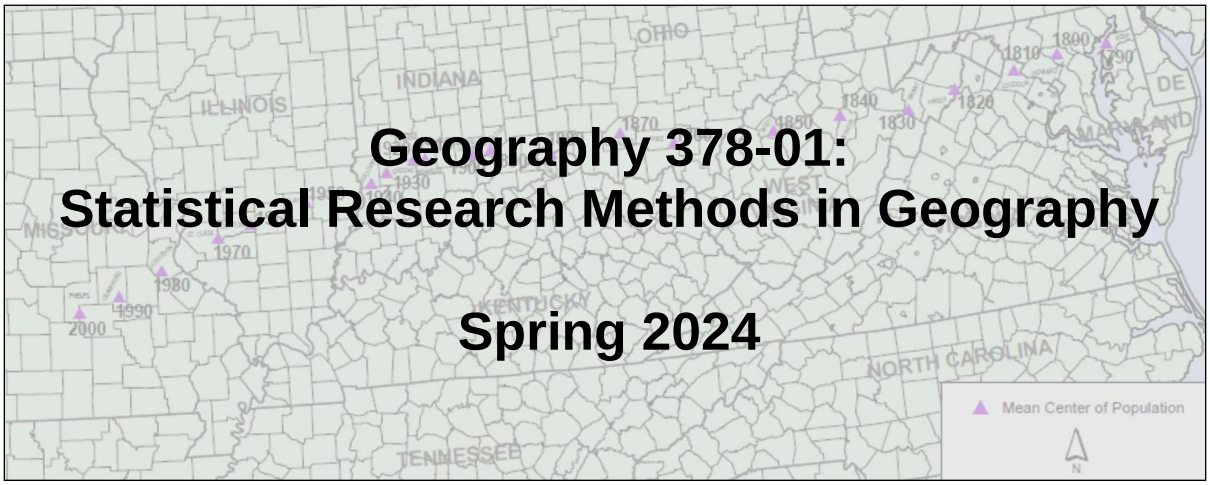

Geography 378-01:
Statistical Research Methods in Geography

Spring 2024

Instructor: Laura Smith (she/her)
E-mail: SMITHL@macalester.edu
Office: Carnegie 104b

Meets: MWF 10:50–11:50 a.m.
Carnegie 107

Open office hours: Monday 2:15-3:00 p.m.
Tuesday 10:00-11:00 a.m.
Wednesday 2:15-3:00 p.m.
Thursday 10:30-11:30 a.m.
Or at any other time you propose (in-person or virtual)
Drop-ins welcome too!

Teaching Assistants: Nicholai Jost-Epp, Uy Nguyen, Brian Pryzby

I. COURSE CONTENT AND GOALS

This course covers statistical research methods that geographers use to describe and analyze places and themes. **The primary learning goals for the course are that students learn to apply and to interpret statistics appropriately.** Statistics are a valuable tool in geographic analysis but too often they are used improperly, without a basic understanding of underlying principles and assumptions. In this course, you will learn how to appropriately apply both descriptive and inferential statistical methods for use in geographical research. You will also learn to evaluate and develop statistical research designs, including the preparation and presentation of an original research project of your own.

We will begin the semester with various methods for exploratory data analysis, such as graphical display and the preliminary mapping of spatial information. Topics such as spatial statistics, geographic sampling, and the mapping of residuals from linear regression will also be incorporated. In completing the exercises, you will gain practical experience in the application of statistical methods to spatial problems through the use of statistical software.

By the end of the course, you should be able to think logically and carefully through each step of the research process, from originating the research question to acquiring and evaluating data,

operationalizing the question of interest, selecting and using the appropriate statistical tools, analyzing the results, and interpreting the findings. My hope is that you will also find that you enjoy statistics! ☺

II. TEXTBOOK

Lembo, Jr., Arthur J. and J. Chapman McGrew, Jr. 2024. *An Introduction to Statistical Problem Solving in Geography*, 4th ed. The text is available digitally or in hard copy; there is also a physical copy available for checkout from library reserve. The 3rd edition (published 2014) is also acceptable for use.

Any other required readings will be posted to our Moodle site. Data for the exercises will also be posted to Moodle.

III. EXPECTATIONS AND ASSESSMENT

Class format

One of the main reasons that I enjoy teaching this class so much – besides the material, of course – is that it ensures that I get to know every Geography major before they graduate. Your presence in class matters; attendance is important not only for your learning but also for building community with each other.

However, I fully recognize that there will be times when you are not able to or do not feel comfortable attending class, whether because of public health concerns or any other reason. If religious observances create conflicts, please reach out early in the semester so we can plan ahead. Along with what we cover together in person, I will post pre-recorded content videos to Moodle that you can refer to for reinforcement or for keeping up with the course material through any absences.

We continue to face challenges in all aspects of life – including teaching and learning – and we will need to demonstrate grace and flexibility in order to be successful. I am committed to being flexible and open to changing our course approach and expectations as we go, and I hope that you will be willing to do the same for me.

Technology guidelines

We will rely heavily on our Moodle page to manage the course. This is where you will find the detailed weekly schedules, reading assignments, pre-recorded content videos, course exercises and data, links to any Zoom class sessions or office hours, and other information/ announcements. You will submit your exercises and associated work files via Moodle dropboxes; this will allow me and the course TAs to provide feedback directly on the digital documents. I will also use the Moodle gradebook feature to post your scores. Please plan to log into the site regularly and pay attention to any "Announcements and News" forum posts.

Within the classroom, you are welcome to use laptops for academic purposes. Please do not use technology in a way that is disruptive to an academic space.

Assessment

Assessment within the course is based upon your ability to demonstrate knowledge of statistical research methods in geography.

