1. Course Basics

Course Name: Spatial Data Analysis

Course Prefix & Number: DANA 310, CRN 34567, Fall 2026 (Online)

2. Instructor Information

Jason Yang, PhD

The School of Earth, Atmosphere, and Sustainability (SEAS)
Ball State University, Muncie, IN

3. Course Information

Course Description

This is an introductory course in spatial analysis and statistics through GIS, which presents spatial data analysis methods and geoinformation analysis techniques to solve various geographical problems, following a "Describe–Explore–Explain" approach. This course offers both a theoretical (Theory) and a practical (Lab) section for each chapter and adopts a "learn-by-doing" approach. Theory presents in detail concepts, methods and metrics, while Lab applies these metrics in solved step-by-step examples through ArcGIS Pro.

Prerequisites

GEOG 265 or GEOG 250 or permission of instructor

Course Goals

- Presents the basic concepts of spatial analysis and spatial analysis workflow that follows a describe–explore–explain structure.
- Introduces commonly used spatial analysis methods including Point Patterns, Autocorrelation, Data Reduction and Spatial Clustering, and Regressions.
- Works on a case study so that students can delve deeper into the different approaches applied in spatial analysis.

Objectives and Student Learning Outcomes:

Objectives	Student Learning Outcomes

Use the software ArcGIS Pro	*Students are able to complete all labs in the textbook without much difficulty using the software.*
Describe spatial data	*Students are able to calculate statistics of spatial data using Exploratory Spatial Data Analysis Tools.*
Explore spatial data	*Students are able to explore spatial data using different spatial analysis methods and techniques.*
Explain the results from spatial analysis	*Students are able to explain and interpret the results from spatial analysis on a case study.*

Course Structure

This online course contains 8 modules and is based on bi-weekly units, averaging one module or one chapter every two weeks. In each module, students are assigned reading materials, lab exercises, quizzes, and discussions.

4. Course Materials

Required textbook:

No textbook is required for this course; reading materials and lab instructions will be posted in each module.

***Data*:**

Exercise data can be downloaded in Module 0: Data.

Software:

ArcGIS Online & **ArcGIS Pro**

- ArcGIS Online needs to be signed in here. before you use the ArcGIS Pro: choose Your ArcGIS organization's URL, type **bsumaps** in the space, then use your Ball State Login to sign in.
- ArcGIS Pro 3.7.1 is the required software for completing assignments in this course. All computers in the GIS labs in the School of Earth, Atmosphere, and Sustainability (SEAS) have the latest software installed.

- If students work in the Bracken Library on campus, you can use Library Software Locator by searching "ArcGIS Pro" to find which computer has the software installed and is available to use.
- If students have to work from home, a computer with Windows Operating System (**not for Mac OS**) is needed for installing ArcGIS Pro (details see Module 0: Software).

5. Course Assignments and Assessments

Course Assignments

Students' final grade (letter) for this course will be determined by the weighted percentage calculated using the following weights (details see the Module 0: Course Schedule)

Assignment details, including instructions, relevant readings, due dates, and grading criteria/rubrics will be posted and updated on Canvas. Please check Canvas regularly to stay informed and on track.

Assignments	#	Weights
Discussions	7	10%
Lab Exercises	7	40%
Quizzes	8	50%
Total		100%

Course Grading Scale

All students' grades are determined by the weighted grade percent (the Total column) in the Grade Center and lettered in the following grade scales:

		B+	87.0-89.9%	**C+**	77.0-79.9%	**D+**	67.0-69.9%	**F**	< 59.9%
A	>= 94.0%	**B**	84.0-86.9%	**C**	74.0-76.9%	**D**	64.0-66.9%		
A-	90.0-93.9%	**B-**	80.0-83.9%	**C-**	70.0-73.9%	**D-**	60.0-63.9%		

6. University Policies and Statements

University Statement

We are committed to ensuring that all members of the community are welcome, through valuing the various experiences and worldviews represented at Ball State and among those we serve. We promote a culture of respect and civil discourse. If you need course adaptations or accommodations because of a disability, please contact the instructor of record as soon as possible. Ball State's Disability Services OfficeLinks to an external site. coordinates services for students with disabilities; documentation of a disability needs to be on file in that office before any accommodations can be provided. Disability Services can be contacted at 765-285-5293 or dsd@bsu.edu.

