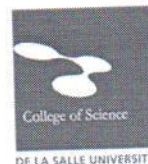




**DE LA SALLE UNIVERSITY**  
**College of Science**  
**Mathematics and Statistics Department**



**RISKTHE**– Risk Theory  
 Prerequisite: LIFECO1

Prerequisite to:MODEGEO

**Instructor:** \_\_\_\_\_  
**Consultation Hours:** \_\_\_\_\_

**Contact details:** \_\_\_\_\_  
**Class Schedule and Room:** \_\_\_\_\_

**Course Description**

A course that covers economics of insurance, individual and collective risk model, continuous time model and ruin theory.

**Learning Outcomes**

On completion of this course, the student is expected to present the following learning outcomes in line with the Expected Lasallian Graduate Attributes (ELGA) and the outcomes prescribed by the CHED Memorandum Order for the BS Mathematics program.

ELGA	Learning Outcome	Program Outcome													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
Critical and Creative Thinker Effective Communicator Lifelong Learner	At the end of the course, the student will														
	apply appropriate mathematical and statistical concepts and processes, tools and softwares in the solution to various conceptual and real-world problems involving risk models.	✓	✓	✓	✓	✓	✓				✓		✓	✓	✓

**Program Outcomes (BS Statistics)**

- A graduate of the program should be able to
1. Demonstrate broad and coherent knowledge and understanding of the core areas of statistical theory and statistical modeling .
  2. Apply critical and problem solving skills using the scientific method.
  3. Interpret scientific data and make judgments that include reflection on relevant scientific and ethical issues.
  4. Carry out basic mathematical and statistical computations and use appropriate technologies in (a) the analysis of data; and ( b) In pattern recognition, generalization, abstraction, critical analysis and problem solving.
  5. Communicate information, ideas problems and solutions, both, orally and in writing, to other scientists, decision makers and the public.
  6. Relate science and mathematics with other disciplines.
  7. Design and perform safe and responsible techniques and procedures in laboratory or field practices.
  8. Critically evaluate input from others.
  9. Appreciate the limitations and implications of science in everyday life.
  10. Commit to the integrity of data.
  11. Demonstrate broad and coherent knowledge and understanding in the core areas of statistics, computing and mathematics.
  12. Generate information involving the conceptualization of a strategy for generating timely and accurate/reliable data, organizing a process for putting together or compiling the needed data, and transforming available data into relevant and useful forms.
  13. Translate real-life problems into statistical problems.
  14. Identify appropriate statistical tests and methods and their proper use for the given problems, select optimal solutions to problems and make decision in the face of uncertainty.

**Final Course Output**

As evidence of attaining the above learning outcomes, the student is required to submit the following during the indicated dates of the term.

Learning Outcome	Required Output	Due Date
At the end of the course, the student will apply appropriate mathematical and statistical concepts and processes, tools and softwares in the solution to various conceptual and real-world problems involving risk models.	Compilation of solved problems (theoretical exercises) that will manifest the application of the concepts learned	Week 13

**Rubric for assessment**

**A. Problem Set**

CRITERIA	Excellent (4)	Good (3)	Satisfactory (2)	Needs Improvement (1)
Content	Demonstrates minimal understanding of concepts and skills with so many errors	Demonstrates some understanding of concepts and skills with minimal errors	Demonstrates understanding of concepts and skills with one or two errors	Demonstrates in-depth understanding of concepts and skills with no error
Organization	Presented concepts/skills which were poorly organized and lacked supporting evidence	Presented concepts/skills which were minimally organized with minimal supporting ideas	Presented concepts/skills which were logically organized with some supporting ideas	Presented concepts/skills which were logically organized with complete supporting ideas
Integration	Demonstrates no integration of the concepts presented	Demonstrates limited integration of the concepts presented	Demonstrates some integration of the concepts presented	Demonstrates integration of the concepts presented
Accuracy of Computations/ Solutions	Incorrect computations /solutions	Computations/ solutions have some errors.	Computations/solutions are correct but not explained well.	Computations/ solutions are correct and explained correctly
Overall Presentation and creativity	Overall presentation is neither creative nor artistic with no innovative ideas	Overall presentation shows limited effort in its creativity and artistic value with limited innovative ideas	Overall presentation shows some effort in its creativity and artistic value with some innovative ideas	Overall presentation is creative and artistic with innovative ideas

**Additional Requirements**

Quizzes, seatwork, homework, final examination.

