COURSE TITLE: Introduction to Probability and Statistics. Prerequisite: MATH 201.

TEXTBOOK: *Probability and Statistics for Engineering and the Sciences,* by Jay Devore, 9th Edition

COURSE SUMMARY: This is a first course in probability and statistics. We will begin by considering some graphical displays to summarize data. We will then introduce some fundamental concepts necessary for the study of probability, such as the sample spaces, and events. We will study counting techniques and use them to compute probabilities of events in equiprobable spaces. We will discuss conditional probability, independence, and the Bayes' theorem. We will study probability distributions of both discrete and continuous random variables; the concepts of sampling distributions and asymptotic limiting distribution (the central limit theorem); statistical (point) estimations, confidence intervals, hypothesis testing

COURSE CONTENT

Section	Topics
2.1	Sample Spaces and Events
2.2	Axioms and Properties of Probability
2.3	Counting Techniques. Diverse Ways of Sampling (with/without replacement, with/without ordering). Allocation (Occupancy) Models.
2.4	Conditional Probability. Bayes' Theorem
2.5	Independence of Events
3.1	Random Variables
3.2	Discrete Probability Distributions
3.3	Expected Values
3.4	Binomial Probability Distribution
3.5	Hypergeometric Distribution and Negative Binomial Distribution
3.6	Poisson Distribution
4.1	Probability Density Functions
4.2	Cumulative Distribution Functions. Expected Values. Variance
4.3	The Normal Distribution
4.4	Gamma Distribution, Chi-squared Distribution, Exponential Distribution
*	Poisson Process
*	Mixture of a Discrete and a Continuous Random Variable
*	Chebyshef's Inequality
5.1	Jointly Distributed Random Variables. Conditional Distributions. Independent Random Variables. Distribution of the Minimum and Maximum of a Set of Random Variables
5.2	Expected Values, Covariance, Correlation
5.3	Statistics and Their Distributions
5.4	The Distribution of the Sample Mean. The Central Limit Theorem
5.5	Linear Combinations of Independent Normal Random Variable
6.1	Point Estimation
6.2	Method of Moments
7.1	Confidence Intervals (C.I.)
7.2	Large Sample C.I.'s for a Population Mean and Proportion
7.3	C.I's. Based on Normal Population Distribution
7.4	C.I's. for the Variance and Standard Deviation of a Normal Population
8.1	Hypotheses and Test Procedures. P-values and Errors
8.2	z Tests for Hypotheses about a Population Mean

Suggested Problems

Chapter 1: 11,22,25,33,35,39,40-44,49,50,55,57,58,61,68,69,74,78

Chapter 2: 1-5, 7-9, 11-13, 15-22, 24-32, 34-53, 55-75, 77-90, 92, 95, 103, 109, 110, 112-114

Chapter 3: 2, 4-10, 12-15, 17-19, 23, 24, 27-30, 32-38, 42, 44, 45, 47-50, 52, 55-57, 59-63, 66-70, 72, 73, 75-81, 83, 85, 86, 88, 91, 92, 96, 97, 99, 102, 107, 111, 113, 114, 117

Chapter 4: 1-13, 15-22, 24, 26, 28-32, 35-38, 40-42, 44, 46-48, 51, 52, 55, 57, 59, 60, 62-65, 67, 69, 71, 99, 100, 106, 107, 114, 117

Chapter 5: 1, 3, 4, 6-13, 15, 20-28, 30, 33, 35-38, 41, 46, 47, 49-60, 62, 64-68, 72-75, 77, 84, 90, 92, 97, 98

Chapter 6: 1-4, 8, 10, 12, 13, 15, 17, 18, 21, 22, 32 (a), 34

Chapter 7: 1-7, 11-14, 16, 19, 22, 23, 25, 29-34, 42-46, 50, 51, 54, 55

Chapter 8: 1, 2, 5-9,, 11, 13, 14-16, 18-22, 24-26, 29, 30, 33-35, 38, 39, 41-45, 48, 49, 51, 52, 65, 66, 69, 76, 77

GRADING POLICY: The assessment will be based on two tests. The percentages will depend on the content covered in the final test. Should the final test be cumulative, the weights for the first and second tests will be (.4, .6). Otherwise the tests will have equal weights.

Unique Learning Needs of Students with Disabilities. AUB strives to make learning experiences as accessible as possible. If you anticipate or experience academic barriers due to a disability (including mental health, chronic or temporary medical conditions), please inform your lecturer immediately so that we can privately discuss options. In order to help establish reasonable accommodations and facilitate a smooth accommodation process, you are encouraged to contact the Accessible Education Office: accessibility@aub.edu.lb; +961-1-350000, x3246; West Hall, 314.

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