DESCRIPTION
Intermediate Quantitative Methods in Geography GEOG247 & GEOG347 concerns multivariate statistics, including multivariate linear regression, logistic regression, ANOVA and spatial statistics. Students work with the R statistical software. The prerequisite is an introductory statistics course, such as high school Advanced Placement Statistics or Clark's Intro to Quantitative Methods GEOG110 & GEOG311. This course meets the skill requirement for Geography majors and doctoral students.

SETTING	Mon. & Thur. 2:50-4:05 pm
	Sackler Science Center, S223
PROFESSOR	Yanan Wu
E-MAIL	yanawu@clarku.edu
OFFICE HOURS	Tuesday & Thursday 1:30 – 2:30 pm
	Or by appointment
TEACHING ASSISTANT	Khadija Nisar
E-MAIL	knisar@clarku.edu
TA OFFICE HOURS	3:00 PM to 5:00 PM Tuesday
	Room 102B, Main Geography Building

STUDENT RESOURCES

RESOURCES: Joseph Hair, William Black, Barry Babin, and Rolph Anderson. Multivariate Data Analysis. Edition 7 or 8. Upper Saddle River NJ: Prentice Hall.
Amazon.com usually offers prices less than $30. Edition 8

David Diez, Mine Cetinkaya-Rundel, Christopher Barr, and OpenIntro. OpenIntro Statistics, Edition 4. Available at https://www.openintro.org/book/os/ .

REQUIRED SOFTWARE:
R & R Studio.
Install R & R Studio

COURSE SCHEDULE:

Month	Date	Day	Course Topic	Readings	Course Assignments
JAN	13	M	Introduction to the Course		
	16	R	Working w R software		Assignment 1 Due by Jan 22
	20	M	University holiday		
	23	R	Inferential Statistics	OpenIntro Ch 5-7	Assignment 2 Due by Feb 2
	27	M	Data Exploration Variable Distribution	OpenIntro Ch 1-2 Hair Ch. 2	
	30	R	Data Exploration Variable Distribution	OpenIntro Ch 1-2 Hair Ch. 2	
FEB	3	M	Bivariate Regression	OpenIntro Ch. 8	Assignment 3 Due by Feb 9
	6	R	Bivariate Regression	OpenIntro Ch. 8	
	10	M	Multivariate Regression	OpenIntro Ch. 9.1 – 9.4 Hair Ch. 5	Assignment 4 Due by Feb 23
	13	R	Multivariate Regression		
	17	M	Wellness Day – No classes		
	20	R	Multivariate Regression		
	24	M	Regression Criticism	Hair Ch. 5	Assignment 5 Due by March 9
	27	R	Regression Criticism		
MAR	3	M	*SPRING BREAK*		
	6	R	*SPRING BREAK*		
	10	M	ANOVA	OpenIntro, Ch 7.5 Hair Ch. 6	Assignment 6 Due by March 16
	13	R	ANOVA		
	17	M	Logistic regression	OpenIntro Ch. 9.5	Assignment 7 Due by March 30

				Hair Ch. 8	
	20	R	Logistic regression		
AAG	24	M	*AAG Conference*		
	27	R	*AAG Conference*		
	31	M	Principal Components Analysis		Assignment 8 Due by April 6
APR	3	R	Principal Components Analysis		
	7	M	Geographically Weighted Regression		Assignment 9 Due by April 13
	10	R	Geographically Weighted Regression		
	14	M	Spatial Autocorrelation		
	17	R	Spatial Autocorrelation		
	14	M	Project work		
	24	R	Project work		
	28	M	Final presentations		
MAY	1	R	Final presentations		
	5	M	**Final report due**		

*Course content may vary or be adjusted in order to meet the needs of the class. The instructor reserves the right to adjust the schedule or amend the content of this syllabus at any time and without notice.

EVALUATION

Assignments   80% = nine assignments
Final Project   20% = 15% oral + 5% written

The following grading system will be used to determine final grades:

A	93.0 - 100.0	**B+**	88.0 - 89.9	**C+**	77.0 - 79.9	**D+**	67.0 - 69.9
		B	83.0 - 87.9	**C**	73.0 - 76.9	**D**	60.0 - 66.9
A-	90.0 - 92.9	**B-**	80.0 - 82.9	**C-**	70.0 - 72.9	**F**	0.0 - 59.9

Your performance throughout the semester, based on the grading components listed above, will determine your final grade.

ASSIGNMENTS

You must do the assignments in a manner that maximizes your learning. You should begin the assignment as soon as you get the instructions. You should work alone until you complete the assignment to the best of your ability. Then you should compare your work with the work of some of your classmates to enhance your understanding. If you still have questions, then seek help from the Teaching Assistant or Clark's tutoring services.

Late Submissions: Grades for *Lab Assignments* will be reduced by 10% for each day they are late (e.g. 1-24 hrs. past deadline, 25-48 hrs. past deadline, etc.). No submissions greater or equal to 10 days late will be accepted without direct permission from the instructor based on valid and confirmable extenuating circumstances.

PROJECT

The project's purposes are:
1) to apply statistical procedures
2) to interpret statistical results
3) to make an oral presentation of a statistical analysis
4) to write a report

Each student will compile a project, deliver an oral presentation, and submit a written report. There are many datasets freely available online, so you should be able to find one that interests you. You must organize the dataset for use in R. You must use your datasets to demonstrate the statistical procedures that we examine in class. Follow the recommendations in the documents that the professor supplies concerning clarity. The written report must show improvement over the oral presentation. Make your figures tell your story as much as possible.

