SM316 – Engineering Mathematics with Probability and Statistics
Fall Semester 2016-2017

Textbooks: 1. *Probability & Statistics for Engineers & Scientists*, 9th Edition, by Walpole, Myers, Myers & Ye
2. *Beginning Linear Algebra (Schaum's outlines)*, by Seymour Lipschutz

Lesson	Date	Section	TOPIC	PROBLEMS
1	01/08	2.1, 2.2	Sample Spaces and Events	**p.42:** 2.1, 2.3, 2.4, 2.5, 2.8, 2.14, 2.17
2	01/09	2.2, 2.3	Set Operations; Counting	**p.42:** 2.18, 2.19, 2.20 **p.51:** 2.21, 2.22, 2.23, 2.28
3	01/11	2.3	Permutations and Combinations	**p.51:** 2.30, 2.31, 2.32, 2.33, 2.34, 2.35, 2.36, 2.37
4	01/14	2.4, 2.5	Probability; Additive Rules	**p.59:** 2.50, 2.51, 2.52, 2.56, 2.58, 2.59, 2.61
5	01/16	2.5, 2.6	Additive Rules; Conditional Probability	**p.59:** 2.67, 2.72 **p.69:** 2.73, 2.74, 2.77, 2.81, 2.82
6	01/18	2.6, 2.7	Conditional Probability; Bayes' Rule	**p.69:** 2.89, 2.93, 2.94 **p.76:** 2.95, 2.97, 2.101, 2.103, 2.120
7	01/23	3.1, 3.2	Random Variables; Discrete Probability Distributions	**p.91:** 3.1, 3.2, 3.3, 3.5, 3.11, 3.35
8	01/25	3.2, 3.3	Discrete & Continuous Probability Distributions	**p.91:** 3.6, 3.7, 3.8, 3.9, 3.12, 3.13, 3.15
9	01/28	3.3	Continuous Probability Distributions	**p.91:** 3.14, 3.17, 3.19, 3.21, 3.27, 3.29, 3.30, 3.31
10	01/30	4.1	Mean of a Random Variable	**p.117:** 4.1, 4.2, 4.5, 4.7, 4.12, 4.13
11	02/01	4.1, 4.2	Mean of a Function of a Random Variable; Variance.	**p.117:** 4.17, 4.19, 4.20, 4.35 **p.127:** 4.33, 4.34, 4.35, 4.37, 4.43
12	02/04	4.3	Mean and Variance of aX+b	**p.137:** 4.53, 4.55, 4.57, 4.58, 4.59
13	02/06		Review	
14	02/08		Test 1	
15	02/11	5.1, 5.2	Discrete Uniform & Binomial Distribution	**p.150:** 5.1, 5.3, 5.8, 5.9, 5.11, 5.12, 5.16, 5.17, 5.27
16	02/13	5.5	The Poisson Distribution	**p.164:** 5.53, 5.56, 5.57, 5.58, 5.65, 5.67
17	02/15	6.1-6.3	Uniform Distribution; Normal Distribution; Areas Under the Normal Curve	**p.185:** 6.1, 6.2, 6.3, 6.4, 6.5, 6.7
18	02/20	6.3, 6.4	Areas Under the Normal Curve; Applications of the Normal Distribution	**p.185:** 6.8, 6.9, 6.11, 6.13, 6.14, 6.18
19	02/22	6.4, 6.6	Applications of the Normal Distribution; The Exponential Distribution	**p.185:** 6.22, 6.23 **p.206:** 6.45, 6.46, 6.55, 6.81
20	02/25	8.1-8.3	Random Samples, Statistics, Sampling Distributions	**p.230:** 8.2, 8.3, 8.9, 8.14
21	02/27	8.4	Central Limit Theorem; Sampling Distribution of the Mean	**p.241:** 8.17, 8.18, 8.19, 8.21, 8.22, 8.24
22	03/01	8.4	Sampling Distribution of the Difference Between Two Means	**p.241:** 8.26, 8.28, 8.29, 8.30, 8.32, 8.34

23	03/04	6.7, 8.5	χ^2-Distribution; Sampling Distribution of S^2	**p.259:** 8.37, 8.39, 8.41, 8.42
24	03/06	8.6	The t-Distribution	**p.259:** 8.44, 8.45, 8.46, 8.48, 8.49, 8.50
25	03/08		Review	
26	03/18	9.1-9.3	Parameter Estimation; Confidence Intervals	
27	03/20	9.4	Confidence Interval for μ, σ^2 known	**p.282:** 9.2, 9.3, 9.4, 9.5, 9.6, 9.7, 9.8
28	03/22	9.4	Confidence Interval for μ, σ^2 unknown	**p.282:** 9.10, 9.11, 9.12, 9.13
29	03/25		Review	
30	03/27		Test 2	
31	03/29	1.2-1.7	Vectors; Matrices; Matrix Algebra	**p.33:** 1.72, 1.73, 1.76, 1.77
32	04/01	2.2, 2.5-2.9	Systems of Linear Equations	**p.101:** 2.80(a)(b), 2.81, 2.82(a)
33	04/03	2.9, 2.10	Homogeneous Systems	**p.101:** 2.82(b)(c), 2.83(a)(b), 2.85, 2.91
34	04/05	3.1-3.5	Square Matrices; Matrix Inverse; Special Matrices	**p.144:** 3.77(A & C), 3.78(A & C), 3.83, 3.84, 3.94
35	04/08	5.2, 5.5	Linear Independence; Rank of a Matrix	**p.215:** 5.48, 5.50, 5.68
36	04/10	10.1-10.3, 10.7	Determinants; Laplace Expansion	**p.388:** 10.52, 10.53(b)(d), 10.54(a)
37	04/12	10.6, 10.10	Properties of Determinants; Cramer's Rule	**p.388:** 10.65, 10.66(a), 10.80, 10.82, 10.87
38	04/15	11.1-11.4	Eigenvalues & Eigenvectors; Characteristic Polynomial	**p.437:** 11.57, 11.60(a) (**Note:** find the characteristic polynomial, eigenvalues and eigenvectors for each matrix)
39	04/17	11.4	Eigenvalues & Eigenvectors	**p.437:** 11.60(b)(c) (characteristic polynomial, eigenvalues and eigenvectors only), 11.63, 11.65(a)
40	04/19	11.4, 11.5	Diagonalization	**p.437:** 11.57, 11.60 (for each matrix find, if possible, an invertible matrix that diagonalizes it), 11.58
41	04/22		Review	
42	04/24		Review	
43	04/26		Test 3	
44	04/29		Course Review	

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Course Objectives: At the end of this course, midshipmen are expected to:

- use the concept and properties and theorems about probability and probability distributions to model real life phenomena and to compute and interpret probabilities of events.
- use statistical methods to estimate parameters a population from a sample and interpret the results.
- perform matrix computations and use basic spectral theory to analyze the structure of a matrix.