

Fall 2023

MATH 661-111, Fall 2023: Applied Statistics

Thomas Falconer

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MATH 661: Applied Statistics *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: Role and purpose of applied statistics. Data visualization and use of statistical software used in course. Descriptive statistics, summary measures for quantitative and qualitative data, data displays. Modeling random behavior: basic probability theory and common probability distribution models, including normal distribution. Computational statistical inference: confidence intervals and tests for means, variances, and proportions. Common regression analyses and their inferences.

Number of Credits: 3

Prerequisites: **MATH 112**

Course-Section and Instructors:

Course-Section	Instructor
Math 661-111	Professor Thomas Falconer

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

Required Textbook:

Title	<i>Introduction to the Practice of Statistics</i>
Author	Moore, McCabe, and Craig
Edition	10th
Publisher	MacMillan Learning
ISBN #	Paperback ISBN:9781319244446

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

COURSE GOALS

Course Objectives:

- This course will acquaint students with fundamental statistical techniques and statistical reasoning that can be applied to many real world contexts.

Course Outcomes

On successful completion of this course, the student will be able to:

- Explain and apply statistical methods for displaying, summarizing and describing data
- Explain and perform basic probability calculations
- Define and explain sampling distributions and the central limit theorem
- Perform statistical analysis including estimation, hypothesis testing, and analysis of variance
- Understanding how to interpret estimates of common regression methods
- Exposed to scientific literature to understand how statistics is used in research

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:

Homeworks	40%
Journal club	10%
Class attendance and participation	10%
Mid-term Exam	20%
Final Exam	20%

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

A	90 - 100	C+	60 - 69
B+	80 - 89	C	50 - 59
B	70 - 79	F	0 - 49

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.

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

Midterm Exam	Week 8
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Final Exam	December 16 - 22, 2023
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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.

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
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Course Outline

Week	Subject Topic
Week 1 - Sept 11	<i>Class introductions; R set-up; introduction to basic probability theory</i>
Week 2 - Sept 18	<i>Continuation of probability theory: sets and counting methods (chapter 1)</i>
Week 3 - Sept 25	<i>Introduction to statistics: history of statistics; introduction to count data and sample distributions (chapter 2)</i>
Week 4 - Oct 2	<i>Statistics: data distributions and common probability density functions (section 1.4)</i>
Week 5 - Oct 9	<i>Statistics: correlations and introduction to hypothesis testing (section 2.3, chapter 4, chapter 6)</i>
Week 6 - Oct 16	<i>Continuation of hypothesis testing (chapter 7, chapter 8)</i>
Week 7 - Oct 23	<i>Continuation of hypothesis testing (chapter 9, chapter 12, 13)</i>
Week 8 - Oct 30	<i>Mid-term examination (conducted during class time)</i>
Week 9 - Nov 6	<i>Univariate linear regression: fundamentals of regression (chapter 10)</i>
Week 10 - Nov 13	<i>Univariate linear regression: fundamentals of regression (chapter 10)</i>
Week 11 - Nov 20	<i>Multivariate linear regression (chapter 11)</i>
Week 12 - Nov 27	<i>Logistic regression (chapter 14)</i>
Week 13 - Dec 4	<i>Linear Algebra: vectors and matrices</i>
Week 14 - Dec 11	<i>Linear Algebra: systems of linear equations (as they relate to statistics)</i>
Final Exam	<i>Final exam schedule to be set by Registrar</i>

*Updated by Professor Thomas Falconer - 08/30/2023
Department of Mathematical Sciences Course Syllabus, Fall 2023*