Instructor: Dr. Marwan Al-Momani  
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Phone: 7526  
Office Hours: UTR: 12.00pm -12.50pm or by appointment

Course Description:

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: STAT 501. Cannot be taken for credit with MATH 561 and MATH 563.


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

<table>
<thead>
<tr>
<th>Activity</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework and other class activities</td>
<td>22%</td>
</tr>
<tr>
<td>Exam 1</td>
<td>22%</td>
</tr>
<tr>
<td>Exam 2</td>
<td>20%</td>
</tr>
<tr>
<td>Final Exam (Comprehensive)</td>
<td>36%</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Letter grade</th>
<th>A+</th>
<th>A</th>
<th>B+</th>
<th>B</th>
<th>C+</th>
<th>C</th>
<th>D+</th>
<th>D</th>
<th>F</th>
<th>DN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cut-off</td>
<td>TBD</td>
<td>84</td>
<td>TBD</td>
<td>70</td>
<td>TBD</td>
<td>60</td>
<td>TBD</td>
<td>50%</td>
<td>&lt;50%</td>
<td>&gt; 6 absences</td>
</tr>
</tbody>
</table>

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 problems 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)

<table>
<thead>
<tr>
<th>Week</th>
<th>Sections</th>
<th>Topics</th>
</tr>
</thead>
</table>
| 1    | Jan 17-21 | 8.1-8.3 Introduction  
Problem of Point Estimation  
Sufficiency, Completeness, and Ancillarity |
| 2    | Jan 24-28 | 8.3 Sufficiency, Completeness, and Ancillarity (continue)  
Unbiased Estimation |
| 3    | Jan. 31 - Feb. 4 | 8.4-8.5 Unbiased Estimation Lower Bound For The Variance of An Estimator. |
| 4    | Feb. 7 - Feb. 11 | 8.5 Unbiased Estimation (Continued): Lower Bound For The Variance of An Estimator. |
| 5    | Feb. 14 - Feb. 18 | 8.6-8.7 Substitution Principle (Method Of Moments)  
Maximum Likelihood Estimators |
| 6    | Feb. 21 - Feb. 25 | 8.8 Bayes and Minimax Estimation |
| 7    | Feb. 28 - Mar. 3 | 9.1-9.2 Introduction  
Some Fundamental Notations of Hypotheses Testing |
| 8    | Mar. 6 - Mar. 10 | 9.3-9.4 Neyman-Pearson Lemma  
Families With Monotone Likelihood Ratio |
| 9    | Mar. 20 - Mar. 24 | 9.5-9.6 Unbiased And Invariant Tests  
Locally Most Powerful Tests |
| 10   | Mar. 27 - Mar. 31 | 10.1-10.2 Introduction  
Generalized Likelihood Ratio Tests |
| 11   | April 3-7 | 10.3-10.5 Chi-Square Tests  
t-Tests |
| 12   | April 10-14 | 10.5, 11.1 F-Tests  
Introduction |
| 13   | | 11.2 Some Fundamental Notations Of Convenience Intervals |
| 14   | | 11.3-11.4 Methods Of Finding Confidence Intervals  
Shortest-Length Confidence Intervals |
| 15   | | 11.5 Unbiased Confidence Intervals |

Mar. 13 - Mar. 17: Spring Vacation