King Fahd University Of Petroleum & Minerals
Department of Mathematics and Statistics

STAT501: Probability and Mathematical Statistics I - Term 151

Instructor: Dr. Marwan Al-Momani
Office: Bldg. 5-319.
E-mail : almomani@kfupm.edu.sa
Phone : 7526
Office Hours: MTW: 12.00pm -12.50pm or by appointment

- **Course Description:**

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.

- **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.

- **Prerequisites**: Graduate standing
- **Textbook:** An Introduction to Probability and Statistics, Rohatgi, VK and Saleh, AK (2001) . Wiley.
- **Assessment**

Assessment for this course will be based on homework, two major exams and a comprehensive final exam, as in the following:

Activity	Weight
Homework	20%
Exam 1 : Monday , October 12, 2015	22.5%
Exam 2 : Wednesday, November 18, 2015	22.5%
Final Exam (Comprehensive): December 20, 2015	36%

- **Important Notes:**

  - There is no quota on the number of students who can get an A+ grade.
  - Attendance on time is very important. Mostly, attendance will be checked within the first five minutes of the class. Entering the class after that, is considered as late (2 lates= 1 Absence) and
  - More than 10 minutes late = Absence (regardless of any excuse).

- **Grades**

Letter grade	A+	A	B+	B	C+	C	D+	D	F	DN
Cut-off	TBD	84	TBD	70	TBD	60	TBD	50%	<50%	≥ 6 absences

- **General Notes:**
  - Students are required to carry **pens**, **note-taking equipment** and a **calculator** to **EVERY lecture and exams**. It is strongly recommended to keep a **binder** for class-notes.
  - Students are also expected to bring the book, take notes and organize their solved questions in a **binder** for easy retrieval to help them in study and review for class, exams, etc
  - It is to the student's advantage to keep a binder for storing class notes, homework, and other graded assignments. Students who are **organized** will find it **easier** to find important materials when **studying for exams**.
  - To successfully prepare for the exams, students MUST **solve problems** regularly and with discipline. The selected assigned problems are specifically designed to prepare you for major and final exams. Therefore, it is expected that you complete these problems **step-by-step** and with comprehension.
  - If you happen to stumble upon a solution manual somewhere, remember 2 important points.
    - Due to publishing costs and deadlines, these solutions are brief and may have mistakes.

- In your career as an actuary and your exams and quizzes in this class, you are expected to know every step to a problem and to know if a solution is incorrect. Thus, the best way to solve problem is without these brief solutions.

- ***Never round*** your intermediate results to problems when doing your calculations. This will cause you to lose calculation accuracy. Your answers may then be different from the exam keys even when you use the right procedure.
- For every exam, so you need to bring with you ***pens, pencils, a sharpener, an eraser,*** and any scientific ***calculator*** **with statistical functions.**

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

Syllabus (Tentative)

Week	Sections	Topics
1 August 23-27	1.1-1.3	Introduction Sample space Probability Axioms
2 August 30-Sept.3	1.3-1.4	(Continue) Probability Axioms Combinatorics: Probability of finite Sample Space
3 Sept.6 -10	1.5- 1.6 2.1-2.2	Conditional Probability and Bayes Theorem Independence of Events Introduction Random Variables
4 Sept.13-17	2.3—2.4	Probability Distributions of Random Variables Discrete and Continuous Random Variables
Sept.20 -28 Id Al-Adha Vacation		
5 Sept.29-Oct.1	2.5	Functions of Random Variables
6 Oct.4-8	2.5 3.1-3.2	(Continue) Functions of Random Variables Introduction Moments of a Distribution Function
7 Oct.11-15	3.2-3.3	(Continue) Moments of a Distribution Function Generating Functions, *Hand-out (Laplace Transform)*
8 Oct.18-22	3.4 4.1-4.2	Some Moment Inequalities Introduction Multiple Random variables
9 Oct.25-29	4.3-4.4	Independent Random variables Functions of Several Random variables
10 Nov.1-5	4.4-4.5	(Continue) Functions of Several Random variables Covariance, Correlation, and Moments
11 Nov.8-12	4.6-4.7	Conditional Expectation Order Statistics and Their Distributions
12 Nov.15-19	6.1-6.2	Introduction Modes of Convergence
13 Nov.22-26	6.3-6.6	Weak Law of Large Numbers Strong Law of large Numbers Limiting Moment Generating Functions Central Limit Theorem
14 Nov.29- Dec.3	7.1-7.3	Introduction Random Sampling Sample Characteristics and Their Distributions
15 Dec. 6- 10	7.4-7.5	Chi-Square, t-, and F-Distributions: Exact Sampling Distributions Large-Sample Theory
16 Dec. 13- 14		Review and catch up