Freedom of Expression

In this course, we are committed to fostering a learning environment that values intellectual diversity, encourages free expression, and promotes open inquiry. As members of the Ball State Community, we treat each person in the Ball State community with civility, courtesy, compassion, and dignity and respect and learn from differences in people, ideas, and opinions. Please review Ball State University's Statement on Freedom of ExpressionLinks to an external site., the resources on Ball State's Freedom of Expression webpageLinks to an external site., and Ball State's Beneficence Pledge.

Title IX

Ball State University is committed to providing a safe and inclusive learning environment for all students. If you or someone you know has experienced sexual harassment—including sexual assault, dating violence, domestic violence, or stalking, please know that you are not alone. The University offers support services and resources. For more information or to report an incident, please visit bsu.edu/titleix or contact the Title IX Coordinator at 765-285-1545 or at titleix@bsu.edu

As your instructor, I am a mandatory reporter under the Title IX policy and required to report any information I receive about possible sexual harassment. This includes information shared in class discussions, assignments, or private conversations.

What happens after I report? The Title IX Coordinator will email the person who experienced sexual harassment (complainant) and invite them to schedule a meeting. If the complainant **chooses** to meet with the Title IX Coordinator,

- Title IX Coordinator will offer supportive measures (e.g., counseling, extensions on deadlines, course-related adjustments, changes to work or class schedules, and/or referrals to campus offices), review the policy, and discuss options to move forward.

- If a complaint is filed by the complainant or the University, an investigation will begin following University policy.

University Grade Appeal Policy

If you believe you received a final course grade that does not reflect your performance due to fairness or a procedural issue, you have the right to file an appeal within 5 school days after final grades are posted by the Office of the Registrar. Review the University Grade Appeal Policy and ProcessLinks to an external site..]

Student Academic Ethics Policy

Honesty, trust, and personal responsibility are fundamental attributes of the university community. Academic dishonesty and other forms of academic misconduct threaten the foundation of an institution dedicated to the pursuit of knowledge and will not be tolerated. To maintain its credibility and reputation, and to equitably assign evaluations of scholastic and creative performance, Ball State University is committed to maintaining a climate that upholds and values the highest standards of academic integrity. Visit the VPAA's academic integrity websiteLinks to an external site. (Students tab) for resources on understanding academic integrity, citing sources properly, and avoiding inadvertent academic dishonesty. To learn about BSU's academic integrity expectations and students' rights, please read the University Student Academic Ethics PolicyLinks to an external site..

Academic integrity violations include giving or receiving an unfair academic advantage (cheating), presenting someone else's ideas or work as your own (plagiarism), and falsifying academic records. Unless otherwise indicated, you must work independently by yourself. Check with me if you are unsure whether something constitutes academic dishonesty. Examples of academic integrity violations include but are not limited to:

- Using resources not authorized by the faculty member (including devices, AI tools, hidden notes, and open books)
- Using commercial study websites to find answers to graded assignments (Chegg, Course Hero, StudyPool, OneClass, etc.).
- Without the instructor's written permission, giving away, buying, or selling graded assignments class notes, exams, study guides, or other course materials to other students or to third-party vendors (Course Hero, Chegg, 24HourAnswers, etc.).
- Working with another person on any assignment other than authorized group projects.

- Sharing or allowing others to access your files, whether done with permission or not.
- Reusing your own work from another semester, course, or section.
- Sharing answers with others during exams (passing notes, texting, whispering, gesturing)
- Discussing exam questions and answers with students who have not taken the exam.
- Soliciting others to complete work for you.

