KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
DEPARTMENT OF MATHEMATICS & STATISTICS
DHAHRAN, SAUDI ARABIA

STAT501: Probability and Mathematical Statistics I - Term 242   (3-0-3)

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. Law 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 and Package:
1. Rohatgi, VK and Saleh, AK (2015) *An Introduction to Probability and Statistics, Wiley* 3rd Edition.
2. *R* package or Wolfram alpha (MATHEMATICA)

Instructor: Dr. Mohammad H. Omar   **Office:** Bldg – 5, room – 508.   **Phone:** 2471
E-mail: omarmh@kfupm.edu.sa (Not by WebCT/Blackboard email)
Office Hours: UTR: 12.30pm -1.40pm or by appointment.

Assessment

Assessment for this course will be based on attendance, homework, Class project, 2 major exams and a comprehensive final exam, as in the following:

Activity	Weight
Class Participation (Attendance, homework, and quizzes)	10%
Exam 1 (Joint Random Variables – Chap 1-3) **Thursday (Feb 20 week 6), 2.00 pm (in class)**	20%
Exam 2 (Properties of Random Variables and Limiting Distributions) **Thursday (Apr 10 week 11), 2:00 pm (in class)**	20%
Project (Bivariate Distributions) **Tuesday (week 13), due in class**	15%
Final Exam (Comprehensive) **(will be updated by registrar website)**	35%

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.
- For every exam, so you need to bring with you *pens*, *pencils*, *a sharpener*, *an eraser*, and any scientific *calculator* **with statistical functions**.
- 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**.
- *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 SOA exam key even when you use the right procedure.
- **The Usage of Mobiles in Class:** Students are not allowed to use mobiles for any purpose during class time except for attendance. Students who want to use electronic devices to take notes must take permission from their instructor. Violations of these rules will result in a penalty decided by the instructor.
- A formula sheet (check OneNote) and statistical tables will be provided for you in every exam.

IMPORTANT NOTE on GRADES: There is no quota on the number of students who can get an A+ grade.

Attendance: Students are expected to attend all lectures.

✓ *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).
✓ If a student misses a class, he/she **is responsible** for any announcement made in that class.
✓ In accordance with University rules, after warned **twice** by the instructor, a DN grade will be awarded to any student who excessively

accumulates
- ✓ 9 unexcused absences in lectures. (20%)
- ✓ 15 excused and unexcused absences in lectures. (33.3%)

➢ Only official excuse from KFUPM student affairs office will be accepted. All other excuses (medical centers, governmental offices, etc) are not.

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.

Academic Integrity: All KFUPM policies regarding **ethics** and **academic honesty** apply to this course. KFUPM adheres to the policy of decency and respect and such students must adhere to the KFUPM dress code while on campus.

Syllabus (Tentative)

Week	Sections	Topics	Notes
1 Jan 12-16	Ch 1	**A Mathematical Introduction, Elementary Probabilistic Methods**	
2 Jan 19-23	Ch 2	**Elementary Probabilistic Methods (cont) Discrete Random Variables**	
3 Jan 26-30	Ch 2	**Properties of Discrete Random Variables Continuous Random Variables**	
4 Feb. 2-6	Ch 2	**Properties of Continuous Random Variables**	**Choose your Project topic: Sunday**
5 Feb. 9-13	Ch 3-5 (except 4.7, 5.4)	**Mathematical Aspect of Selected Discrete Probability Models Mathematical Aspect of Selected Continuous Random Variables Joint Discrete Random Variables Joint Continuous Random Variables**	
6 Feb. 16-20	Ch 5	**Joint Continuous Random Variables (cont)**	**(2 wks):** Midterm grade reports starts
		Thursday (Feb 20) – 1st Major Exam (chapters 1, 2, & 3)	
7 Feb. 24-27	Ch 7	**Fixed Sample, Random Sample, Discrete Sampling Distributions**	Saudi Founding Day (Feb 23)
8 March 2-6	Ch 6	**Continuous Sampling Distributions Limiting Distributions**	
9 March 9-13	Ch 4.7	**Limiting Distributions (cont) Discrete Order Statistics**	
10 March 16-20	Ch 4.7	**Continuous Order Statistics**	**March 23- April 3: Eid Al-Fitr Holidays**
11 April 6-10	Ch 5.4	**Bivariate Normal Distribution**	
		Thursday, Apr 10 – 2nd Major Exam (chapters 4, 5 & 6)	
12 April 13-17	Ch 7	**Normal Sampling Distributions for Inference**	
		Tuesday, Apr 22- (Bivariate Distribution Project due)	
13 Apr 20-24	Ch 6	**Large Sample Theory Simulation Continuous Bivariate Distributions**	**Thurs**: Project Report due to instructor
14 Apr 27-May 1	Ch 5.4 +Assig read	**Sampling Theories for Bivariate Normal Distribution**	
15 May 4 -8	Ch 5.4 + Assig read	**Continuous Multivariate Distributions Non-Central Probability Functions**	
16	Review	**Review**	
		Final Exam (Comprehensive): TBA by Registrar	