DE LA SALLE UNIVERSITY
College of Science
Mathematics and Statistics Department

LIFECO2 – *Life Contingencies 2*
Prerequisite: LIFECO1

Prerequisite to:

Instructor:_____
Consultation Hours:_____

Contact details:_____
Class Schedule and Room:_____

Course Description

A three-unit course that covers multiple life functions, multiple decrement models, advanced multiple life theory and population 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													
	At the end of the course, the student will	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Critical and Creative Thinker Effective Communicator Lifelong Learner	apply appropriate mathematical and statistical concepts and processes, tools and softwares in modeling of actuarial science variables involving joint-life and last-survivor status and the construction of life tables involving multiple decrement functions.	✓	✓	✓	✓	✓	✓			✓		✓	✓	✓	✓

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 modeling of actuarial science variables involving joint-life and last-survivor status and the construction of life tables involving multiple decrement functions.	A collaborative activity on the construction of multiple life table functions based on the life table constructed in the prerequisite course LIFECO1 which includes comparison of the results obtained from other countries.	Week 13

Rubric for assessment

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

Group Member Assessment

Criteria	Excellent/4	Good/3	Satisfactory/2	Needs Improvement/1
Contribution	Group member completed an equal share of work and strived to maintain that equity throughout the project	Group member contributed significantly, but other members clearly contributed more	Group member contributed little toward the project	Group members contributions were insignificant or nonexistent
Dependability	Group member provided contributions with 100% punctuality and always	Group member contributions were mostly punctual and almost always	Group member contributions were regularly late and often missed	Group member was undependable forcing other members to take up the slack

	appeared for group work	appeared for group work	scheduled group work	
Efficiency	Work performed was very useful and contributed significantly to the final product	Participation was inefficient and thus contributions were less than expected	Work performed was inappropriate and mostly useless toward the final product	Work performed was completely ineffective and useless in the final product
Attitude	Group member was very positive and pleasant to work with	Group member didn't complain but offered little enthusiasm	Group member sometimes complained and was somewhat of a burden	Group member often complained and generally demoralized the group

Additional Requirements

At least 3 Quizzes (1.5 hours per quiz) , 1 Final Exam, Seatwork, Assignment, Recitation, Group Work

Grading System

	FOR EXEMPTED STUDENTS (w/out Final Exam)	FOR STUDENTS with FINAL EXAM	
		with no missed quiz	*with one missed quiz*
Average of quizzes	90%	60%	50%
Seatworks, Boardwork, Assignment,Project	10%	10%	10%
Final exam	-	30%	40%

Scale:

95-100%	4.0
89-94%	3.5
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
	MULTIPLE LIFE FUNCTIONS 1.1 Joint Distributions of Future Lifetimes 1.2 Joint-Life and Last Survivor Status 1.3 Insurance and Annuity Benefits Involving Multiple Life Functions 1.4 Laws of Mortality Involving Multiple Life Functions 1.5 Simple Contingent Functions	Week 1-3	Library work Group discussion and presentations Problem Sets Computer Laboratory Activity
	QUIZ NO. 1	Week 4	
	ADVANCED MULTIPLE LIFE THEORY 2.1 More General Statuses 2.2 Compound Statutes 2.3 Contingent Probabilities and Insurances 2.4 Compound Contingent Functions 2.5 Reversionary Annuities, Benefit	Week 4 -7	Library work Group discussion and presentations Problem Sets Computer Laboratory Activity

	Premiums and Reserves Involving Multiple Life Functions		
	Quiz No 2	Week 7	
	MULTIPLE DECREMENT MODELS 3.1 Two Random Variables Representing Two Decrements 3.2 Random Survivorship Group 3.3 Deterministic Survivorship Group 3.4 Associated Single Decrement Tables 3.5 Construction of a Multiple Decrement Table	Week 8-10	Library work Group discussion and presentations Problem Sets Computer Laboratory Activity
	Quiz No 3	Week 11	
	POPULATION THEORY 4.1 The Lexis Diagram 4.2 A Continuous Model 4.3 Stationary and Stable Populations 4.4 Actuarial Applications	Week 12	Library work Group discussion and presentations Problem Sets Computer Laboratory Activity
	Final Examination	2.0 hrs	

*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, Gerber, Hickman, Jones and Nesbitt., (1997). *Actuarial Mathematics, (2nd edition)*
Jordan C. W. Jr., (2003), *Life Contingencies*. 5OA

Online Resources

Ordinary Joint Life and Last Survivor Annuities –Two Lives - . Accessed October 29, 2012 from:
www.nyc.gov/html/olr/downloads/pdf/nyceira/joint_table.pdf
www.actuaries.org.uk/...life-table-and-multiple-decrement-table
www.math.uconn.edu/~valdez/math288s08/Math288-Weeks3to5.pdf

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

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