**Grading System**

	FOR EXEMPTED STUDENTS (w/out Final Exam)	FOR STUDENTS with FINAL EXAM		Scale:	
		with no missed quizzes	with one missed quiz		
Average of quizzes	90%	60%	50%	95-100%	4.0
Seatworks, Boardwork, Assignment, Project	10%	10%	10%	89-94%	3.5
Final exam		30 %	40%	83-88%	3.0
				78-82%	2.5
				72-77%	2.0
				66-71%	1.5
				60-65%	1.0
				<60%	0.0

**Learning Plan**

LEARNING OUTCOME	TOPIC	WEEK NO.	LEARNING ACTIVITIES
	<b><u>THE ECONOMICS OF INSURANCE</u></b> Introduction Utility Theory Insurance and Utility Elements of Insurance Optimal Insurance	7.5 hours / Week 1-3	Library work Group discussion and presentations Problem Sets Computer Laboratory Activity
	QUIZ No1	1.5 hours/ Week 3	
	<b><u>INDIVIDUAL RISK MODELS FOR A SHORT TERM</u></b> Introduction Models for Individual Claim Random Variables Sums of Independent Random Variables Approximations for the Distribution of the Sum Applications to Insurance	7.5 hours / Week 4 - 6	Library work Group discussion and presentations Problem Sets Computer Laboratory Activity
	Quiz No 2	1.5 hours/ Week 7	
	<b><u>COLLECTIVE RISK MODELS FOR A SINGLE PERIOD</u></b> Introduction The Distribution of Aggregate Claims Selection of Basic Distributions The Distribution of N Approximations to the Distribution of Aggregate Claims	9 hours / Week 7-9	Library work Group discussion and presentations Problem Sets Computer Laboratory Activity reflection
	Quiz No 3	1.5 hours/Week 10	
	<b><u>COLLECTIVE RISK MODELS OVER AN EXTENDED PERIOD</u></b> Introduction A Discrete Time Model A Continuous Time Model Ruin Probabilities and the Claim Amount Distribution The First Surplus below the Initial Level The Maximal Aggregate Loss	7.5 hours / Week 10 – 12	Library work Group discussion and presentations Problem Sets Computer Laboratory Activity
	<b>Final Examination</b>	2.0 hours	

\*Problem sets are given weekly and the students are expected to work on the solutions for their fourth hour activity. At the end of the term, the solutions to the problems will be compiled and submitted as one of the course outputs.

**References**

- Bowers, N.L. et al (1997). *Actuarial Mathematics*. Itasca: Society of Actuaries  
 Jordan C. W. Jr., (2003), *Life Contingencies*. 50A  
 Kaas, Goovaerts, Ohaene and Denvit (2007) *Modern Actuarial Risk Theory*. (1<sup>st</sup> Edition). Springer  
 Pentikainein, T., Daykin, C.D. & Pesonen, M. (1994). *Practical Risk Theory for Actuaries*. (1<sup>st</sup> Edition).  
 London: Chapman & Hall

### Online Resources

UTILITY. Accessed October 29, 2012 from: <http://pespmc1.vub.ac.be/ASC/UTILITY.html>

Introduction to Insurance Economics in *Ehow*. Accessed October 29, 2012 from:

[http://www.ehow.com/about\\_6626073\\_introduction-insurance-economics.html](http://www.ehow.com/about_6626073_introduction-insurance-economics.html)

Ruin Probability – Ruin Theory in *World Finances*. Accessed October 29, 2012 from: <http://world-finances.com/theory-of-risk/ruin-probability-ruin-theory>

### Class Policies

1. The required minimum number of quizzes for a 3-unit course is 3, and 4 for 4-unit course. No part of the final exam may be considered as one quiz.
2. Cancellation of the lowest quiz is not allowed even if the number of quizzes exceeds the required minimum number of quizzes.
3. As a general policy, no special or make-up tests for missed exams other than the final examination will be given. However, a faculty member may give special exams for
  - A. approved absences (where the student concerned officially represented the University at some function or activity).
  - B. absences due to serious illness which require hospitalization, death in the family and other reasons which the faculty member deems meritorious.
4. If a student missed two (2) examinations, then he/she will be required to take a make up for the second missed examination.
5. If the student has no valid reason for missing an exam (for example, the student was not prepared to take the exam) then the student receives 0% for the missed quiz.
6. Students who get at least 89% in every quiz are exempted from taking the final examination. Their final grade will be based on the average of their quizzes and other prefinal course requirements. The final grade of exempted students who opt to take the final examination will be based on the prescribed computation of final grades inclusive of a final examination. Students who missed and/or took any special/make-up quiz will not be eligible for exemption.
7. Learning outputs are required and not optional to pass the course.
8. Mobile phones and other forms of communication devices should be on silent mode or turned off during class.
9. Students are expected to be attentive and exhibit the behavior of a mature and responsible individual during class. They are also expected to come to class on time and prepared.
10. Sleeping, bringing in food and drinks, and wearing a cap and sunglasses in class are not allowed.
11. Students who wish to go to the washroom must politely ask permission and, if given such, they should be back in class within 5 minutes. Only one student at a time may be allowed to leave the classroom for this purpose.
12. Students who are absent from the class for more than 5 meetings will get a final grade of 0.0 in the course.
13. Only students who are officially enrolled in the course are allowed to attend the class meetings.

Approved by:



**DR. JOSE TRISTAN F. REYES**

Chair, Mathematics and Statistics