



蘇州大學
Soochow University

MAT 309 Applied Linear Models

Winter 2024

Course Credits: 4

Contact Hours: 56 hours

Instructor: TBA

Email:TBA

COURSE OBJECTIVES

This course offers a comprehensive exploration of linear models and their practical applications in various domains, including statistics, economics, biology, and engineering. Students will delve into the theoretical foundations of linear models, their assumptions, and how to handle violations. Additionally, they will gain proficiency in model building, experimental design, and the analysis of complex datasets through multilevel and growth modeling.

Upon Completion of this Course, students will be able to:

1. Understand how to use regression analysis to analyze different type of data;
2. Understand the concept of regression analysis in the context of experimental and sampling designs;
3. Interpret regression analysis results in a meaningful context for application by practitioners in the field;
4. Develop the skills necessary for the students to apply and interpret regression models using R;
5. Demonstrate how to conduct diagnostics and correct for the violation of the assumptions of the general linear model..

PREREQUISITES

STA 267 Probability and Statistical Estimation

GRADING

Grades will be determined by accumulating points, with 100 points being the



maximum, as follows:

ITEM	POINTS
2 Assignments	20 Points
2 Quizzes	20 Points
Final Report Project	20 Points
Midterm Exam	15 Points
Final Exam	25 Points
Total	100 Points

Late submissions will be graded at the end of the course. Grades will be assigned according to the following rule:

$$A \geq 90 > B \geq 80 > C \geq 70 > D \geq 60 > F.$$

We reserve the right to make adjustments to the overall grading policy.

COURSE MATERIALS

Required Texts:

M.H. Kutner et al, *Applied Linear Statistical Models*, McGraw-Hill, 2005.

Recommended (Optional) Texts or Other Materials:

None

COURSE TOPICS

MODULE	TASKS
Module 1	<p>Topics: Topic 1: Simple Linear Regression Topic 2: Inferences in Regression and Correlation Analysis Topic 3: Diagnostics and Remedial Measures Topic 4: Simultaneous Inferences</p> <p>Assessments: Assignment #1</p>



Module 2	Topics: Topic 5: Matrix Approach to Simple Linear Regression Analysis Topic 6: Multiple Regression: Inference Topic 7: Multiple Regression: Effects of Multicollinearity Topic 8: Regression Models for Quantitative and Qualitative Predictors Assessments: Quiz #1
Module 3	Topics: Topic 9: Model Building Topic 10: Autocorrelation in Time Series Data Topic 11: Nonlinear Regression and Neural Networks Topic 12: Logistic and Poisson Regression Assessments: Assignment #2 Midterm Exam
Module 4	Topics: Topic 13: Design of Experiment Topic 14: One-Way ANOVA Topic 15: Analysis of Factor Level Means Topic 16: Two-Way ANOVA Assessments: Quiz #2
Module 5	Topics: Topic 17: Analysis of Covariance Topic 18: Two-Factor Studies with Unequal Sample Sizes Topic 19: Random and Mixed Effects Models Topic 20: Final Exam Review Assessments: Final Report Project Final Exam

ATTENDANCE

1) Class attendance is required. Missing classes without permission will lead to decrease in overall grade.

Missing less than two classes: no penalty.

Missing more than two classes: 7% will be taken off from the overall grade.

If the instructor reports a student's frequent missing of class to the Soochow University Academic Administration Office, the student might get a written warning and might be prohibited from attending final exam.



2) Participants in this course are expected to arrive in class promptly and adequately prepared. The primary objective of this course is to critically engage with the readings and the subject matter. Therefore, course participants are expected to have completed the reading prior to class and prepare thoughtful reflections/commentaries to share with fellow colleagues.

LEARNING REQUIREMENTS

- 1) Late assignments are not acceptable and are subjected to grade deductions.
- 2) Assignments submitted in the wrong format will be counted as not submitted.
- 3) Failure to submit or fulfill any required course component results in failure of the class.
- 4) Make-up for midterm and final exams only with valid excuses, as defined by the University.
- 5) In order to earn a Certificate of Completion, participants must thoughtfully complete all assignments by stated deadlines and earn an average quiz score of 50% or greater.

TECHNOLOGY POLICY

The use of electronic devices in class is distracting, both for the user and for the rest of the class. Only non-programmable calculators can be used in the tests and exam. Any attempts to use cell phones and other electronic communication devices will be seemed as cheating. Laptops are discouraged, unless you use them for activities DIRECTLY related to the course (eg., note taking, reading course documents).

ACADEMIC INTEGRITY POLICY

Soochow University highly values the academic integrity and aims to promote the academic fairness, honesty and responsibility. Any academic dishonesty behaviors and any attempts to cheats and plagiarism will be reported to the university administration office. A written warning and the relevant penalties will be imposed. The record might be shown on the official university transcript.

DISABILITY ACCOMMODATION



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Soochow University is committed to maintaining a barrier-free environment so that students with disabilities can fully access programs, courses, services, and activities at Soochow University. Students with disabilities who require accommodations for access to and/or participation in this course are welcome.

Note:

Please contact the University Administrative Office immediately if you have a learning disability, a medical issue, or any other type of problem that prevents professors from seeing you have learned the course material.