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

AS450: Risk Modeling - **Lab Term 241 T 1-2.50pm**

Course Objectives:

Types of Risks faced by an organization; Risk Modelling, its evaluation and Analysis; Techniques used in quantifying financial and non-financial risks. Covers value at risk (VaR), extreme value theory (EVT), scenario and stress testing, risk aggregation techniques including use of correlation, integrated risk distributions and copulas. Approaches for managing risk.

Prerequisites: AS 201 and STAT 214

Textbook and Package:

1. Rashid (2021). ACTEX Study Manual for SOA ERM, Fall 2021. ACTEX. ISBN: 978-1-64756-454-4
2. Texas BAII Plus Calculator or Texas BAII Professional

Reference:

1. Sweeting, Paul (2019). Financial Enterprise Risk Management, 2nd Revised Edition, International Series on Actuarial Science. Cambridge University Press. ISBN13: 9781107184619
2. Jorion, Philippe (2006). Value at Risk: The New Benchmark for Managing Financial Risk (3rd Ed.), McGraw-Hill education. ISBN-13: 978-0071464956.
3. Society of Actuaries ERM Exam Notes
4. ERM exam syllabus on SOA site.

Instructor: Dr. Mohammad H. Omar **Office:** Bldg – 5, room – 508. **Phone:** 2471
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Office Hours: U: 9.00am-10:10am and R: 12.20pm–1.30pm or by appointment on MS Teams chat.

Assessment

Assessment for this course will be based on the following:

Activity	Weight	Marks
Attendance and Lab Participation	10%	2
Lab Assignments	30%	6
Lab Tests	60%	10
Total	100%	18

IMPORTANT NOTE:

- ✓ ***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).

General Notes:

- ***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.
- For every exam, so you need to bring with you ***pens***, ***pencils***, ***a sharpener***, ***an eraser***, and a ***SOA approved calculator***.

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

Student Learning Outcomes: See Society of Actuaries Exam ERM (Enterprise Risk Management – Fall 2021) LO.

Lab Syllabus (Tentative)

Week	*Dates*	*Topic*	*Sections*	*Topic*	*Notes*
1	Aug 27	2	10.3, 10.4, Lab C33-C37, 14.3.4	**Integrated risk distributions and Copulas (incl principal Component analysis)**	
2	Sep 3	2	See above	**Integrated risk distributions and Copulas**	
3	Sep 10	3	Ch 12, Lab C29-32, C43-45	**Extreme Value Theory** **Lab Assessment 1 (Topic 2 & 3)**	
4	Sep 17	4	14.2.2, 14.3, 14.9	**Techniques used in quantifying particular (financial and non-financial) risks** **Interest Rates Models** **Chain Ladder Method**	

5	Sep 24	5	15.4	**Computing VaR and TVaR**	(2 wks): Midterm grade reports starts
6	Oct 1	6	14.2	**Portfolio Risks: Analytical Methods**	
7	Oct 8	6	Ch 11 (except 11.7), ch 13, 9.5	**Forecasting Risks and Correlations (SVD, Smoothing with splines)** **Lab Assessment 2 (Topic 4 & 5)**	
8	Oct 15	7	Handout	**Risk Modelling, its evaluation and Analysis**	
9	Oct 22	8	Handout	**Discriminant analysis** **Lab Assessment 3 (Topic 5 & 6)**	
10	Oct 29	8	9.5, 10.4, ch 18	**Aggregation of Risk and Allocation of Capital**	
11	Nov 5	9	Lab C23-24	**Stress Testing and Scenario Analysis**	
Midterm Break: Nov 10 –14					
12	Nov 19	10	Ch 7, 14.10	**Measuring\Assessing Operational Risk**	
13	Nov 26	10	Ch 15	**Risk Measures** **Lab Assessment 4 (Topic 7 & 8)**	
14	Dec 3	10	Ch 16	**Risk Management Tools & Techniques**	
15	Dec 10		Review	**Risk Management Tools & Techniques (cont.), Review**	