45 pm
Room: Art & Exhibition Hall 2201

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Office Hours: TBD

Course description: This course introduces students to key concepts and methods in spatial statistics. The class will have a very applied feel and will be a combination of lecture and lab sessions. Students will learn about the different types of spatial data, methods to examine patterns in spatial data, and learn to apply these methods using real world datasets. The course assumes that students have an understanding of descriptive and inferential statistics. The course will primarily use the R software for statistical analysis (`http://r-project.org`). At the end of the course, students should:

- know and understand the different types of spatial data

- understand the potential and limitations of spatial data analysis

- understand concepts of statistics and how they are applied in spatial analysis

- be able to measure and interpret patterns using point and areal data

- know the types of methods appropriate for analyzing different types of spatial data

- be able to apply the methods learned to their own research questions

Course format and materials: Class sessions will combine lectures, discussion and labs. There will be several sessions where you are given a chance to think through and solve problems. There will be a number of assigned readings for this class. Assigned readings will be posted to blackboard and should be completed prior to the class session on the dates indicated. Readings will be either from the text or will be made available in electronic format on the course Blackboard site.

Textbook: O'Sullivan, David, and David Unwin. Geographic information analysis. John Wiley & Sons, 2014. **This book is available in PDF format from the UIC library** `https://library.uic.edu`. Assigned readings from the textbook or elsewhere will be posted on Blackboard.

Grading: Course grades will be assessed on the basis of assignments (60%), a final project (30%), and class attendance and participation (10%). There will be a 20% penalty on late assignments. Late assignments will not be accepted after 3 days.

Absences: Attendance for this class is mandatory.

In-class Expectations: No cell phones, text messaging, surfing or checking email is allowed in class. Arrive on time for class.

Academic Honesty: As an academic community, UIC is committed to providing an environment in which research, learning, and scholarship can flourish and in which all endeavors are guided by academic and professional integrity. All members of the campus community —students, staff, faculty, and administrators —share the responsibility of insuring that these standards are upheld so that such an environment exists. Instances of academic misconduct by students will be handled pursuant to the Student Disciplinary Policy: `https: //dos.uic.edu/docs/Student%20Disciplinary%20Policy%2017-18%20(FINAL).pdf`

Table 1: Schedule of Topics

Date	Topics
01/13/2020	**No class** - I will be attending the annual Transportation Research Board conference in Washington, D.C. **Tasks to be completed by 01/27/2020:** • Get started with the *Learning R (2013)* tutorial available through the LinkedIn online tutorial system (formerly lynda.com). See Blackboard for details on how to access. • Complete assigned readings posted on Blackboard.
01/20/2020	**No class** - Martin Luther King Holiday
01/27/2020	Introduction to spatial statistics Types & properties of spatial data
02/03/2020	Statistical concepts (a quick review) Lab session: Introduction to data analysis using R
02/10/2020	Mapping basics Lab session: Introduction to spatial analysis using R
02/17/2020	Exploratory spatial data analysis: Centrographic analysis
02/24/2020	Point pattern analysis: Kernel Density Estimation, Quadrat counts
03/02/2020	Point pattern analysis: Distance based measures characterizing point patterns
03/09/2020	Lab: Point pattern analysis with R
03/16/2020[†]	Analysis of areal/polygon data: Global measures of spatial association
03/23/2020	Spring Break - No Class
03/30/2020	Analysis of areal/polygon data: Local measures of spatial association
04/06/2020	Lab: Global and local measures of spatial association with R
04/13/2020	Analysis of geostatistical data with examples
04/20/2020	Extensions & selected topics
04/27/2020	Open session - project questions, etc.
05/04/2020 [∓]	Student presentations

[†]Project proposal due by end of week on 03/20/2020.

[∓]Final project report due.