SIM-UB Undergraduate Program
GEO 411: Multivariate Statistics in Geography
Spring 2021

Course Outline

Instructor: Xin Tao
Class Day/Time: Wednesdays and Fridays; 8:30 – 10:00
Classroom: Please refer to electronic signboard
Office Hours: 10:00 – 11:30
Office Location: Please refer to electronic signboard
E-mail: xintao@buffalo.edu
Telephone: +1 716-645-3717

Textbook (recommended): Rogerson, P., Statistical Methods for Geography, 4th edition, ISBN: 978-1-4462-9573-1.

Course Description and/or Objectives: This course covers the statistical analysis of geographic data and techniques for geographic analysis. It provides an introduction to techniques of multivariate analysis. Topics include ANOVA, simple regression, multiple regression, logistic regression, principal components analysis, and cluster analysis.

Course Requirements: There are five quizzes and five homeworks for the course. The exams consist of calculated numeric questions and short answer questions. The homework due dates are shown in the syllabus.

Student Learning Outcomes: Successful completion of this course will prepare students for the use of statistical methods in their own academic work and in their future employment. Though the course is aimed at geographical applications, students ultimately entering many other fields should also find the material covered to be useful. The course will also enable students to read a wider range of literature and research reports.

Assessment: There will be 5 quizzes. The lowest quiz score will be dropped and the remaining highest four is worth 80% of the final grade. Homework problems will be given throughout the term, and will be worth 20% of the final grade. Those students on the borderline between grades will have their grade determined on the basis of effort, class attendance and participation.

Grading:

UB Letter Grade	% Equivalent	Interpretation
A	93.0 – 100.0	High Distinction
A-	90.0 – 92.9	High Distinction
B+	87.0 – 89.9	Superior
B	83.0 – 86.9	Superior
B-	80.0 – 82.9	Superior
C+	77.0 – 79.9	Average
C	73.0 – 76.9	Average
C-	70.0 – 72.9	Average
D+	67.0 – 69.9	Minimal Passing Grade
D	60.0 – 66.9	Minimal Passing Grade
F	0.00 – 59.9	Failure
FX		Failure for nonattendance

Incomplete Grades: Under certain circumstances (e.g. extended hospitalization), students may apply for a grade of Incomplete. See the UB catalog for details of the Incomplete grade policy and requirements at:

https://catalog.buffalo.edu/policies/explanation.html

Request for an Incomplete grade must be made prior to the end of the semester. Approval is not automatic, must be supported by robust relevant documentation, and is at the discretion of the instructor.

Class Policies
Missed exams: The student contacts the instructor either before, or on the day of, the scheduled exam, unless with a note that explains why the instructor could not be contacted.

Late policy: Assignments must be submitted in print or electronic version on the specific due date to the instructor. Late work will lose 10 percent per day.

Attendance: Students are expected to attend classes regularly. A student who incurs an excessive number of absences may be withdrawn form a class at the discretion of the professor. See the UB catalog for details of the class attendance policy at:

https://catalog.buffalo.edu/policies/attendance.html

General UB Program Policies
Attendance and active participation is expected by all students in every class. Students are expected to be present for the entire duration of each class. Tardiness to or absenting oneself during class will result in a deduction from the attendance and participation portion of the final grade.

Late assignments, if accepted, will be penalized.

Students who are absent from a **midterm exam** must request a makeup exam from the course instructor; a makeup will be given only if there is an appropriate, documented reason for absence from the exam (such as an MC); any disputes regarding the validity of the reason or the documentation may be referred to the student advisor.

Students who are absent from a **final exam** must formally request a makeup exam in writing to Ms. Katie Fassbinder, Assistant Resident Director, within 24 hours of the original exam. The makeup exam request form can be found in SIMConnect. In all cases, supporting documents must be provided and a make-up exam will only be scheduled if there is a valid and appropriate reason for the absence. For example, prior commitments to external activities or events outside of SIM are not considered a valid reason for absence. For medical cases, students must submit a detailed letter from the doctor**,** highlighting the date of the medical consultation, the nature and the severity of the illness, and how the illness prevented them from taking the scheduled exam, in addition to a Medical Certificate (MC). A **Medical Certificate alone will not be accepted for make-up final exams.** Disputes may be referred to the Resident Director.

There will be no make ups for other course assessments, and students who are absent from such assessments will receive a zero.

UB Statement of Principle on Academic Integrity:
The University at Buffalo has a responsibility to promote academic honesty and integrity and to develop procedures to deal effectively with instances of academic dishonesty. Students are responsible for the honest completion and representation of their work, for appropriate citation of sources, and for respect for others' academic endeavors. By placing their name on academic work, students certify the originality of all work not otherwise identified by appropriate acknowledgements.

Additionally, students are expected to understand and abide completely by the following guidelines for academic integrity in all UB courses:

Plagiarism, cheating, and other incidents of academic dishonesty will result in an **automatic failing grade for the course.** Depending on the severity of the violation, your case may also be reported to UB for further investigation and may result in expulsion from the university.

Plagiarism consists of copying work from another source without giving proper citations. You must not copy information from printed materials, internet sources, or from the work of other students. If you are uncertain about how to submit your work correctly, consult the instructor immediately.

Any claim of ignorance of the rules of academic integrity by any student is unacceptable.

See the policy here: Undergraduate Academic Integrity Policy

Reasonable Accommodations and Accessibility Resources for Students with Disabilities
Reasonable Accommodation refers broadly to reasonable modifications of policies, practices, and procedures as necessary to ensure that persons with disabilities have the same opportunities as others in all programs, services, and benefits of the University at Buffalo. Anyone with a disability who needs reasonable accommodations in the SIM-UB Program should refer to the Student Handbook (available online via SIMConnect) for further information, or consult the Resident Director.

Syllabus

Week	Date	Topic	Assignments
1	1/27	Discrete distribution and continuous distribution	
	1/29	Hypothesis testing	
2	2/3	R	HWK 1 out
	2/5	Cluster analysis	HWK 1 due
3	2/10	**Quiz 1**	
	2/12	No class (holiday)	
4	2/17	ANOVA	
	2/19	Analysis of Variance	HWK 2 out
5	2/24	Analysis of Variance and Covariance	
	2/26	Analysis of Variance and Covariance	HWK 2 due
6	3/3	**Quiz 2**	
	3/5	Regression	
7	3/10	Linear regression	HWK 3 out
	3/12	Linear regression	
8	3/17	Multiple linear regression	HWK 3 due
	3/19	**Quiz 3**	
9	3/24	Generalized linear models	
	3/26	Generalized linear regression	HWK 4 out
10	3/31	Nonlinear regression	
	4/2	No class (holiday)	
11	4/7	Nonlinear models	HWK 4 due
	4/9	**Quiz 4**	
12	4/14	Dimensionality reduction	
	4/16	Principle component analysis	HWK 5 out
13	4/21	Principle component analysis	
	4/23	Factor analysis	HWK 5 due
14	4/28	**Quiz 5**	
15	TBA	**Makeup quizzes (if approved)**	

Disclaimer: This syllabus is subject to change with advanced notice to the students. Unforeseen events will require adjustment to the syllabus.