Generative AI Statement

Some Use of Generative AI Permitted Under Some Circumstances or With Explicit Permission

ChatGPT and other generative AI tools may be used in this class to support your ideas, but not for assignment completion. You will be informed as to when, where, and how these tools are permitted to be used, along with guidance for attribution. Any use outside of this permission constitutes a violation of Ball State University's Student Academic Ethics PolicyLinks to an external site..

7. Student Support Services

The Learning Center

The Learning Center offers free Tutoring and Academic Coaching for many courses at Ball State. Students can make appointments for online (Zoom) or in-person (NQ 350) appointments. To make an appointment, visit myballstate.bsu.edu and click on "Navigate" in the Academic Tools section, or just go directly to bsu.navigate.eab.comLinks to an external site..

Testing accommodations for students with disabilities are available for students who have received the appropriate documentation from Disability Services. Tests may be administered in the Learning Center.

Supplemental Instruction is available in select courses. If you have an SI leader for your course, that person will provide students with information the first week of school regarding weekly study sessions. For more information about Learning Center programming, visit bsu.edu/learningcenterLinks to an external site. or call 765-285-1006. Follow us on Instagram: BallStateLCLinks to an external site..

The Counseling Center

The Ball State University Counseling Center offers free and confidential services to all students. The Counseling Center is located in Lucina Hall, Room 320. To schedule an appointment, you can contact us at 765-285-1736. Ball State also offers a 24/7 Crisis Line, which can be reached at 765-285-HOPE (4673). The Crisis Line is a mental health resource for those who are struggling with any mental health concerns, including thoughts of self-harm and/or suicide.

At the Ball State Counseling Center, we see students for a variety of reasons, some of which include homesickness, relationship concerns, anxiety, and depression. At your first appointment, you will work with a therapist to create a plan that will connect you with resources that best fit your needs. We assist students with getting connected to therapy at our Center as well as connecting students to self-help resources, other on-campus resources, and community-based resources. All Ball State students also have access to several on-demand, self-help resources through a variety of different platforms. All of these resources, including a direct link to our website, can be found **here**Links to an external site..

The Speaking Center

The Speaking CenterLinks to an external site. is a free resource available to all members of the BSU community wanting to improve their public speaking abilities. We offer personalized coaching designed to help you become a more confident and effective speaker. Our trained coaches provide constructive feedback and support throughout the entire speech preparation process, whether you are in the early stages of brainstorming ideas and organizing your thoughts, or you need to practice your delivery and refine your message.

The Center is in the David Letterman Communication and Media Building, room 302. To schedule an appointment, please access us through your Navigate app or use this direct linkLinks to an external site. to sign up for a time**.** Appointments are available both in person and on Zoom. Appointments are available in person, on Zoom, and in virtual reality (VR) for those interested in practicing in an immersive speaking environment.

The Basic Needs Hub

If you are having difficulty affording enough food, do not have a safe and reliable place to sleep, and/or experiencing an emergency or crisis, help is available through the Basic Needs HubLinks to an external site.. The Basic Needs Hub has information, resources, and provides individualized support to students. To talk with a supportive staff member about

your experience, receive one on one assistance, or learn more about resources, you can submit a Basic Needs Assistance FormLinks to an external site.

8. Canvas and Student Privacy

Canvas Accessibility

Canvas provides a user experience that is easy, simple, and intuitive. Special attention has been paid to making Canvas screen-readable. The Rich Content Editor encourages users to create accessible content pages (i.e. text formatting is accomplished using styles). Canvas is designed to allow limited customization of colors and schemes to be accessible for all users. The National Federation of the Blind granted Canvas the Gold Level Web Certification in 2010.

