MATH 644: Regression Analysis Methods
Fall 2023 Course Syllabus

NJIT Academic Integrity Code: All Students should be aware that the Department of Mathematical Sciences takes the University Code on Academic Integrity at NJIT very seriously and enforces it strictly. This means that there must not be any forms of plagiarism, i.e., copying of homework, class projects, or lab assignments, or any form of cheating in quizzes and exams. Under the University Code on Academic Integrity, students are obligated to report any such activities to the Instructor.

COURSE INFORMATION

Course Description: Regression models and the least squares criterion. Simple and multiple linear regression. Regression diagnostics. Confidence intervals and tests of parameters, regression and analysis of variance. Variable selection and model building. Dummy variables and transformations, growth models. Other regression models such as logistic regression. Using statistical software for regression analysis.

Number of Credits: 3

Prerequisites: MATH 661 or equivalent with departmental approval

Course-Section and Instructors:

Course-Section	Instructor
Math 644-101	Professor C. Jin

Office Hours for All Math Instructors: Fall 2023 Office Hours and Emails

Required Textbook:

Title	*Applied Linear Regression Models*
Author	Kutner, Nachtsheim, Nester
Edition	4th
Publisher	McGraw-Hill/Irwin
ISBN #	ISBN-10: 0073014664; ISBN-13: 978-0073014661.
Reference Book	Linear Models with R, by Julian Faraway (2005).

University-wide Withdrawal Date: The last day to withdraw with a **W** is **Monday, November 13, 2023**. It will be strictly enforced.

POLICIES

DMS Course Policies: All DMS students must familiarize themselves with, and adhere to, the Department of Mathematical Sciences Course Policies, in addition to official university-wide policies. DMS takes these policies very seriously and enforces them strictly.

Grading Policy: The final grade in this course will be determined as follows:

Homework	30%
Midterm Exam	30%
Final Exam	40%

Your final letter grade will be based on the following tentative curve.

A	90 - 100	**C**	68 - 74
B+	85 - 89	**D**	50 - 67
B	80 - 84	**F**	0 - 70
C+	75 - 79		

Attendance Policy: Attendance at all classes will be recorded and is **mandatory**. Please make sure you read and fully understand the Math Department's Attendance Policy. This policy will be strictly enforced.

Homework: For every day of unexcused lateness, you will get 1/3 of total points deducted from the grade of each homework.

Exams: There will be one exam during the semester and a cumulative final exam during the final exam week:

Midterm Exam	Oct 16, 2023
Final Exam Period	December 17 - December 23, 2023

The final exam will test your knowledge of all the course material taught in the entire course. Make sure you read and fully understand the Math Department's Examination Policy. This policy will be strictly enforced.

Makeup Exam Policy: There will be **NO MAKE-UP QUIZZES OR EXAMS** during the semester. In the event an exam is not taken under rare circumstances where the student has a legitimate reason for missing the exam, the student should contact the Dean of Students office and present written verifiable proof of the reason for missing the exam, e.g., a doctor's note, police report, court notice, etc. clearly stating the date AND time of the mitigating problem. The student must also notify the Math Department Office/Instructor that the exam will be missed.

Cellular Phones: All cellular phones and other electronic devices must be switched off during all class times.

ADDITIONAL RESOURCES

Further Assistance: For further questions, students should contact their instructor. All instructors have regular office hours during the week. These office hours are listed on the Math Department's webpage for Instructor Office Hours and Emails.

Accommodation of Disabilities: The Office of Accessibility Resources and Services (OARS) offers long term and temporary accommodations for undergraduate, graduate and visiting students at NJIT.

If you need an accommodation due to a disability, please contact the Office of Accessibility Resources and Services at oars@njit.edu, or visit Kupfrian Hall 201 to discuss your specific needs. A Letter of Accommodation Eligibility from the office authorizing student accommodations is required.

For further information regarding self identification, the submission of medical documentation and additional support services provided please visit the Office of Accessibility Resources and Services (OARS) website at:

https://www.njit.edu/accessibility/

Important Dates (See: Fall 2023 Academic Calendar, Registrar)

Date	Day	Event
September 4, 2023	Monday	Labor Day
September 5, 2023	Tuesday	First Day of Classes
September 11, 2023	Monday	Last Day to Add/Drop Classes
November 13, 2023	Monday	Last Day to Withdraw
November 21, 2023	Tuesday	Thursday Classes Meet
November 22, 2023	Wednesday	Friday Classes Meet
November 23 to November 26, 2023	Thursday and Saturday	Thanksgiving Recess - Closed
December 13, 2023	Wednesday	Last Day of Classes
December 14, 2023	Thursday	Reading Day 1
December 15, 2023	Friday	Reading Day 2
December 17 to December 23, 2023	Sunday to Saturday	Final Exam Period

Course Outline

This is a tentative outline and could be subject to change.

Date	Lecture	Chapter	Topic
Week 1	1	Chapter 1	**Simple Linear Regression Model with distribution of error**

Sept 11			**terms unspecified, Normal Error Regression Model**
Week 2 Sept 18	2	Chapter 2	**Inferences Concerning Regression Parameters Interval Estimation of mean response Prediction of New Observation**
Week 3 Sept 25	3	Chapter 2	**Analysis of Variance Approach to Regression General Linear Test Approach Descriptive Measures of Linear Association**
Week 4 Oct 2	4	Chapter 3	**Diagnostics for Predictor Variable, Residuals Overview of Tests Involving Residuals Test for Constancy of Error Variance, F Test for Lack of Fit Overview of Remedial Measures, Box-Cox Transformations**
Week 5 Oct 9	5	Chapter 4	**Joint Estimation for Regression Parameters Simultaneous Estimation of Mean Responses Simultaneous Prediction Intervals for New Observations**
Week 6 Oct 16	6		**MIDTERM EXAM**
Week 7 Oct 23	7	Chapter 4	**Regression through Origin Effects of Measurement Errors Inverse Predictions**
Week 8 Oct 30	8	Chapter 5	**Matrices and their Properties Simple Linear Regression Model in Matrix Terms Least Squares Estimation of Regression Parameters**
Week 9 Nov 6	9	Chapter 5	**Fitted Values and Residuals Analysis of Variance Results Inferences in Regression Analysis**
Week 10 Nov 13	10	Chapter 6	**Multiple Regression Models General Linear Model in Matrix Terms Estimation of Regression Coefficients**
Week 11 Nov 20	11	Chapter 6	**Fitted Values and Residuals Analysis of Variance Results Inferences about Regression Parameters**
Week 12 Nov 27	12	Chapter 7	**Extra Sums of Squares Summary of Tests Concerning Regression Coefficients**
Week 13 Dec 4	13	Chapter 9	**Overview of Model-Building Process**
Week 14 Dec 11	14		**Review for FINAL EXAM**
			FINAL EXAM: December 18, 2022, 6:00PM - 8:30PM (FMH 405)

Updated by Professor C. Jin- 8/22/2023