Your grade will be based on the following (650 points total):

Exercises and Assignments (10 @ 25 pts. each)	= 38%
Midterm Exam (150 pts.)	= 23%
Final Exam (150 pts.)	= 23%
Final Project (100 pts.)	= 15%

The exams will include problem solving and short answer questions, with an emphasis on the appropriate application of the different statistical tests available. You will be evaluated in part on your ability to apply different statistical methods properly and also on your understanding of the rationale for using a given statistical procedure.

Grade cut-off percentages are as follows: A = 93-100%; A- = 90-92.9%; B+ = 87-89.9%; B = 83-86.9%; B- = 80-82.9%; C+ = 77-79.9%; C = 73-76.9%; C- = 70-72.9%; D+ = 67-69.9%; D = 63-66.9%; D- = 60-62.9%; NC = <60%.

Academic honesty

Students are expected to maintain the highest standards of honesty in their college work; violations of academic integrity are serious offenses. If you have questions about Macalester's academic integrity policy, please refer to the *Student Handbook* (https://www.macalester.edu/student-affairs/) or Academic Programs at http://www.macalester.edu/academicprograms/academicpolicies/academicintegrity/).

All sources used in preparing your work must be cited; this includes data sources. APA is the preferred citation style of the Geography Department; see the library's citation guides and resources under the Research Guides menu at https://libguides.macalester.edu/citation.

IV. RESOURCES AND SUPPORT

Open office hours

Please come visit me during open office hours with any questions, issues, or concerns about the course or the Geography department more broadly. If you are not able to attend regularly scheduled office hours, please let me know and we can find an alternative time to meet (in-person or virtually). The course TAs will also offer plentiful open office hours for assistance with your exercises!

Email is the most efficient way to contact me; I strive to answer all course-related messages as soon as possible (and at most within 24 hours during the week).

Academic accommodations

I recognize that course design may pose barriers to a student's ability to access or demonstrate mastery of course content. I honor academic accommodations as outlined via the Center for Disability Resources and in discussion regarding what is reasonable for this course. Students with long- or short-term disabilities should schedule an appointment through the Disability Resources website at https://www.macalester.edu/disability-resources/.

Academic resources

The Macalester Academic Excellence (MAX) Center (https://www.macalester.edu/max/), located on the first floor of Kagin Commons, provides numerous academic resources from time management and study strategy workshops to quantitative material and writing assistance.

Health and well-being

Here at Macalester, you are encouraged to make your well-being a priority throughout this semester and your career here. Investing time into taking care of yourself will help you engage more fully in your academic experience. Remember that beyond being a student, you are a human being carrying your own experiences, thoughts, emotions, and identities with you. It is important to acknowledge any stressors you may be facing, which can be mental, emotional, physical, financial, etc., and how they can have an academic impact. If you are having difficulties maintaining your well-being, out to one of the resources here: https://www.macalester.edu/current-students/.

In our classroom, we will adhere to the Mac Stays Safer Community Commitment.

Title IX

Macalester is committed to providing a safe and open learning and living environment for all students, staff, and faculty. Any community member experiencing sexual harassment, sexual violence, relationship violence, or stalking, is encouraged to seek help and support.

Please be aware that as a faculty member, it is my responsibility to report disclosure about sexual harassment, sexual misconduct, relationship violence, and stalking to the Title IX Office. The purpose of this report is to ensure that anyone experiencing harm receives the resources and support they need. I will keep this information *private* and it will not be shared beyond this required report.

You may also contact Macalester's Title IX Coordinator directly (phone: 651-696-6258; e-mail: titleixcordinator@macalester.edu); she will provide you with supportive measures, resources, and referrals. Additional information about how to file a report (including anonymously) is available on the Title IX website.

V. GENERAL SCHEDULE AND ASSIGNMENTS

The following schedule represents the general timeline of content and assignments; specific readings and due dates will be posted to our Moodle page.

Dates	Topics	Exercises
Week 1 (1/15-1/21)	Introductions	
Week 2 (1/22-1/28)	Quantitative methods in Geography Data measurement	QR Discussion
Week 3 (1/29-2/4)	Data classification and display Data quality and validity Descriptive statistics (central tendency)	
Week 4 (2/5-2/11)	Descriptive statistics (dispersion, shape) Descriptive spatial statistics (central tendency)	Exercise 1
Week 5 (2/12-2/18)	Descriptive spatial statistics (dispersion) Probability concepts	Exercise 2
Week 6 (2/19-2/25)	Probability theory and distributions (normal, binomial, geometric, Poisson)	Exercise 3
Week 7 (2/26-3/3)	Sampling Estimation in sampling Midterm review	Exercise 4
Week 8 (3/4-3/10)	Confidence intervals Transition to inferential statistics	Midterm Exam (3/4)
Week 9 (3/11-3/17)	*Spring break*	

Dates	Topics	Exercises
Week 10 (3/18-3/24)	Hypothesis testing (one-sample) Hypothesis testing (two-sample)	Exercise 5
Week 11 (3/25-3/31)	Hypothesis testing (two-sample) ANOVA Chi-square goodness-of-fit	Exercise 6
Week 12 (4/1-4/7)	Contingency analysis (cross-tabs) Correlation Regression	Exercise 7
Week 13 (4/8-4/14)	Regression residual analysis *Geography Honors Day (4/10)* Multiple regression	Exercise 8
Week 14 (4/15-4/21)	Inferential spatial statistics (point, area) Student project work time	Exercise 9
Week 15 (4/22-4/28)	Student project results	Final Project
Week 16 (4/29-5/5)	Final review	Final Exam (10:30 a.m.–12:30 p.m. on THURS 5/2)