Find more information by visiting the Canvas Voluntary Product Accessibility Template (VPAT) Links to an external site.**.**

FERPA and Privacy

As a student, your educational records are considered confidential. Under FERPA (Family Educational Rights and Privacy Act), your records are confidential and protected. Under most circumstances, your records will not be released without your written and signed consent. However, some directory information may be released to third parties without your prior consent unless a written request to restrict this is on file. You can learn more about student rights to privacy by reading **Ball State's FERPA and Privacy and Protection**Links to an external site.**.**

9. Course Expectations and Policies

Course Participation Expectations

- This course is designed with weekly activities, discussion, and other forms of regular collaboration and communication.
- It is recommended that you log into your Canvas course 3 to 4 times a week and check your official Ball State email account daily to view announcements and prepare for class.
- Complete all assignments, quizzes, tests, and any other activities by the stated due dates.

Feedback Policy

- I or TA will respond to email from your official Ball State email address within 24 hours during weekdays (Monday-Friday) and within 48 hours on the weekend.
- I or TA will read every discussion post but I will not always personally comment on posts.
- I or TA will grade your quizzes, assignments, and discussions no later than within 5 school days of submission.
- Contact me directly if you have questions or concerns about your performance in class.

Late Assignment Policy

- All assignments are due by 11:59 pm EST/EDT time on the due dates indicated.
- Assignments posted after the indicated due dates will be subject to a decreased letter grade for each day late.
- Internet connectivity and technical issues may occur and impede you from turning in work on time. Turn in work early and often, and set up a back-up plan, such as visiting a local library or borrowing a peer's computer.
- You have one (1) permitted late assignment to allow for these issues, to which you can turn in one assignment 24 hours late.
- Canvas will not accept assignments for grading after 11:59 pm EST/EDT on the final day of class.

Assignment Submission Policy

- All assignments should be submitted as Word documents with extensions of **.doc or .docx for reports** and package file with extension of **.ppkx for maps** unless otherwise indicated in the assignment description.
- Assignments, unless otherwise indicated, should be submitted using the assignment link in the module**.**

Grading Policy

- It is my policy that appropriate evaluation of your academic performance is an integral part of your learning experience.

- In the absence of mistakes, fraud, bad faith or incompetence, I will be the key decision-maker on the assignment of grades.

Engagement Expectations

To support a respectful and engaging academic community that encourages the free exchange of ideas and civil discourse, we will follow these ground rules:

- **Respect different perspectives.** Share your ideas and let others share theirs.
- **Challenge ideas, not people.** Disagree respectfully. No personal attacks or put-downs. Focus on exploring ideas critically and constructively.
- **Listen to understand.** Stay curious, ask questions to understand, and give others space to speak.
- **Assume good intentions.** Approach discussions with curiosity and compassion.
- **Keep it private.** What is shared in class stays in class. Do not share others' words or work without permission.
- **Be respectful.** Avoid hurtful language, stereotypes, or content that may demean others. Keep feedback constructive.

10. Course Schedule

Modules	**Contents**	**Assignments**	**Points**
Module 1	GIS and ArcGIS Pro	Overview quiz\Lab\Quiz	10\100\78
Module 2	Chapter 1: Think Spatially	Lab\Quiz\Discussion	100\80\10
Module 3	Chapter 2: Exploratory Spatial Data Analysis Tools and Statistics	Lab\Quiz\Discussion	100\80\10
Module 4	Chapter 3: Analyzing Geographic Distributions and Point Patterns	Lab\Quiz\Discussion	100\80\10
Module 5	Chapter 4: Spatial Autocorrelation	Lab\Quiz\Discussion	100\80\10

Module 6	Chapter 5: Multivariate Data in Geography	Lab\Quiz\Discussion	100\80\10
Module 7	Chapter 6: Modeling Relationships	Lab\Quiz\Discussion	100\80\10
Module 8	Final project. The deadline for all assignments is December 8, 26 at 11:59 p.m.	Lab (final project)\Discussion	100\10

11. Subject to Change Statement

This syllabus is subject to change in the event of extenuating circumstances.