STA 6709: Spatial Statistics

Fall 2021

Time and Location: Monday, Wednesday, and Friday from 9:20am to 10:10am, OSB 0327

Instructor Information:

Name: Jonathan Bradley

E-mail: jrbradley@fsu.edu

Office: OSB 405

Office Hours: Monday and Wednesday from 10:30am − 11:30am (or by appointment).

Course Website: Canvas

Zoom Access: I will hold lectures in OSB 0327 and record them live over Zoom. These recordings will be made available to all students on Canvas. My office hours will be made available over Zoom as well.

Required Textbook: Banerjee, Carlin, and Gelfand, *Hierarchical Modeling and Analysis for Spatial Data (2nd edition)*, Chapman & Hall/CRC (2015).

Other Readings: I may ask you to read other materials besides the required text (e.g., journal articles). I will provide copies of these additional readings to the class.

Prerequisites: Sufficient knowledge of statistical inference and linear models (i.e., completion of STA 5326, 5327, 5166, and 5167). Please contact me if you have not taken these courses.

Goal: To learn statistical theory and methods useful in the analysis of spatial data.

Topics: This course examines methods for the analysis of spatial data, including geostatistical data, lattice data, and point patterns. The course also includes theory and applications of basic principles and techniques. In particular, we will cover selected sections from Chapters $1-12$ of Banerjee, Carlin, and Gelfand (2015, **BCG**) including: theory and methods of point-referenced data (Chps. 2 and 3), areal-referenced data (Chp. 4), spatial hierarchical models (Chps. 5 and 6), big spatial data (Chp. 12), multivariate spatial data (Chps. 9 and 10), multiscale spatial data (Chp. 7), and point-processes (Chp. 8). Certain methods covered in class will be demonstrated in R.

Grading: Homework assignments (1/3 of total grade), a midterm (1/3 of total grade), and a final project (1/3 of total grade). Homeworks will be graded by the teaching assistant or the instructor, and the remaining course material will be graded by the instructor.

Assignments: There will be five homework assignments (lowest grade dropped), each due on a Friday by 4pm. You have the option to turn in homework assignments on Canvas or in person. Place the homework in my mailbox. The due dates for each assignment are listed below:

- Assignment 1: September 10
- Assignment 2: October 1
- Assignment 3: October 15
- Assignment 4: November 5
- Assignment 5: November 19

Although R will be used in class, assignments that require statistical computing may be done using any programming language.

Midterm: The midterm will be held on October 22.

Final Project: Before you turn in your final project you must turn in a project proposal. This project proposal must be approved by Dr. Bradley before the final project is turned-in for grading. The project proposal is due October 29. The final project will be due sometime between December 6 - December 10. Requirements for the project proposal and the final project will be given on October 1.

University Attendance Policy: Excused absences include documented illness, deaths in the family and other documented crises, call to active military duty or jury duty, religious holy days, and official University activities. These absences will be accommodated in a way that does not arbitrarily penalize students who have a valid excuse. Consideration will also be given to students whose dependent children experience serious illness.

Academic Honor Policy: The Florida State University Academic Honor Policy outlines the University's expectations for the integrity of students' academic work, the procedures for resolving alleged violations of those expectations, and the rights and responsibilities of students and faculty members throughout the process. Students are responsible for reading the Academic Honor Policy and for living up to their pledge to ". . . be honest and truthful and . . . [to] strive for personal and institutional integrity at Florida State University." (Florida State University Academic Honor Policy, found at `http://fda.fsu.edu/Academics/Academic-Honor-Policy`.)

Americans With Disabilities Act: Students with disabilities needing academic accommodation should:

1. register with and provide documentation to the Student Disability Resource Center; and
2. bring a letter to the instructor indicating the need for accommodation and what type.

Please note that instructors are not allowed to provide classroom accommodation to a student until appropriate verification from the Student Disability Resource Center has been provided.

This syllabus and other class materials are available in alternative format upon request.

For more information about services available to FSU students with disabilities, contact the:

Student Disability Resource Center
874 Traditions Way
108 Student Services Building
Florida State University
Tallahassee, FL 32306-4167
(850) 644-9566 (voice)
(850) 644-8504 (TDD)
sdrc@admin.fsu.edu
`http://www.disabilitycenter.fsu.edu/`