

King Fahd University of Petroleum and Minerals
 Department of Mathematics and Statistics
 Dhahran, Saudi Arabia
STAT-301: Introduction to Probability Theory (Term 182)

Instructor: Nasir Abbas

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Office Hours: 12:05 pm – 01:25 pm UTR (Tentative)

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Course Description: Basic classical models of probability. Set functions. Axiomatic definition of probability. Conditional probability and Bayes' theorem. Random variables and their types. Distributions, moments, and moment generating functions. Special discrete and continuous distributions. Random vectors and their distributions. Marginal and conditional distributions. Independent random variables. Functions of random variables. Sums of independent random variables. Weak law of large numbers and the central limit theorem.

Textbook: A First Course in Probability by Sheldon Ross, 9th edition. Pearson Education, 2014.

Assessment*

Activity	Weight
Class Participation (home works, quizzes, attendance, etc.)	10%
First Major Exam <i>(Chapters 1-3, Week 5)</i>	18%
Second Major Exam <i>(Chapter 4-5, Week 10)</i>	21%
Third Major Exam <i>(Chapters 6-7, Week 14)</i>	21%
Final Exam <i>(Comprehensive, as per university schedule)</i>	30%

Grade Assignment

Score	87 – 100	80 – 86.9	75 – 79.9	70 – 74.9	65 – 69.9	60 – 64.9	55 – 59.9	50 – 54.9	0 – 49.9
Grade	A+	A	B+	B	C+	C	D+	D	F

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

Cheating and Plagiarism: This course is composed of individual assignments. It is important that your individual assignment be completed with your own efforts instead of copying it from your fellow student. KFUPM instructors follow “*zero tolerance*” approach with regard to cheating and plagiarism. During examinations (quizzes and major exams) cheating or any attempt of cheating by use of illegal activities, techniques and forms of fraud will result in a *grade of F* in the course along with reporting the incident to the higher university administration.

Important Notes:

- ✓ Only University issued excuses will be accepted.
- ✓ **Attendance** on time is *very* important.
- ✓ Use of **mobile** is *banned* during the class.
- ✓ **Homework** problems will be assigned later.

Weekly Schedule

Date	Section	Topics (Tentative)
Week 1 January 06 - 10	Chapter 1 Sections 1-5	Introduction, The Basic Principle of Counting, Permutations, Combinations, Multinomial Coefficients.
Week 2 January 13 - 17	Chapter 2 Sections 1-4	Introduction, Sample Space and Events, Axioms of Probability, Some Simple Propositions.
Week 3 January 20 - 24	Chapter 2 Sections 5-6	Sample Space, Having Equally Likely Outcomes, Probability as a Continuous Set Function.
Week 4 January 27 - 31	Chapter 3 Sections 1-3	Introduction, Conditional Probability, Bayes's Formula
Week 5 February 03-07	Chapter 3 Sections 4-5	Independent Events, Is $P(. F)$ a Probability?
Week 6 February 10 - 14	Chapter 4 Sections 1-4	Random Variables, Discrete Random Variables, Expected value, Expectation of a Function of a Random variable, Variance.
Week 7 February 17 - 21	Chapter 4 Sections 6-7	The Bernoulli and Binomial Random Variables, The Poisson Random variable.
Week 8 February 24 - 28	Chapter 4 Sections 8-10	Other Discrete Probability Distributions, Expected Value of Sums of Random Variables, properties of the Cumulative Distribution Function
Week 9 March 03 - 07	Chapter 5 Sections 1-5	Introduction, Expectation and Variance of Continuous Random Variables, The Uniform Random Variable, Normal random Variables, Exponential Random Variables.
Week 10 March 10 - 14	Chapter 5 Sections 6-7	Other Continuous Distributions, The Distribution of a Function of Random variables.
Week 11 March 17 - 21	Chapter 6 Sections 1-3	Joint Distribution Functions, Independent Random variables, Sums of Independent Random variables.
Week 12 March 24 - 28	Chapter 6 Sections 4-7	Conditional Distributions: Discrete Case, Conditional Distributions: Continuous Case, Order Statistics, Joint Probability Distribution of Functions of Random Variables.
Week 13 March 31 - April 04	Chapter 7 Sections 1-3	Introduction, Expectation of Sums of Random Variables, Moments of the Number of Events that Occur.
Week 14 April 07 - 11	Chapter 7 Sections 4-7	Covariance, Variance of Sums, and Correlations, Conditional Expectation, Conditional and Prediction, Moment Generating Functions
Week 15 April 14 - 18	Chapter 8 Sections 1-5	Introduction, Chebyshev's Inequality and WLLN, The Central Limit Theorem, The SLLN, Other Inequalities. (if time permits)