



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

Instructor: Laura Smith (she/her)

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Office: Carnegie 104b

Office hours: Monday 2:15-2:45 p.m.

Tuesday 1:30-2:30 p.m.

Thursday 10:00-11:15 a.m. and 1:00-2:00 p.m.

or at any other time you propose (in-person or virtual)

Teaching Assistants: Maura Haas, 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 into the course. 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

McGrew, Jr., J. Chapman, Arthur J. Lembo, Jr., and Charles B. Monroe. 2014. *An Introduction to Statistical Problem Solving in Geography*, 3rd ed. The text is available digitally or in hard copy; there is also a physical copy available for checkout from library reserve.

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. I feel optimistic that we will be able to meet in-person for the full semester, but the good news is that *Statistical Research Methods in Geography* also works quite well as a remote course. Along with what we cover together in person, I will post pre-recorded content videos that you can refer to for reinforcement or for catching up on any missed sessions. We may also add in some “flipped” class sessions, where you will watch a content video ahead of time and we will utilize our class time for questions and collaborative work time.

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, and links to any Zoom class sessions or office hours. 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 “News Forum” posts.

If we do need to meet via Zoom at times this semester, please label your video with your preferred name and pronouns. Much as I appreciate seeing everyone and being able to more easily engage with you, I will not require that you have your camera on during virtual sessions. I would like to record our virtual meetings to share with anyone who is not able to be present; the recordings will only be available via our password-protected Moodle site.

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.

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).

Assessment

Your presence in class (whether in-person or virtual) 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. I am hopeful that the resources provided via Moodle (content videos, recorded virtual classes) will allow you to keep up with the course material through any absences.

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:

Exercises and Assignments (11 @ 25 pts. each)	= 40%
Midterm Exam (150 pts.)	= 22%
Final Exam (150 pts.)	= 22%
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 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.

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 Disability Services, and in discussion regarding what is reasonable for this course. Students with long- or short-term disabilities should schedule an appointment by emailing disabilityservices@macalester.edu, or calling the Disability Services Office, 651-696-6275.

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* (<http://www.macalester.edu/studentaffairs/studenthandbook/>) or the Academic Programs website (<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>.

Health and well-being

Here at Macalester, you are encouraged to make your well-being a priority throughout this semester and your career here. Staying well is even more complicated now with COVID-19, as well as ongoing systemic racism and other forms of oppression – this complex context requires flexibility, creativity, persistence, and support. 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, please reach out to one of the resources listed at <http://bit.ly/2zcyuqU>.

We will adhere to the [Mac Stays Safer Community Commitment](#), including the [Well-Fitted Mask Policy](#). If you do not feel well or are exhibiting any symptoms of COVID-19, please do not come to class.

IV. 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 at the start of each week.

<u>Dates</u>	<u>Topics</u>	<u>Exercises</u>
<u>Week 1</u> (8/31-9/2)	Introductions	
<u>Week 2</u> (9/5-9)	Quantitative methods in Geography Data measurement	QR Discussion assignment
<u>Week 3</u> (9/12-16)	Data classification Displaying quantitative information Data quality and validity	
<u>Week 4</u> (9/19-23)	Descriptive statistics (central tendency) Descriptive statistics (dispersion, shape)	Exercise 1
<u>Week 5</u> (9/26-30)	Descriptive spatial statistics (central tendency and dispersion)	Exercise 2
<u>Week 6</u> (10/3-7)	Probability concepts Probability theory and distributions (normal, binomial, geometric, Poisson)	Exercise 3
<u>Week 7</u> (10/10-14)	Sampling Estimation in sampling	Exercise 4
<u>Week 8</u> (10/17-21)	Confidence intervals <i>Fall break</i>	Midterm Exam (10/17)

<u>Dates</u>	<u>Topics</u>	<u>Exercises</u>
<u>Week 9</u> (10/24-28)	Hypothesis testing (one-sample) Hypothesis testing (two-sample)	Exercise 5
<u>Week 10</u> (10/31-11/4)	Hypothesis testing (two-sample) ANOVA Chi-square goodness-of-fit	Exercise 6
<u>Week 11</u> (11/7-11)	Chi-square goodness-of-fit Contingency analysis (cross-tabs) Correlation	Exercise 7
<u>Week 12</u> (11/14-18)	Regression Multiple regression	Exercise 8
<u>Week 13</u> (11/21-25)	Inferential spatial statistics (point) <i>Thanksgiving break</i>	Exercise 9
<u>Week 14</u> (11/28-12/2)	Inferential spatial statistics (area) Student project work time	Exercise 10
<u>Week 15</u> (12/5-9)	Student project results Final exam review	Final Exam (10:30 a.m.–12:30 p.m. on WED 12/14)