MAT 381 Regression Analysis

Fall 2023

Course Credits: 4
Contact Hours: 56 hours
Instructor: TBA
Email:TBA

COURSE OBJECTIVES

This course provides an introduction to students with the concepts, theories and methods of regression analysis. Topics include simple linear regression, multiple linear regression, model adequacy checking, polynomial regression models, multicollinearity, variable selection and model building, regression models, nonlinear regression, regression analysis of time series data and so forth. Students will be able to apply the concepts, theories and methods to make regression analysis by learning this course.

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

1. Understand the basic concepts in probability and statistics, linear and nonlinear regression analysis

2. Use matrix operations to analyze variance of linear combination of random variables

3. Calculate and analyze entries in the variance table

4. Use R to manipulate data and calculate variables

PREREQUISITES

N/A

GRADING

Grades will be determined by accumulating points, with 100 points being the maximum, as follows:

ITEM	POINTS
Quizzes	20 Points
Assignments	20 Points
Midterm Test	25 Points
Final Exam	35 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 ≥ 90 > B ≥ 80 > C ≥ 70 > D ≥ 60 > F.

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

COURSE MATERIALS

Required Texts:

Douglas C. Montgomery, Elizabeth A. Peck and G. Geoffrey Vining, *Introduction to Linear Regression Analysis*, 5th Edition, John Wiley & Sons, Inc., 2012.

Recommended (Optional) Texts or Other Materials:

None

COURSE TOPICS

MODULE	TASKS
Module 1	**Topics:** Topic 1: Simple Linear Regression Topic 2: Multiple Linear Regression Topic 3: Model Adequacy Checking Topic 4: Transformations and Weighting to Correct Model Inadequacies **Assessments:** Quiz#1
Module 2	**Topics:** Topic 5: Transformations to Linearize the Model Topic 6: Diagnostics for Leverage and Influence Topic 7: Polynomial Regression Models Topic 8: Regression Approach to Analysis of Variance **Assessments:** Assignment#1

Module 3	**Topics:** Topic 9: Multicollinearity Topic 10: Variable Selection and Model Building Topic 11: Validation of Regression Models Topic 12: Introduction to Nonlinear Regression **Assessments:** Quiz#2 Midterm
Module 4	**Topics:** Topic 13: Nonlinear Least Squares Topic 14: Generalized Linear Models Topic 15: Logistic Regression Models Topic 16: Poisson Regression **Assessments:** Assignment#2
Module 5	**Topics:** Topic 17: The Generalized Linear Model Topic 18: Regression Analysis of Time Series Data Topic 19: Other Topics in the Use of Regression Analysis Topic 20: Effect of Measurement Errors in the Regressors; Designed Experiments for Regression **Assessments:** 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).

ACEDEMIC 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

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.