Spring 2023

GEOG 4103 Introductory Spatial Analysis

Course Information

- **Course times and location:**
  - Tuesdays and Thursdays, 2:20 PM – 3:40 PM, Derby Hall 140
- **Credit hours:** 3.0
- **Mode of delivery:** In-person

Instructor

- **Name:** Dr. Chayanika Singh
- **Email:** singh.1883@osu.edu
- **Office location:** 1085 Derby Hall
- **Office hours:**
  - Thursday 1:00 PM – 2:00 PM (in-person)
  - Zoom by appointment (send me an email for setting up zoom meeting)
- **Preferred means of communication:**
  - My preferred method of communication for questions is **email.** Please have the email subject as "Geog4103_.....", to make sure it gets my attention.
  - My class-wide communications will be sent through the Announcements tool in CarmenCanvas. Please check your notification preferences (go.osu.edu/canvas-notifications) to be sure you receive these messages.

Teaching Assistant

- **Name:** Ruochen Yin
- **Email:** yin.874@buckeyemail.osu.edu
- **Office location:** 1131 Derby Hall
- **Office hours:**
  - Tuesday & Thursday 4:00 PM – 5:00 PM (in-person)
  - Zoom by appointment

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Course Prerequisites

 Math 1116 or 1130 or above, or Math Placement Level M or L, or permission of instructor.

Course Description

This course introduces the key concepts of statistical analysis of spatial data emphasizing on spatial thinking. In this course fundamental statistical methods are presented in the context of geographic sciences. Students will develop a fundamental understanding of statistical concepts and the tools geographers use to solve statistical problems. The class instructions are divided into lectures and labs (both in same room) to be held in-person at the scheduled class time. Lectures will introduce students a range of fundamental statistical and spatial analysis methods used in geographic problem solving. Labs will help students develop skills to analyze and interpret spatially referenced data using computer software. This course emphasizes hands-on experience and practical understanding. Real-world examples from a variety of topical areas in geography will be used in the lectures and labs.

Credit Hours and Work Expectations

This is a 3 credit-hour course. According to Ohio State bylaws on instruction (go.osu.edu/credit hours), students should expect around 3 hours per week spent on direct instruction (instructor content and Carmen activities, for example) in addition to 6 hours of homework (reading and assignment preparation, for example) to receive a grade of C average.

Alternative to in- person class instructions

Should an in-person classes be canceled (due to any reason such as extreme weather etc.), I will notify you as to which alternative methods (remote teaching, recorded video or homework assignment) of teaching will be offered to ensure continuity of instruction for this class. Communication will be done via Carmen Canvas.

Course Materials and Technologies

Required Textbook

[R] Rogerson, P.A. (2015). *Statistical Methods for Geography*: *A Student's Guide* (*Fourth or Fifth Edition*), Sage Publications, London.

You can access useful materials, videos, sample exercises on the following link:

https://study.sagepub.com/rogerson5e/student-resources/introduction-to-statistical-methods-for-geography

Required Equipment

Computer: current Mac (MacOS) or PC (Windows 10) with high-speed internet connection

Webcam: built-in or external webcam, fully installed and tested

Microphone: built-in laptop or tablet mic or external microphone

Data Storage: A portable memory device (with 16GB or larger) or access to cloud drive (Box, OneDrive, Dropbox etc.) is needed for data storage for lab assignments.

Other: a mobile device (smartphone or tablet) to use for BuckeyePass authentication

If you do not have access to the technology you need to succeed in this class, review options for technology and internet access at go.osu.edu/student-tech-access.

Required Software

R and R Studio

R: https://cran.r-project.org/bin/windows/base/
RStudio: https://posit.co/download/rstudio-desktop/
Please install R **first**, then install RStudio.

Microsoft Office 365

- All Ohio State students are now eligible for free Microsoft Office 365 ProPlus through Microsoft's Student Advantage program. Each student can install Office on five PCs or Macs, five tablets (Windows, iPad®, and Android™), and five phones.
- Office 365 is installed within the student's BuckeyeMail account. Full instructions for downloading and installation can be found here.

CarmenCanvas Access

You will need to use BuckeyePass (buckeyepass.osu.edu) multi-factor authentication to access your courses in Carmen. To ensure that you are able to connect to Carmen at all times, it is recommended that you do each of the following:

Register multiple devices in case something happens to your primary device. Visit the BuckeyePass - Adding a Device (go.osu.edu/add-device) help article for step-by-step instructions.

Request passcodes to keep as a backup authentication option. When you see the Duo login screen on your computer, click **Enter a Passcode** and then click the **Text me new codes** button that appears. This will text you ten passcodes good for 365 days that can each be used once.

