

## **MATH 333-H01: Probability and Statistics - Honors** *Fall 2020 Coordinated 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.

**DMS Online Exam Policy Fall 2020:** Exams will be proctored using both Respondus LockDown Browser+Monitor and Webex. Students will be required to join a Webex meeting from their phone with their cameras on, and to 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.

Please be sure you read and fully understand our [DMS Online Exam Policy](#).

### **COURSE INFORMATION**

**Course Description:** Descriptive statistics and statistical inference. Topics include discrete and continuous distributions of random variables, statistical inference for the mean and variance of populations, and graphical analysis of data.

**Number of Credits:** 3

**Prerequisites:** **MATH 112H** with a grade of B or better or **MATH 112** with a grade of A or **MATH 133** with a grade of A.

#### **Course-Section and Instructors**

<b>Course-Section</b>	<b>Instructor</b>
Math 333-H01	Professor P. Natarajan

**Office Hours for All Math Instructors:** [Fall 2020 Office Hours and Emails](#)

#### **Required Textbook:**

<b>Title</b>	<i>Applied Statistics and Probability for Engineers</i>
<b>Author</b>	Montgomery and Runger
<b>Edition</b>	7th
<b>Publisher</b>	John Wiley & Sons
<b>ISBN #</b>	1) 978-1119409533 - Text with WileyPlus Registration Card 2) 978-1119400226

**University-wide Withdrawal Date:** The last day to withdraw with a **W** is **Monday, November 9, 2020**. It will be strictly enforced.

## COURSE GOALS

**Course Objective:** The objective of this course is to acquaint students with probability, descriptive statistics and statistical inference and demonstrate real world applications using examples drawn from various fields.

### Student Learning Outcomes

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

- Demonstrate understanding of various statistical terms and methods for summarizing, organizing, and presenting data.
- Compute measures of central tendency, position, and variability and interpret them.
- Describe sample space and events and demonstrate their knowledge of various counting techniques, notions of probability, random variables and various discrete and continuous probability distributions.
- Demonstrate conceptual understanding of sampling distributions and the central limit theorem.
- Perform statistical analysis, such as estimation, hypothesis testing, regression, and draw conclusions.

**Assessment:** The assessment tools used will include online weekly homework assignments and quizzes/additional homework/mini-projects, two online common mid-term exams, and an online comprehensive common final exam. The quizzes and exams will be proctored using an online proctoring tool such as Lockdown Browser with Respondus Monitor and Webex. The format for the online common exams will be announced before the exams.

## 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, Quizzes, Mini-Projects	15%
Common Midterm Exam I	25%
Common Midterm Exam II	25%
Final Exam	35%

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

A	90 - 100	C	65 - 74
B+	85 - 89	D	55 - 64
B	80 - 84	F	0 - 54
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/ Quiz/ Exam Requirements:** Online Weekly Homework will be assigned on WileyPlus. Additional

Homework/Mini-Projects and/or Quizzes would also be given.

**Old Exams:** [http://math.njit.edu/students/undergraduate/course\\_exams.php](http://math.njit.edu/students/undergraduate/course_exams.php)

**Exams:** There will be two online common midterm exams during the semester and one online comprehensive final exam during the final exam week. Exams will be proctored using both Respondus LockDown Browser+Monitor and Webex.

Respondus LockDown Browser is a locked browser for taking exams or quizzes in Canvas with the requirement of webcam and microphone. It prevents you from printing, copying, going to another URL, or accessing other applications during an exam or quiz.

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. Formula sheet and tables will be provided.

Exams will be held on the following days:

Common Midterm Exam I	October 7, 2020
Common Midterm Exam II	November 11, 2020
Final Exam Period	December 15 - 21, 2020

The time of the midterm exams is **4:15-5:40 PM** for daytime students and **5:45-7:10 PM** for evening students. Any modifications to the exam timings, based on the exam format, will be announced before the exam. The final exam will test your knowledge of all the course material taught in the entire course.

## **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.)

**Calculator Policy:** Only a basic (non-programmable and non-graphing) calculator is permitted during the exams.

## **LECTURES, OFFICE HOURS, COMMUNICATION, AND TECHNICAL SUPPORT**

**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. For technical issues with WileyPlus Online Homework, students can contact WileyPlus technical support.

**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](http://math.njit.edu/students/policies_exam.php)

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 and put away during all class times.

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## ADDITIONAL RESOURCES

**Math Tutoring Center:** Located in the Central King Building, Lower Level, Rm. G11 (See: [Fall 2020 Hours](#))

**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 the Office of Accessibility Resources and Services at [973-596-5417](tel:973-596-5417) or via email at [lyles@njit.edu](mailto: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 (OARS) website at:

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

**Important Dates** (See: [Fall 2020 Academic Calendar](#), Registrar)

Date	Day	Event
September 1, 2020	T	First Day of Classes
September 5, 2020	S	Saturday Classes Begin
September 7, 2020	M	Labor Day
September 8, 2020	T	Monday Classes Meet
September 8, 2020	T	Last Day to Add/Drop Classes
November 9, 2020	M	Last Day to Withdraw
November 25, 2020	W	Friday Classes Meet
November 26-29, 2020	R - Su	Thanksgiving Recess - University Closed
December 10, 2020	R	Last Day of Classes
December 11 & 14, 2020	F & M	Reading Days
December 15 - 21, 2020	T - M	Final Exam Period

