For MATH 333 - Spring 2024

- **Textbook**: *Applied Statistics and Probability for Engineers*
- **Author(s)**: Montgomery and Runger
- **Edition**: 7th
- **ISBN #**: 1) 978-1119758693 (Text with WileyPlus Registration Card)

2) 978-1119498421 (Standalone WileyPlus Registration Card)

1. **Course Assessment Criteria**: Objectives, Outcomes, and Assessment

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
1) Demonstrate understanding of various statistical terms and methods for summarizing, organizing, and presenting data
2) Compute measures of central tendency, position, and variability and interpret them.
3) 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
4) Demonstrate conceptual understanding of sampling distributions and the central limit theorem
5) Perform statistical analysis, such as estimation, hypothesis testing, regression, and draw conclusions.

Assessment: The assessment tools used will include online weekly homework assignments, quizzes, two common mid-term exams, and a comprehensive common final exam.

2. **Course Outline**: Online Homework Assignments will be posted on WileyPlus.

Week	Class	Lecture	Section	Topic
Week 1 1/16 (T)	**1**	**1**	**6.1**	*Descriptive statistics:* Numerical Summaries of data: Sample Mean, Sample Variance, Sample Standard Deviation, Range
	2	**2**	**6.2**	*Descriptive statistics:* Stem and Leaf Diagram, Mean, Median, Quartiles, Interquartile Range
Week 2 1/23 (T)	**3**	**3**	**6.3, 6.4**	*Descriptive statistics:* Histograms, Boxplot
	4	**4**	**2.1, 2.2, 2.3**	*Probability:* Sample Spaces and Events; Interpretations and Axioms of Probability
Week 3 1/30 (T)	**5**	**5**	**2.4, 2.5, 2.6, 2.7**	*Probability:* Addition rules; Conditional Probability; Multiplication and Total Probability Rules; Independence
	6	**6**	**2.8**	*Probability:* Bayes' theorem
Week 4 2/6(T)	**7**	**7**	**3.1, 3.2**	*Discrete Random Variables and Probability Distributions:* Discrete Random Variables; Probability Distributions and Probability Mass Functions; Cumulative Distribution Functions
	8	**8**	**3.3, 3.4**	*Discrete Random Variables and Probability Distributions:* Mean and Variance of a Discrete Random Variable; Discrete Uniform

				Distribution
Week 5 2/13 (T)	**9**	**9**	**3.5, 3.6**	*Discrete Random Variables and Probability Distributions:* Binomial Distribution; Geometric Distribution only from Section 3.6
	10	**10**	**3.8**	*Discrete Random Variables and Probability Distributions:* Poisson Distribution
Week 6 2/20 (T)	**11**			REVIEW FOR EXAM #1
				MIDTERM EXAM I: WEDNESDAY ~ FEBRUARY 21, 2024
	12	**11**	**4.1, 4.2**	*Continuous Random Variables and Probability Distributions:* Continuous Random Variables; Probability distributions and Probability Density Functions; Cumulative Distribution Functions
Week 7 2/27 (T)	**13**	**12**	**4.3, 4.4**	*Continuous Random Variables and Probability Distributions:* Mean and Variance of a Continuous Random Variable; Continuous Uniform Distribution
	14	**13**	**4.7**	*Continuous Random Variables and Probability Distributions:* Exponential Distribution
Week 8 3/5 (T)	**15**	**14**	**4.5**	*Continuous Random Variables and Probability Distributions:* Normal distribution
	16	**15**	**4.6**	*Continuous Random Variables and Probability Distributions:* Normal Approximation to the Binomial and Poisson Distributions
3/10(S) to 3/17(S)				**SPRING RECESS (NO CLASSES)**
Week 9 3/19 (T)	**17**	**16**	**7.1- 7.2**	*Point estimation of Parameters and Sampling Distributions:* Point Estimation; Sampling Distributions and the Central Limit Theorem
	18	**17**	**8.1**	*Statistical Intervals for a Single Sample:* Confidence interval on the Mean of a Normal distribution, Variance Known
Week 10 3/26 (T)	**19**	**18**	**8.2**	*Statistical Intervals for a Single Sample:* Confidence Interval on the Mean of a Normal Distribution, Variance Unknown
	20	**19**	**8.3**	*Statistical Intervals for a Single Sample:* Confidence intervals on the Variance and Standard deviation of a Normal Distribution
				(WITHDRAWAL DEADLINE: MONDAY, APRIL 1, 2024
Week 11 4/2 (T)	**21**	**20**	**8.4**	*Statistical Intervals for a Single Sample:* Large-Sample Confidence Interval for a Population Proportion
	22	**21**	**9.1- 9.2**	*Tests of Hypotheses for a Single Sample:* Hypothesis Testing; Tests on the Mean of a Normal Distribution, Variance Known
Week 12 4/9 (T)	**23**			REVIEW FOR EXAM #2 **MIDTERM EXAM II: WEDNESDAY ~ APRIL 10, 2024**
	24	**22**	**9.1- 9.2**	*Tests of Hypotheses for a Single Sample:* Tests on the Mean of a Normal Distribution, Variance Known
Week 13 4/16(T)	**25**	**23**	**9.3.1**	*Tests of Hypotheses for a Single Sample:* Tests on the Mean of a Normal Distribution, Variance Unknown
	26	**24**	**9.5.1**	*Tests of Hypotheses for a Single Sample:* Tests on a Population Proportion
Week 14 4/23 (T)	**27**	**25**	**10.4 10.1.1, 10.1.3**	*Statistical Inference for Two Samples:* Paired t-test Inference on the Difference in Means of Two Normal Distributions, Variances known

	28	**26**	**11.2**	*Simple Linear Regression and Correlation:* Simple Linear Regression (if time permits) REVIEW FOR FINAL EXAM
Week 15 4/30 (T)				April 30 (Tuesday): Friday classes meet (Last day of Classes)
				Reading Day 5/1 and 5/2 (W & R)
5/3 - 5/9				**FINAL EXAM WEEK**

3. **Grade Distribution**:

The final grade in this course will be determined as follows:

▪ **Homework and Quizzes:**	**15%** (7.5% each)
▪ **2 Common Midterm Exams:**	**25% each**
▪ **Final Exam:**	**35%**

4. **Grading Scale**:

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**		

5. **Homework/ Quiz Requirements**

Online Weekly Homework will be assigned on WileyPlus. Additional Homework and/or Quizzes would also be given. Quizzes could be on paper or using an online proctored environment (Lock down browser with Respondus). http://www.respondus.com/lockdown/download.php?id=264548414

Old exams are available at:

http://math.njit.edu/students/undergraduate/course_exams.php

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.

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

Exams: There will be two proctored common midterm exams during the semester and one proctored comprehensive final exam during the final exam week. Common Exams will be held on the following days:

Exam 1:	**FEBRUARY 21, 2024**
Exam 2:	**APRIL 10, 2024**
Final Exam Week:	**MAY 3 - 9, 2024**

The time of the midterm exams is 4:15 pm-5:40 pm for daytime students and 6 pm-7:25 pm for evening students. The final exam will test your knowledge of all the course material taught in the entire course

6. **Technical support**

Students may also contact the IST Service Desk with any questions at 973-596-2900. Questions or problems can be submitted via web form by going to: https://servicedesk.njit.edu and clicking on the "Report your issue online" link.

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