Install the Duo Mobile application (go.osu.edu/install-duo) on all of your registered devices for the ability to generate one-time codes in the event that you lose cell, data, or Wi-Fi service.

If none of these options will meet the needs of your situation, you can contact the IT Service Desk at 614-688-4357 (HELP) and IT support staff will work out a solution with you.

Technology Skills Needed for This Course

Basic computer and web-browsing skills

Navigating CarmenCanvas (go.osu.edu/canvasstudent)

CarmenZoom virtual meetings (go.osu.edu/zoom-meetings)

Recording a slide presentation with audio narration and recording, editing and uploading video (go.osu.edu/video-assignment-guide)

Technology Support

For help with your password, university email, CarmenCanvas, or any other technology issues, questions or requests, contact the IT Service Desk, which offers 24-hour support, seven days a week.

- **Self Service and Chat**: go.osu.edu/it
- **Phone:** 614-688-4357 (HELP)
- **Email:** servicedesk@osu.edu

Grading and Faculty Response

Your Grades will be calculated based on the following assignment weightage

Assignment Category	Points
Labs (10)	40%
Homework assignments	30%
Exam (2)	30%
Total	**100%**
Attendance (extra credit)	5%

Descriptions of Major Course Assignments

Labs

Description: Lab assignments provide hand-on exercises as software application of statistical methods learned in the lecture class. All labs will use R & R studio. Basic skills to learn R in an easy-to-follow instructions, will be taught in labs (there is no need to have any previous experience in R or any other programming language). There will be 10 labs during this class, and each lab will have an assignment. For each lab assignment, you will need to answer several questions. Assignment questions will be provided to you in advance at the end of each lab's instruction. More details will be provided later in class.

Lab questions: If you have any questions on lab contents and/or grades (can't finish specific steps, tools are not working, etc.), **please contact your TA via email and/ or visit TA's office hours.**

Homework assignments

Description: there will be several homework assignments including short quizzes and calculation exercises related to key statistical concepts. These will be introduced after a specific topic is discussed in class and will be administered via carmen canvas. Quiz part will contain multiple choices and blank filling questions while exercises need you to do some math-based calculations related to the lecture contents. More details will be provided later in class.

Exams

Description: There will be two (Midterms and Final) non-cumulative exams which is open-book and based on all the topics discussed in the lecture. Exam will contain multiple choices and blank filling questions related to only the lecture contents. Exams will be administered online using course website. More details will be provided later in class.

Exam must be taken at the scheduled time unless you have informed your instructor *before* the exam with proper reasons and documents and got approved by the instructor. **Please contact your instructor in advance of the scheduled exam to schedule a make-up exam**, except in the case of emergency. Make-up exams for excused absences will not be penalized. Make-up exams for unexcused absences will be penalized 15%.

Attendance

Description: Attendance (in lectures and labs) will be recorded at all class meetings. Presence during classes help students to understand and work in a coherent way. Our prior experience shows that those students who regularly show up in the lectures & labs learn more from their peers and instructors than those who prefer to work/study on their own (skipping class attendance). To encourage lab presence and productivity, **attendance is made worth up to 5% of EXTRA CREDITS** counted towards the final grades in this course. However, 2 unexcused absences are allowed to cover any emergency or unexpected event that may prevent you coming to the labs. In case of any health emergency such as COVID19 related absences, please make sure to inform your Lab TA and me as soon as possible to get special arrangements as per policies. Documented proof may be required to get your attendance excused.

Academic integrity and collaboration: Your written assignments, including discussion posts, should be your own original work. In formal assignments, you should follow APA style to cite the ideas and words of your research sources. You are encouraged to ask a trusted person to proofread your assignments before you turn them in but no one else should revise or rewrite your work.

Late Assignments

Please refer to Carmen for due dates. Assignments will be **penalized 10% for each day late** (except holidays). Thus, **assignments submitted 10 days after the deadline will be graded 0. Extensions will not be granted due to lost work**; be sure you back up and keep all your work.

Instructor Feedback and Response Time

I am providing the following list to give you an idea of my intended availability throughout the course. Remember that you can call 614-688-4357 (HELP) at any time if you have a technical problem.

Preferred contact method: If you have a question, please contact me first through my Ohio State email address. I usually reply to emails within **24 to 48 hours on school days**. If you do not get a response within 2 days, you should send a follow up email. To make sure your email does not go in my junk folder, **start the subject line as "GEOG_4103"** followed by appropriate subject text. (The email sent via Inbox on carmen canvas may not get my attention quickly).

