

# GEOG 8102 – Advanced Spatial Data Analysis

Friday 10:00-12:45pm

## Instructor

Professor Desheng Liu  
Email: liu.738@osu.edu  
Office Hours: CarmenCanvas Calendar  
Office Location: CarmenZoom

## Course Description

This course focuses on advanced statistical methods for spatially referenced data, including spatial point patterns, geostatistical data, and lattice data. Major topics to be covered include spatial random processes, exploratory spatial data analysis, spatial point pattern analysis, spatial covariance functions, variograms, kriging, spatial autoregressive models, and geographically weighted regression. Computer exercises are designed to help students to gain hands-on experience on the topics presented in lectures. Students are required to present and discuss assigned readings and develop an individual research project that applies spatial statistical methods in geographical problem solving.

## Course Website

The course schedule, announcements, lecture notes, assignments, readings, and other course information will be posted on Carmen (<https://carmen.osu.edu>).

## Prerequisites

GEOG 5100 (4103), or consent of instructor. Students should be familiar with basic probability theory, multiple linear regression, and basic linear algebra.

## Required Textbook

Lance A. Waller and Carol A. Gotway (2004). *Applied Spatial Statistics for Public Health Data*. Wiley, New York.

## Reference Books

Trevor C. Bailey and Anthony C. Gatrell. (1995). *Interactive Spatial Data Analysis*, Prentice Hall.

Roger S. Bivand, Edzer J. Pebesma, and V. Gómez-Rubio (2013). *Applied Spatial Data Analysis with R*, 2<sup>nd</sup> edition. Springer, New York.

Anselin, Luc. (2005). *Exploring Spatial Data with GeoDa<sup>TM</sup>: A Workbook*, available at <http://www.csiss.org/clearinghouse/GeoDa/geodaworkbook.pdf>.

## Course Evaluation

Final course grades will be based on the following weighting of assessment components:

- Class discussion 20%
- Homework 25%
- Midterm 15%
- Final project 40%

## Academic Misconduct

Please help maintain an academic environment of mutual respect and fair treatment. It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term academic misconduct includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). Academic misconduct will not be tolerated and will be dealt with procedurally in accordance with university policy, which is available at <http://oaa.osu.edu/coam.html>. For additional information, see the Code of Student Conduct at <http://studentlife.osu.edu/csc/>.

## Students with Disabilities

The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can privately discuss options. You are also welcome to register with Student Life Disability Services to establish reasonable accommodations. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. **SLDS contact information:** [slds@osu.edu](mailto:slds@osu.edu); 614-292-3307; [slds.osu.edu](http://slds.osu.edu); 098 Baker Hall, 113 W. 12th Avenue.

## Health and Safety Requirements

All students, faculty and staff are required to comply with and stay up to date on all university safety and health guidance (<https://safeandhealthy.osu.edu>), which includes wearing a face mask in any indoor space and maintaining a safe physical distance at all times. Non-compliance will be warned first and disciplinary actions will be taken for repeated offenses.