TIME COMMITMENT & ATTENDANCE

The instructor will deliver during Thursday's classes the instructions for the assignments, which will be due by the specific date that list on the syllabus. The penalty for lateness is 1 percentage point per hour for assignments, the exam, and all parts of the project. If you want to pass this course, then you must begin assignments as soon as you receive the instructions. Monday's classes offer students opportunities to ask about the assignments. This course requires 180 hours of work per semester. This translates to 12 hours per week including class time, which means students spend 4.75 hours to prepare for each 1.25-hour class for two classes per week. You must attend all classes on-time and for the entire duration of the class. If you have a legitimate reason for not attending class, then you must communicate it to the assistants and the professor before that class. Unexcused absences will prevent the professor from giving the benefit of the doubt concerning borderline final grades. Illness is an acceptable excuse. If you have any contagious illness, then you must not attend class. Some additional excuses are acceptable and others are not acceptable. The criterion to determine whether an excuse is acceptable is whether it would be acceptable for the professor to use the same excuse for him to be absent from class according to his principles. You must not walk out of class without explanation. If you have a condition that requires you to exit class unexpectedly, then tell the professor before class. The Add/Drop deadline is the date you begin to pay tuition irrevocably. Graduate students must receive a grade

of at least B- for the course to count towards graduation. Students who cannot resist doing non-course related work during class must not take this course.

POLICIES

ACADEMIC INTEGRITY:

Please act with personal integrity and be respectful of other students. Do not engage in, or tolerate, acts of falsification, misrepresentation, or deception. Your written work must be your own. A first infraction will lead to a grade of zero on the assignment in question; a second infraction will result in course failure.

Academic integrity is a basic value for all higher learning. Simply expressed, it requires that work presented must be wholly one's own and unique to that course. All direct quotations must be identified by source. Academic integrity can be violated in many ways: for example, by submitting someone else's paper as one's own; cheating on an exam; submitting one paper to more than one class; copying a computer program; altering data in an experiment; or quoting published material without proper citation of references or sources. Attempts to alter an official academic record will also be treated as violations of academic integrity. To ensure academic integrity and safeguard students' rights, all suspected violations of academic integrity by undergraduates are reported to the College Board. Such reports must be carefully documented, and students accused of the infraction are notified of the charge. In the case of proven academic dishonesty, the student will receive a sanction, which may range from an F in the assignment or course to suspension or expulsion from the University. The complete academic integrity policy is available with Academic Advising at the following website: http://www.clarku.edu/offices/aac/integrity.cfm.

FACULTY MEMBERS ARE RESPONSIBLE EMPLOYEES

As an instructor, one of my responsibilities is to help create a safe learning environment on our campus. I also have a mandatory responsibility to report information regarding sexual misconduct or information about a crime that may have occurred at Clark. Students may speak to someone confidentially by contacting the Center for Counseling and Personal Growth at (508) 793-7678 or our faculty confidential sources: Kathleen Palm Reed, James Cordova, Sasha Adkins, and Andrew Stewart. If you would like to pursue a formal complaint through university procedures, contact Lynn Levy by email at Title-IX@clarku.edu or by phone at (508) 793-7194. If you would like to pursue a criminal complaint you can contact University Police at (508) 793-7575 or work with the Title IX Coordinator to arrange for a meeting with Worcester Police.

STUDENT ACCESSIBILITY SERVICES:

Clark University is committed to providing students with documented disabilities equal access to all university programs and facilities. If you have or think you have a disability and require academic accommodations, you must register with Student Accessibility Services (SAS), which is located in room 430 on the fourth floor of the Goddard Library. If you have questions about the process, please contact the Director of Student Accessibility Services, Thomas Sawicki, at tsawicki@clarku.edu or accessibilityservices@clarku.edu or (508) 798-4368.

Students having special needs regarding, or concerns about, the classroom environment are urged to come to my office to discuss the issue in question. If you are registered with SAS and qualify for accommodations that you would like to utilize in this course, please request those accommodations through SAS in a timely manner. Students having disability documentation and wishing to have special accommodations made in this class should tell me during the first two weeks of the semester.

TECHNOLOGY POLICY:

You will need to have your own laptop to bring to lecture, as we will be doing in class practical work fairly frequently. Please let us know if this requirement will be a problem. Lab sessions are held in Clark University computer labs using shared/public desktop computers. While participating in class or lab, either in person or remotely, please refrain from engaging with your phone, social media, or other non-statistical websites/app during lectures and lab sessions. Please use laptops, university computers, personal computers, and/or tablets only for the purpose of taking/reviewing notes and lecture slides and/or working on assigned course material. There is no need for the use of phones, social media, or other non-statistical websites/app during lectures and lab sessions, and the Instructor and TA will observe your technology habits in the classroom. Use of technology deviating from the above will be considered under the attendance grading criteria.

GIS HELP DESK

NEW SPRING 2025 HOURS:

Need help with GIS? Can't make it to visit your professor or TA for office hours? Stop by our GIS Help Desk in the Jefferson Tower (6th floor), or in Jefferson 220A (2nd floor Jefferson building, Geog Main office) on Wednesdays, and visit one of our Help Desk Assistants!

MONDAYS	SASHA 9 AM - 11 AM
TUESDAYS	SASHA 9 AM - 12 PM
WEDNESDAYS @ JF220A	SASHA 9 AM - 12 PM
	WYNNIE 2 PM - 5 PM
THURSDAYS	WYNNIE 2 PM - 5 PM
FRIDAYS	WYNNIE 3 PM - 5 PM

GIS Help Desk hours follow a University schedule. If the University is closed from remote/online operations for any reason, the GIS Help Desk may also be unavailable. GIS Help Desk Assistants operate on a first-come, first-serve drop-in basis. Contact Marjorie Miller (marmiller@clarku.edu) with any questions. or call the Geography Main Office at 508-793-7336 for more information. The GIS Help Desk is sponsored by the Graduate School of Geography at Clark University.