

THE DEPARTMENT OF MATHEMATICAL SCIENCES

MATH 344: Regression Analysis

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: This course introduces the methods for fitting and interpreting regression models. Topics include ordinary least squares, inference for the Normal regression model, model diagnostics and test of fit, transformation of data, qualitative predictors, effects of measurement error, and model selection.

Number of Credits: 3

Prerequisites: MATH 333 with a grade of C or better or MATH 341 with a grade of C or better.

Course-Section and Instructors:

| Course-Section | Instructor |
|----------------|-------------------|
| Math 344-001 | Professor A. Wang |

Office Hours for All Math Instructors: [Fall 2023 Office Hours and Emails](#)

Required Textbook:

| | |
|-----------|---|
| Title | <i>Applied Linear Regression Models</i> |
| Author | Kutner, Nachtsheim and Neter |
| Edition | 4th |
| Publisher | McGraw-Hill |
| ISBN # | 0073014664 |

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% |
| One 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.

Homework: Homework problems will be assigned in class.

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

| | |
|-------------------|---------------------------------|
| Midterm Exam | Oct 9, 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

Math Tutoring Center: Located in the Central King Building, Lower Level, Rm. G11 (See: **Fall 2023 Hours**)

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

| Week | Chapter | Topic |
|------|---------|--|
| 1 | 1 | Simple Linear Regression Model with distribution of error terms unspecified, Normal Error Regression Model |
| 2 | 2 | Inferences Concerning Regression Parameters |

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|----|-------------|---|
| | | Interval Estimation of mean response Prediction of New Observation |
| 3 | 2 | Analysis of Variance Approach to Regression General Linear Test Approach Descriptive Measures of Linear Association |
| 4 | 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 |
| 5 | 4 | Joint Estimation for Regression Parameters Simultaneous Estimation of Mean Responses Simultaneous Prediction Intervals for New Observations |
| 6 | | MIDTERM 1 EXAM: Monday~ Oct 9, 2023 |
| 7 | 4 | Regression through Origin Effects of Measurement Errors Inverse Predictions |
| 8 | 5 | Matrices and their Properties Simple Linear Regression Model in Matrix Terms Least Squares Estimation of Regression Parameters |
| 9 | 5 | Fitted Values and Residuals Analysis of Variance Results Inferences in Regression Analysis |
| 10 | 6 | Multiple Regression Models General Linear Model in Matrix Terms Estimation of Regression Coefficients |
| 11 | 6 | Fitted Values and Residuals Analysis of Variance Results Inferences about Regression Parameters |
| 12 | 7 | Extra Sums of Squares Summary of Tests Concerning Regression Coefficients |
| 13 | 9 | Overview of Model-Building Process |
| 14 | Reading Day | Review for Final Exam |

Updated by Professor A. Wang - 8/17/2023
Department of Mathematical Sciences Course Syllabus, Fall 2023