Mathematical Sciences Syllabi   NJIT Syllabi

Fall 2019

MATH 661-101: Applied Statistics

P. Natarajan

Follow this and additional works at: https://digitalcommons.njit.edu/math-syllabi

MATH 661: Applied Statistics
Fall 2019 Graduate 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: elementary probability and some simple probability distribution models. Normal distribution. Computational statistical inference: confidence intervals and tests for means, variances, and proportions. Linear regression analysis and inference. Control charts for statistical quality control. Introduction to design of experiments and ANOVA, simple factorial design and their analysis. MATH 661 and MATH 663 cannot both be used toward degree credits at NJIT.

Number of Credits: 3

Prerequisites: MATH 112.

Course-Section and Instructors

Course-Section	Instructor
Math 661-101	Professor P. Natarajan

Office Hours for All Math Instructors: Fall 2019 Office Hours and Emails

Required Textbooks:

Title	*Introduction to the Practice of Statistics*
Author	D.S. Moore, G.P. McCabe and B. Craig
Edition	9th
Publisher	MacMillan Learning
ISBN #	1. 978-1319055967 (e-book) 2. 978-1319013622 (looseleaf)

University-wide Withdrawal Date:The last day to withdraw with a **W** is **Monday, November 11, 2019**. It will be strictly enforced.

REFERENCE TEXTBOOKS

- *Mathematical Statistics with Applications*, 2nd Edition, Kandethody Ramachandran and Chris Tsokos, ISBN: 978-0-12-417113-8
- *Introductory Applied Biostatistics* by Ralph D'Agostino, Lisa Sullivan, and Alexa Beiser, 1st edition, ISBN-10: 9780534423995, ISBN-13: 978-0534423995
- *Applied Statistics and Probability for Engineers*, Montgomery and Runger, Sixth edition, ISBN-10: 1118539710, ISBN-13: 978-1118539712
- *An Introduction to Statistical Methods and Data Analysis*, 7th Edition, Ott, R. L. and Longnecker, M.
- *Fundamentals of Biostatistics*, 8th Edition, Bernard Rosner

COURSE GOALS

Course Objectives: This course will acquaint students with statistical techniques, with emphasis on applications.

Course Outcomes

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

- Demonstrate understanding of various statistical methods for summarizing and displaying data
- Demonstrate knowledge of basic probability and inference
- Demonstrate conceptual understanding of sampling distributions and the central limit theorem
- Perform statistical analysis such as estimation, hypothesis testing, regression, and analysis of variance.

Course Assessment: The assessment tools used will include homework assignments and quizzes, a mid-term exam, and a final exam.

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 and Quizzes	25%
Midterm Exam	35%
Final Exam	40%

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

A	90 - 100	C+	75 - 79
B+	85 - 89	C	60 - 74
B	80 - 84	F	0 - 59

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 and Quiz Policy: Weekly homework will be assigned in class/canvas. Quizzes will be given in class.

Software: Minitab/Excel will be used in the course for assignments/demonstration in class lectures. Smartphones and/or laptop would be needed for in-class assessments.

Exams: There will be a midterm exam during the semester and one comprehensive final exam during the final exam week. Use of Non-programmable/Non-graphing calculator is permitted during the exam. Exams will be held on the following days:

Midterm Exam	October 15, 2019
Final Exam Period	December 14 - 20, 2019

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: To properly report your absence from a midterm or final exam, please review and follow the required steps under the DMS Examination Policy found here:

- http://math.njit.edu/students/policies_exam.php

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

ADDITIONAL RESOURCES

Accommodation of Disabilities: Disability Support Services (DSS) offers long term and temporary accommodations for undergraduate, graduate and visiting students at NJIT.

If you are in need of accommodations due to a disability please contact Chantonette Lyles, Associate Director of Disability Support Services at 973-596-5417 or via email at lyles@njit.edu. The office is located in Fenster Hall, Room 260. A Letter of Accommodation Eligibility from the Disability Support Services office authorizing your accommodations will be required.

For further information regarding self identification, the submission of medical documentation and additional support services provided please visit the Disability Support Services (DSS) website at:

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

Important Dates (See: Fall 2019 Academic Calendar, Registrar)

Date	Day	Event
September 3, 2019	T	First Day of Classes
September 13, 2019	F	Last Day to Add/Drop Classes
November 11, 2019	M	Last Day to Withdraw
November 26, 2019	T	Thursday Classes Meet
November 27, 2019	W	Friday Classes Meet
November 28-29, 2019	R-F	Thanksgiving Recess
December 11, 2019	W	Last Day of Classes
December 12, 13 2019	R & F	Reading Days
December 14-20, 2019	F – R	Final Exam Period

Course Outline

Week	Lecture	Chapter	Topic

Week 1 9/3 (T)	1	1	Looking at Data-Distributions
Week 2 9/10 (T)	2	1	Looking at Data-Distributions
Week 3 9/17 (T)	3	2	Looking at Data-Relationships
Week 4 9/24 (T)	4	4	Probability: The study of Randomness
Week 5 10/1 (T)	5	4 5	Probability: The study of Randomness Sampling Distributions
Week 6 10/8 (T)	6	5	Sampling Distributions Review for Exam
Week 7 10/15 (T)	7	5	**MIDTERM EXAM: TUESDAY, OCTOBER 15, 2019** Sampling Distributions
Week 8 10/22 (T)	8	6	Introduction to Inference
Week 9 10/29 (T)	9	6 7	Introduction to Inference Inference for Means
Week 10 11/5(T)	10	6 7	Introduction to Inference Inference for Means
			(WITHDRAWAL DEADLINE MONDAY, NOVEMBER 11, 2019)
Week 11 11/12(T)	11	6 8	Introduction to Inference Inference for Proportions
Week 12 11/19 (T)	12	7 9	Inference for Means Inference for Categorical Data
Week 13 11/26 (T)			**NOVEMBER 26 (T): THURSDAY CLASSES MEET** **NOVEMBER 27(W): FRIDAY CLASSES MEET**
			THANKSGIVING RECESS: **NOVEMBER 28- DECEMBER 1, 2019**
Week 14 12/3 (T)	13	12	One-Way Analysis of Variance
Week 15 12/10 (T)	14	3	Producing Data (if time permits) Review for Final Exam
			Reading Day 12/12(R) and 12/13(F)
12/14 - 12/20			**FINAL EXAM WEEK**
Changes or modifications, if any, will be announced in class			