

MATH 661-104: Applied Statistics

Spring 2021 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 661-104	Professor P. Natarajan

Office Hours for All Math Instructors: [Spring 2021 Office Hours and Emails](#)

Required Textbooks:

Title	<i>Introduction to the Practice of Statistics</i>
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, April 5, 2021**. 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 online homework assignments and quizzes, an online mid-term exam, and a comprehensive/cumulative online 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	15%
Quizzes	15%
Midterm Exam	35%
Final Exam	35%

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/Quiz Requirements: Weekly homework problems will be assigned on Canvas. In addition to the online homeworks there will be Quizzes using online proctored environment (Lock down browser with Respondus, Webex)

Software: Minitab/Excel will be used in the course for assignments/demonstration in class lectures. Laptop/computer would be needed for assessments

Using LockDown Browser with Respondus Monitor for Online Exams/Quizzes:

If a Canvas exam or quiz requires that LockDown Browser with Respondus Monitor be used, you will not be able to take the exam or quiz with a standard web browser.

The webcam can be built into your computer or can be the type that plugs in with a USB cable. Watch this [short video \(Links to an external site\)](#) to get a basic understanding of LockDown Browser and the webcam feature. A student quick start guide is also available at <https://web.respondus.com/wp-content/uploads/2019/08/RLDB-QuickStartGuide-Instructure-Student.pdf>

Download and install LockDown Browser from this link:

<http://www.respondus.com/lockdown/download.php?id=264548414> (Links to an external site.)

Lectures: Lectures will be delivered online using conferencing tools such as WebEx during scheduled class times.

Office Hours: Office hours will be offered online using tools such as WebEx.

Communication: Communication with students will be maintained using emails and announcements on Canvas and through WebEx/Canvas Conference. Students need to frequently check their email for updates. Installing Canvas app for Students is recommended.

Technical Support: Students may also contact the IST Service Desk with any questions. Questions or problems can be submitted via web form by going to: <https://servicedesk.njit.edu> (Links to an external site..) and clicking on the "Report your issue online" link.

You may also call the IST Service Desk with any questions at 973-596-2900.

Exams: There will be an online midterm exam during the semester and one online cumulative/comprehensive final exam during the final exam week. The exams will be proctored using an online proctoring tool such as Lockdown Browser with Respondus Monitor and Webex. Students will join a Webex meeting from their phone with their cameras on and access the exam through LockDown Browser on a Mac or Windows PC with webcam. Students must follow all instructions related to environment checks and camera positioning. The format for the online exams will be announced before the exams. Use of Non-programmable/Non-graphing calculator is permitted during the exam. Formula sheet and tables will be provided. Exams will be held on the following days:

Midterm Exam	March 4, 2021 (tentative)
Final Exam Period	May 7 - May 13, 2021

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: The Office of Accessibility Resources and Services (OARS) 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 Office of Accessibility Resources and Services at [973-596-5417](tel:973-596-5417) or via email at lyles@njit.edu. The office is located in Kupfrian Hall, Room 201. A Letter of Accommodation Eligibility from the Office of Accessibility Resources and Services 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 Office of Accessibility Resources and Services (OARS) website at:

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

Important Dates (See: [Spring 2021 Academic Calendar](#), Registrar)

Date	Day	Event
January 19, 2021	T	First Day of Classes
January 23, 2021	S	Saturday Classes Begin
January 25, 2021	M	Last Day to Add/Drop Classes
March 14 - March 21, 2021	Su - Su	Spring Recess - No Classes
April, 2, 2021	F	Good Friday - No Classes
April 5, 2021	M	Last Day to Withdraw
May 4, 2021	T	Friday Classes Meet
May 4, 2021	T	Last Day of Classes
May 5 & May 6, 2021	W & R	Reading Days
May 7 - May 13, 2021	F - R	Final Exam Period

Course Outline

Week	Lecture	Chapter	Topic
WEEK 1 1/21 (R)	1	1	Looking at Data-Distributions
WEEK 2 1/28 (R)	2	1	Looking at Data-Distributions
WEEK 3 2/4 (R)	3	2	Looking at Data-Relationships
WEEK 4 2/11 (R)	4	4	Probability: The study of Randomness
WEEK 5 2/18 (R)	5	4 5	Probability: The study of Randomness Sampling Distributions
WEEK 6 2/25 (R)	6	5	Sampling Distributions Review for Exam
WEEK 7 3/4 (R)			MIDTERM EXAM: MONDAY, MARCH 4, 2021
	7	5	Sampling Distributions
WEEK 8 3/11 (R)	8	6	Introduction to Inference

3/14 (S) to 3/21 (S)			SPRING RECESS (NO CLASSES)
WEEK 9 3/25 (R)	9	6 7	Introduction to Inference Inference for distributions
WEEK 10 4/1 (R)	10	6 7	Introduction to Inference Inference for distributions
(WITHDRAWAL DEADLINE MONDAY, APRIL 5, 2021)			
WEEK 11 4/8 (R)	11	6 8	Introduction to Inference Inference for Proportions
WEEK 12 4/15 (R)	12	7 9	Inference for distributions Analysis of Two-Way Tables
WEEK 13 4/22 (R)	13	12	One-Way Analysis of Variance
WEEK 14 4/29 (R)	14		Review for Final Exam
			Reading Day 5/5 and 5/6 (W & R)
5/7 - 5/13			FINAL EXAM WEEK
<i>Changes or modifications, if any, will be announced in class</i>			

*Updated by Professor P. Natarajan - 1/9/2021
Department of Mathematical Sciences Course Syllabus, Spring 2021*