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# Course Outline

Week	Class	Lec.	Section	Topic
WEEK 1 9/1 (T)	1	1	6.1	<i>Descriptive statistics:</i> Numerical Summaries of data: Sample Mean, Sample Variance, Sample Standard Deviation, Range
	2	2	6.2	<i>Descriptive statistics:</i> Stem and Leaf Diagram, Mean, Median, Quartiles, Interquartile Range
WEEK 2 9/8 (T)				9/8(T): (Monday Classes Meet)
	3	3	6.3, 6.4	<i>Descriptive statistics:</i> Histograms, Boxplot
WEEK 3 9/15 (T)	4	4	2.1, 2.2, 2.3	<i>Probability:</i> Sample Spaces and Events; Interpretations and Axioms of Probability
	5	5	2.4, 2.5, 2.6, 2.7	<i>Probability:</i> Addition rules; Conditional Probability; Multiplication and Total Probability Rules; Independence
WEEK 4 9/22 (T)	6	6	2.8	<i>Probability:</i> Bayes' theorem
	7	7	3.1, 3.2	<i>Discrete Random Variables and Probability Distributions:</i> Discrete Random Variables; Probability Distributions and Probability Mass Functions; Cumulative Distribution Functions
WEEK 5 9/29 (T)	8	8	3.3, 3.4	<i>Discrete Random Variables and Probability Distributions:</i> Mean and Variance of a Discrete Random Variable; Discrete Uniform Distribution
	9	9	3.5, 3.6	<i>Discrete Random Variables and Probability Distributions:</i> Binomial Distribution; Geometric Distribution only from Section 3.6
WEEK 6 10/6 (T)	10			REVIEW FOR EXAM #1
	<b>COMMON MIDTERM EXAM I: OCTOBER 7, 2020</b>			
	11	10	3.8	<i>Discrete Random Variables and Probability Distributions:</i> Poisson Distribution
WEEK 7 10/13 (T)	12	11	4.1, 4.2	<i>Continuous Random Variables and Probability Distributions:</i> Continuous Random Variables; Probability distributions and Probability Density Functions; Cumulative Distribution Functions
	13	12	4.3, 4.4	<i>Continuous Random Variables and Probability Distributions:</i> Mean and Variance of a Continuous Random Variable; Continuous Uniform Distribution
WEEK 8 10/20 (T)	14	13	4.7	<i>Continuous Random Variables and Probability Distributions:</i> Exponential Distribution
	15	14	4.5	<i>Continuous Random Variables and Probability Distributions:</i> Normal distribution
WEEK 9 10/27 (T)	16	15	4.6	<i>Continuous Random Variables and Probability Distributions:</i> Normal Approximation to the Binomial and Poisson Distributions
	17	16	7.1- 7.2	<i>Point estimation of Parameters and Sampling Distributions:</i> Point Estimation; Sampling Distributions and the Central Limit Theorem
WEEK 10 11/3 (T)	18	17	8.1	<i>Statistical Intervals for a Single Sample:</i> Confidence interval on the Mean of a Normal distribution, Variance Known
	19	18	8.2	<i>Statistical Intervals for a Single Sample:</i> Confidence Interval on the Mean of a Normal Distribution, Variance Unknown
<b>WITHDRAWAL DEADLINE: 11/9(M)</b>				

<b>WEEK 11</b> 11/10 (T)	20			REVIEW FOR EXAM #2
	<b>COMMON MIDTERM EXAM II: NOVEMBER 11, 2020</b>			
	21	19	8.3	<i>Statistical Intervals for a Single Sample:</i> Confidence intervals on the Variance and Standard deviation of a Normal Distribution
<b>WEEK 12</b> 11/17 (T)	22	20	8.4	<i>Statistical Intervals for a Single Sample:</i> Large-Sample Confidence Interval for a Population Proportion
	23	21	9.1-9.2	<i>Tests of Hypotheses for a Single Sample:</i> Hypothesis Testing; Tests on the Mean of a Normal Distribution, Variance Known
<b>WEEK 13</b> 11/24(T)	24	22	9.1-9.2	<i>Tests of Hypotheses for a Single Sample:</i> Tests on the Mean of a Normal Distribution, Variance Known
				11/25(W): (Friday Classes Meet)
<b>THANKSGIVING RECESS: 11/26(R) TO 11/29(S)</b>				
<b>WEEK 14</b> 12/1 (T)	25	23	9.3.1	<i>Tests of Hypotheses for a Single Sample:</i> Tests on the Mean of a Normal Distribution, Variance Unknown
	26	24	9.5.1	<i>Tests of Hypotheses for a Single Sample:</i> Tests on a Population Proportion
<b>WEEK 15</b> 12/8 (T)	27	25	10.4	<i>Statistical Inference for Two Samples:</i> Paired t-test
			10.1.1, 10.1.3	Inference on the Difference in Means of Two Normal Distributions, Variances known
	28	26	11.2	<i>Simple Linear Regression and Correlation:</i> Simple Linear Regression (If time permits) REVIEW FOR FINAL EXAM
	<b>LAST DAY OF CLASSES 12/10 (R)</b>			
			Reading Day 12/11 (F) and 12/14 (M)	
<b>FINAL EXAM WEEK : 12/15(T) TO 12/21(M)</b>				

Updated by Professor P. Natarajan - 11/20/2020  
Department of Mathematical Sciences Course Syllabus, Fall 2020

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