Course Syllabus

1	**Course title**	Risk Theory
2	**Course number**	(0301371)
3	**Credit hours**	3
	Contact hours (theory, practical)	3
4	**Prerequisites/corequisites**	0301331
5	**Program title**	B.Sc.
6	**Program code**	
7	**Awarding institution**	The University of Jordan
8	**School**	Science
9	**Department**	Mathematics
10	**Course level**	Elective Specialization requirement
11	**Year of study and semester (s)**	2rd and 3rd year, 2nd semester
12	**Other department (s) involved in teaching the course**	None
13	**Main teaching language**	English
14	**Delivery method**	■Face to face learning ☐Blended ☐Fully online
15	**Online platforms(s)**	☐Moodle ☐Microsoft Teams ☐Skype ☐Zoom ☐Others…………
16	**Issuing/Revision Date**	1st of March 2023

17 Course Coordinator:

Office numbers, office hours, phone numbers, and email addresses should be listed.

Prof. Amal Helu

Office number 320

Email: a.helu@ju.edu.jo

18 Other instructors:

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19 Course Description:

Risk theory covers the following: survival, severity, frequency, and aggregate models, and uses of statistical methods to estimate the parameters of such models given sample data. It also explains the steps needed in the modelling process. The study of the assumptions needed for each family of models, recognize which assumptions are applicable in a given business application, and appropriately adjust the models for the impact of insurance coverage modifications.

20 Course aims and outcomes:

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A- Aims:

1. Severity Models.
2. Frequency Models.
3. Aggregate Models.
4. For severity, frequency, and aggregate models.

B- Intended Learning Outcomes (ILOs):

Upon successful completion of this course, students will be able to:

SOs / CLOs of the course	SO (1)	SO (2)	SO (3)	SO (4)	SO (5)	SO (6)	SO (7)	SO (8)
1.Know how to calculate basic distributional quantities: moments, percentiles, and generating functions. **2.**Describe how changes in parameters affect the distribution. **3.**Recognize classes of distributions and their relationships. **4.**Identify the applications in which each distribution is used and the reasons why. **5.**Apply the distribution to an application, given the parameters. **6.**Calculate various measures of tail weight and interpret the results to compare the tail weights	●				●			
1. Evaluate the impacts of coverage modifications such as: deductibles, limits, coinsurance. 2. Calculate Loss Elimination Ratios. 3. Evaluate compound models for aggregate claims. 4.Evaluate effects of inflation on losses.	●				●			
1. Identify the applications for which each distribution is used and the reasons why. 2. Compute aggregate claims distributions. 3. Compute relevant parameters and statistics for collective risk	●				●			
1.Apply the zero-truncated or zero-modified distribution to an application given the parameters. 2.Identify the applications for which each distribution is used and the reasons why.	●				●			

21. Topic Outline and Schedule:

Topic	Week	Instructor	Achieved ILOs	Evaluation Methods	Reference
1. Calculate the basic distributional quantities: a) moments b) Percentiles c) Generating functions **2. Describe how changes in parameters affect the distribution.** 3. **Recognize classes of distributions and their relationships.**	1-2		1	Exam	
Apply the following techniques for creating new families of distributions: a) Multiplication by a constant b) Raising to a power c) Exponentiation, d) Mixing.	3-4		1	Exam	6
1. Identify the applications in which each distribution is used and the reasons why. **2. Apply the distribution to an application, given the parameters.** **3. Calculate various measures of tail weight and interpret the results to compare the tail weights.** 4. **Identify and describe two extreme value distributions.**	5-7		5	Exam	8
Frequency Models For the Poisson, Mixed Poisson, Binomial, Negative Binomial, Geometric distribution and mixtures thereof: a) Describe how changes in parameters affect the distribution. b) Calculate moments. c) Identify the applications for which each distribution is used and the reasons why.	8-9		1	Exam	10
Inviting an expert from a bank or insurance company to speak to students about potential job opportunities within their field of study.	13				
Aggregate Models 1. Compute relevant parameters and statistics for collective risk models. 2. Evaluate compound models for aggregate claims. 3. Compute aggregate claims distributions.	13-14		5	Exam	12
For severity, frequency, and aggregate models 1. Evaluate the impacts of coverage modifications: Deductibles, Limits, Coinsurance. 2. Calculate Loss Elimination Ratios. 3. Evaluate the effects of inflation on losses.	15		5	Project	14

22 Evaluation Methods:

Opportunities to demonstrate achievement of the SLOs are provided through the following assessment methods and requirements:					
Evaluation Activity	**Mark**	**Topic(s)**	**SLOs**	**Period (Week)**	**Platform**

23 Course Requirements

(e.g: students should have a computer, internet connection, webcam, account on a specific software/platform…etc):

24 Course Policies:

1. All cell phones must be turned off during class at all times. Phones cannot be used during class (even as a calculator to check your answer). Earphones/buds may not be used during a quiz, test, or exam. Phone texting and chatting on the web are not allowed.

 2. The questions should be addressed to the instructor, not to your classmates while

The lecture is in progress. There is a zero-tolerance policy for disrespectful or disruptive behavior.

3. If you are late to class or need to leave early, enter and leave the room quietly.

4. Please come to class prepared to participate. Please be courteous to your class-

mates and keep extra noise to a minimum.

5. Appeal of grading should be submitted in writing within 5 days of receiving

the evaluation.

6. Students are responsible for all announcements and supplements are given within any

lecture.

7. Cheating and/or plagiarism will not be tolerated. Please see the University of Jordan student Handbook for the definition of cheating and plagiarism, and the severe consequence of such behaviors.

8. Neither food nor drink is allowed in the classroom with the exception of bottled water.

9. No guests are allowed in class.

25 References:

A- Required book(s), assigned reading and audio-visuals:

Textbook: Loss model from data to decisions by Klugman.

26 Additional information:

1- Do not miss class.
2- Print out and read lecture notes before each class.
3- Take notes directly on the printed notes.
4- Complete your homework as soon as possible after class, preferably on the same day.
5- Work in groups of two or more.
6- If you are experiencing major difficulty, see or make an appointment with me immediately.

Name of Course Coordinator: **Prof. Amal Helu**   Date: June, 14, 2023

Head of the curriculum committee: **Prof. Emad Abu Osba**

Head of Department: **Prof. Manal Ghanem**

Head of the curriculum committee/Faculty:

Dean:

Copy to:
Head of Department
Assistant Dean for
Quality Assurance
Course File