Class announcements: I will send all important class-wide messages through the Announcements tool in Carmen Canvas. Please check your notification preferences (go.osu.edu/canvas-notifications) to ensure you receive these messages.

Discussion board: I will check and reply to messages in the discussion boards at least once a week. If there is something urgent and of personal nature, please send me an email.

Grading and feedback: For assignments submitted by the due date, I and Lab TA will try to provide feedback and grades within **7 days after the due date**. Assignments submitted after the due date may have reduced feedback, and grades may take longer to be posted.

Grading Scale

93–100: A
90–92.9: A-
87–89.9: B+
83–86.9: B
80–82.9: B-
77–79.9: C+
73–76.9: C
70–72.9: C-
67–69.9: D+
60–66.9: D
Below 60: E

Other Course Policies

Discussion and Communication Guidelines

The following are my expectations for how we should communicate as a class. Above all, please remember to be respectful and thoughtful.

Writing style: While there is no need to participate in class discussions as if you were writing a research paper, you should remember to write using good grammar, spelling, and punctuation. A more conversational tone is fine for non-academic topics.

Tone and civility: Let's maintain a supportive learning community where everyone feels safe and where people can disagree amicably. Remember that sarcasm doesn't always come across online. I will provide specific guidance for discussions on controversial or personal topics.

Citing your sources: When we have academic discussions, please cite your sources to back up what you say. For the textbook or other course materials, list at least the title and page numbers. For online sources, include a link.

Backing up your work: Consider composing your academic posts in a word processor, where you can save your work, and then copying into the Carmen discussion.

Synchronous sessions: During our Zoom sessions I ask you to use your real name and a clear photo of your face in your Carmen profile. During our full-group lecture time, you may turn your camera off if you choose. When in breakout rooms or other small-group discussions, having cameras and mics on as often as possible will help you get the most out of activities. You are always welcome to use the free, Ohio State-themed virtual backgrounds (go.osu.edu/zoom-backgrounds). Remember that Zoom and the Zoom chat are our classroom space where respectful interactions are expected.]

Academic Integrity Policy

See Descriptions of Major Course Assignments for specific guidelines about collaboration and academic integrity in the context of this class.

Ohio State's Academic Integrity Policy

Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the university's Code of Student Conduct (studentconduct.osu.edu), and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the university's *Code of Student Conduct* and this syllabus may constitute "Academic Misconduct."

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The Ohio State University's *Code of Student Conduct* (Section 3335-23-04) defines academic misconduct as: "Any activity that tends to compromise the academic integrity of the university or subvert the educational process." Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the university's *Code of Student Conduct* is never considered an excuse for academic misconduct, so I recommend that you review the *Code of Student Conduct* and, specifically, the sections dealing with academic misconduct.

If I suspect that a student has committed academic misconduct in this course, I am obligated by university rules to report my suspicions to the Committee on Academic Misconduct. If COAM determines that you have violated the university's Code of Student Conduct (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the university.

If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me.

Other sources of information on academic misconduct (integrity) to which you can refer include:

Committee on Academic Misconduct (go.osu.edu/coam)

Ten Suggestions for Preserving Academic Integrity (go.osu.edu/ten-suggestions)

Eight Cardinal Rules of Academic Integrity (go.osu.edu/cardinal-rules)

Copyright for Instructional Materials

The materials used in connection with this course may be subject to copyright protection and are only for the use of students officially enrolled in the course for the educational purposes associated with the course. Copyright law must be considered before copying, retaining, or disseminating materials outside of the course.

Creating an Environment Free from Harassment, Discrimination, and Sexual Misconduct

The Ohio State University is committed to building and maintaining a community to reflect diversity and to improve opportunities for all. All Buckeyes have the right to be free from harassment, discrimination, and sexual misconduct. Ohio State does not discriminate on the basis of age, ancestry, color, disability, ethnicity, gender, gender identity or expression, genetic information, HIV/AIDS status, military status, national origin, pregnancy (childbirth, false pregnancy, termination of pregnancy, or recovery therefrom), race, religion, sex, sexual orientation, or protected veteran status, or any other bases under the law, in its activities, academic programs, admission, and employment. Members of the university community also

have the right to be free from all forms of sexual misconduct: sexual harassment, sexual assault, relationship violence, stalking, and sexual exploitation.

To report harassment, discrimination, sexual misconduct, or retaliation and/or seek confidential and non-confidential resources and supportive measures, contact the Office of Institutional Equity:

Online reporting form at equity.osu.edu,

Call 614-247-5838 or TTY 614-688-8605,

Or email equity@osu.edu

The university is committed to stopping sexual misconduct, preventing its recurrence, eliminating any hostile environment, and remedying its discriminatory effects. All university employees have reporting responsibilities to the Office of Institutional Equity to ensure the university can take appropriate action:

All university employees, except those exempted by legal privilege of confidentiality or expressly identified as a confidential reporter, have an obligation to report incidents of sexual assault immediately.

