MATH 644: Regression Analysis Methods
Fall 2025 Course Syllabus

NJIT Academic Integrity Code: Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: NJIT Academic Integrity Code.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu

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 Y. Sun

Office Hours for All Math Instructors: Fall 2025 Office Hours and Emails

Required Textbook:

Title	*Applied Linear Regression Models*
Author	Kutner, Nachtsheim, Nester
Edition	4th
Publisher	McGraw-Hill/Irwin

ISBN #	0-072386916
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 10, 2025**. 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 - 49
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.

Religious Observance: NJIT is committed to supporting students observing religious holidays. Students must notify their instructors in writing of any conflicts between course requirements and religious observances, ideally by the end of the second week of classes and no later than two weeks before the anticipated absence.

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	October 13
Final Exam Period	December 14 - December 20, 2025

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 2025 Academic Calendar, Registrar)

Date	Day	Event
September 1, 2025	Monday	Labor Day
September 2, 2025	Tuesday	First Day of Classes
September 8, 2025	Monday	Last Day to Add/Drop Classes
November 10, 2025	Monday	Last Day to Withdraw
November 25, 2025	Tuesday	Thursday Classes Meet
November 26, 2025	Wednesday	Friday Classes Meet
November 27 to November 30, 2025	Thursday to Sunday	Thanksgiving Recess - Closed
December 11, 2025	Thursday	Last Day of Classes

December 12, 2025	Friday	Reading Day 1
December 13, 2025	Saturday	Saturday Classes Meet
December 14 to December 20, 2025	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 9/8	1	Chapter 1	**Course Overview** **Simple Linear Regression Model with distribution of error terms unspecified, Normal Error Regression Model**
Week 2 9/15	2	Chapter 2	**Inferences Concerning Regression Parameters** **Interval Estimation of mean response** **Prediction of New Observation**
Week 3 9/22	3	Chapter 2	**Analysis of Variance Approach to Regression** **General Linear Test Approach** **Descriptive Measures of Linear Association**
Week 4 9/29	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 10/6	5	Chapter 4	**Joint Estimation for Regression Parameters Simultaneous Estimation of Mean Responses Simultaneous Prediction Intervals for New Observations** **Regression through Origin** **Effects of Measurement Errors** **Inverse Predictions**
Week 6 10/13	6		**MIDTERM EXAM**
Week 7 10/20	7	Chapter 5	**Matrices and their Properties** **Simple Linear Regression Model in Matrix Terms** **Least Squares Estimation of Regression Parameters** **Fitted Values and Residuals** **Analysis of Variance Results** **Inferences in Regression Analysis**
Week 8	8	Chapter 6	**Multiple Regression Models**

10/27			**General Linear Model in Matrix Terms** **Estimation of Regression Coefficients**
Week 9 **11/3**	9	Chapter 6	**Fitted Values and Residuals** **Analysis of Variance Results** **Inferences about Regression Parameters**
Week 10 **11/10**	10	Chapter 7	**Extra Sums of Squares** **Summary of Tests Concerning Regression Coefficients**
Week 11 **11/17**	11	Chapter 9 Chapter 10	**Overview of Model-Building Process** **Multicollinearity**
Week 12 **11/24**	12	Chapter 11	**Model Selection** **Ridge Regression**
Week 13 **12/1**	13	Chapter 14	**Logistic Regression** **Generalized Linear Model**
Week 14 **12/8**	14		**Review for FINAL EXAM**
			FINAL EXAM Period: December 14, 2025 - December 20, 2025

Updated by Professor Y. Sun - 2025
Department of Mathematical Sciences Course Syllabus, Fall 2025