King Fahd University of Petroleum and Minerals
Department of Mathematics and Statistics
STAT501: Probability and Mathematical Statistics
Term 211

Instructor: Dr. Taleb Alkurdi   **Office:** 5 - 307
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Office Hours: 2:00 pm – 3:00 pm UT

Course Objectives: To master the basics of probability theory with an aim to apply it to popular probability models and to samples for statistical inference.

Course Description:

STAT 501: Probability and Mathematical Statistics   **(3-0-3)**
Axioms and foundations of probability. Conditional probability and Bayes' theorem. Independence. Random variables and distribution functions and moments. Characteristic functions. Laplace transforms and moment generating functions. Function of random variables. Random vectors and their distributions. Convergence of sequences of random variables. Laws of large numbers and the central limit theorem. Random samples, sample moments and their distributions. Order statistics and their distributions.

Pre-requisite: Graduate standing

Textbook: Rohatgi, V.K. and Saleh, A.K. (2015) An Introduction to Probability and Statistics, Wiley 3rd Edition.

Software: Minitab.

Assessment*

Activity	Weight
Class Evaluation (homework, quizzes, attendance, participation, etc.)	10%
Exam I	22%
Exam II	23%
Final Exam (Comprehensive)	45%

Grade Assignment
Relative Grading based on overall performance of the students registered in this course.

Academic Integrity
 All KFUPM policies regarding **ethics** and **academic honesty** apply to this course.

General Notes
Students are encouraged to regularly check the blackboard announcements.

Syllabus (Tentative)

Week	Sections	Topics
1 August 29-Sep 2	1.1-1.3	Introduction Sample space Probability Axioms
2 Sept 5- 9	1.3-1.4	(Continue) Probability Axioms Combinatorics: Probability of finite Sample Space
3 Sept 12 -16	1.5- 1.6 2.1-2.2	Conditional Probability and Bayes Theorem Independence of Events Introduction Random Variables
4 Sept 19- 3	2.3—2.4	Probability Distributions of Random Variables Discrete and Continuous Random Variables
Thursday 23rd September 2021: National Day Holiday		
5 Sept 26- 30	2.5	Functions of Random Variables
6 Oct 3-7	2.5 3.1-3.2	(Continue) Functions of Random Variables Introduction Moments of a Distribution Function
7 Oct 10-14	3.2-3.3	(Continue) Moments of a Distribution Function Generating Functions, *Hand-out (Laplace Transform)*
Sunday 17th October 2021		Student Break
8 Oct.18-21	3.4 4.1-4.2	Some Moment Inequalities Introduction Multiple Random variables
9 Oct 24-28	4.3-4.4	Independent Random variables Functions of Several Random variables
10 Oct 31-Nov 4	4.4-4.5	(Continue) Functions of Several Random variables Covariance, Correlation, and Moments
11 Nov 7- 11	4.6-4.7	Conditional Expectation Order Statistics and Their Distributions
12 Nov 14-18	6.1-6.2	Introduction Modes of Convergence
13 Nov 21- 25	6.3-6.6	Weak Law of Large Numbers Strong Law of large Numbers Limiting Moment Generating Functions Central Limit Theorem
Midterm Break: 28th November 2021 – 2nd December 2021		
14 Dec 5- Dec 9	7.1-7.3	Introduction Random Sampling Sample Characteristics and Their Distributions
15 Dec 12- 16	7.4-7.5	Chi-Square, t-, and F-Distributions: Exact Sampling Distributions Large-Sample Theory
16 Dec 19		Review and catch up