The following employees have an obligation to report all other forms of sexual misconduct as soon as practicable but at most within five workdays of becoming aware of such information: 1. Any human resource professional (HRP); 2. Anyone who supervises faculty, staff, students, or volunteers; 3. Chair/director; and 4. Faculty member.

Your Mental Health

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. No matter where you are engaged in distance learning, The Ohio State University's Student Life Counseling and Consultation Service (CCS) is here to support you. If you find yourself feeling isolated, anxious or overwhelmed, on-demand mental health resources (go.osu.edu/ccsondemand) are available. You can reach an on-call counselor when CCS is closed at 614- 292-5766. **24-hour emergency help** is available through the National Suicide Prevention Lifeline website (suicidepreventionlifeline.org) or by calling 1-800-273-8255(TALK). The Ohio State Wellness app (go.osu.edu/wellnessapp) is also a great resource.

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Accessibility Accommodations for Students with Disabilities

Requesting Accommodations

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. To establish reasonable accommodations, I may request that you register with Student Life Disability Services (SLDS). After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. In light of the current pandemic, students seeking to request COVID-related accommodations may do so through the university's request process, managed by Student Life Disability Services.

Disability Services Contact Information

- Phone: 614-292-3307

- Website: slds.osu.edu

- Email: slds@osu.edu

- In person: Baker Hall 098, 113 W. 12th Avenue

Accessibility of Course Technology

This online course requires use of CarmenCanvas (Ohio State's learning management system) and other online communication and multimedia tools. If you need additional services to use these technologies, please request accommodations as early as possible.

CarmenCanvas accessibility (go.osu.edu/canvas-accessibility)

Streaming audio and video

CarmenZoom accessibility (go.osu.edu/zoom-accessibility)

Religious Accommodations

Our inclusive environment allows for religious expression. Students requesting accommodations based on faith, religious or a spiritual belief system about examinations, other academic requirements or absences, are required to provide the instructor with written notice of specific dates for which the student requests alternative accommodations at the earliest possible date. For more information about religious accommodations at Ohio State, visit odi.osu.edu/religious accommodations.

Course Schedule

Please note that this is a tentative outline of topics and subjected to change by the instructor as the course progresses. Refer to the Carmen Canvas course for up-to-date due dates.

week	day	date	2:20 pm - 3:40 pm	Due Assignments
			4103- Spatial Analysis DB0140	
1	T	1/10/2023	Syllabus Overview	
	Th	1/12/2023	Geographic data and basic terms	*Syllabus Quiz*
2	T	1/17/2023	Lab 1 - Intro to R	
	Th	1/19/2023	Descriptive stat	
3	T	1/24/2023	Lab 2 - Descriptive stat	*Lab 1*
	Th	1/26/2023	Probability	*HW1*
4	T	1/31/2023	Lab 3- Probability 1	*Lab 2*
	Th	2/2/2023	Probability	*HW2*
5	T	2/7/2023	Lab 3-Probability 2	
	Th	2/9/2023	Sampling	*HW3*
6	T	2/14/2023	Lab 4- Sampling	*Lab 3*
	Th	2/16/2023	Confidence Interval	*HW4*
7	T	2/21/2023	Lab 5- CI	*Lab 4*
	Th	2/23/2023	Hypothesis Testing	*HW5*
8	T	2/28/2023	Lab 6-Hypothesis testing 1	*Lab 5*
	Th	3/2/2023	Hypothesis Testing	
9	T	3/7/2023	Lab 6-Hypothesis testing2	*HW6*
	Th	3/9/2023	Analysis of variance	
10	T	3/14/2023	**Spring Break**	
	Th	3/16/2023		
11	T	3/21/2023	**Mid term Exam**	
	Th	3/23/2023	No Class (AAG 2023)	
12	T	3/28/2023	Lab 7 - Anova	*Lab 6*
	Th	3/30/2023	Correlation	*HW7*
13	T	4/4/2023	Lab 8- Correlation	*Lab 7*
	Th	4/6/2023	Regression	*HW8*
14	T	4/11/2023	Lab 9- Regression	*Lab 8*
	Th	4/13/2023	Spatial analysis	*HW9*
15	T	4/18/2023	Lab 10- Spatial Analysis	*Lab 9*
	Th	4/20/2023	open class/lab	*HW10*
16	T	4/25/2023		*Lab 10*
	Th	4/27/2023	**Final Exam TBD**	
	T	5/2/2023		