LIFECO1 – *Life Contingencies 1*
Prerequisite: STATHE1, THEOINT   *Prerequisite to: LIFECO2, RISKTHE*

Instructor:_____   **Contact details:** _____
Consultation Hours:_____   **Class Schedule and Room:**_____

Course Description

This is course for Actuarial Science students that covers the measurement of mortality, life annuities, life insurance, benefit premiums and benefit reserves for single life functions.

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)

ELGA	Learning Outcome
Critical and Creative Thinker Effective Communicator Lifelong Learner Service-Driven Citizen	By the end of the course, the student will apply appropriate mathematical and statistical concepts and processes, tools and mathematical and statistical softwares in the modeling of actuarial science variables and concepts in the construction of life tables involving single life functions.

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
By the end of the course, the student will apply appropriate mathematical and statistical concepts and processes, tools and mathematical and statistical softwares in the modeling of actuarial science variables and concepts in the construction of life tables involving single life functions.	Collaborative activity on the construction of additional life table functions on known life tables of several countries and the computation of certain life insurance products and life annuities issued at certain ages based on the life tables above. This includes an analysis and comparison of the results across different 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/	Computations/solutions are correct and	Computations/solutions are correct but not	Computations/solutions have some errors.	Incorrect computations

Solutions	explained correctly	explained well.		/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 appeared for group work	Group member contributions were mostly punctual and almost always appeared for group work	Group member contributions were regularly late and often missed scheduled group work	Group member was undependable forcing other members to take up the slack
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

Quizzes: 60%
Final Exam: 30%
Project: 10%
TOTAL: 100%
Passing Grade: 60%

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	Culminating Topics	Week No.	Learning Activities
By the end of the course, the student will apply appropriate mathematical and statistical concepts and processes, tools and mathematical and statistical softwares in	**I. SURVIVAL DISTRIBUTION AND LIFE TABLE** 1.1 Age-at-Death, Time-Until death and Curtate Future Lifetime random variables 1.2 Survival Function	Week 1-3 (9 hours)	Group discussions Library work Computer Laboratory Work Problem Sets

the modeling of actuarial science variables and concepts in the construction of life tables involving single life functions.	1.3 Force of Mortality 1.4 Life Table and Life Table functions 1.5 Deterministic survivorship group 1.6 Assumptions on fractional ages (Linear, Exponential, Harmonic) 1.7 Some Analytical Laws of Mortality (De Moivre, Gompertz, Makeham)		
	II. LIFE INSURANCE 2.1 The present value random variable Z 2.2 Insurances payable at the moment of death (Level benefit and varying benefit) 2.3 Insurances payable at the end of the year of death (Level benefit and varying benefit) 2.4 Relationship between insurances payable at the end of the year of death and at the moment of death	Week 4-6 (9 hours)	
	III. LIFE ANNUITY 3.1 The Present Value random variable Y 3.2 The current payment technique and the aggregate payment technique in finding the actuarial present value of a life annuity 3.3 Continuous life annuity 3.4 Discrete life annuities 3.5 Life annuities with mthly payments 3.6 Apportionable annuities	Week 6-9 (9 hours)	
	IV. BENEFIT PREMIUMS 4.1 The Equivalence Principle 4.2 Fully continuous premiums 4.3 Fully discrete premiums 4.4 True mthly payment premiums 4.5 Apportionable premiums	Week 9-11 (9 hours)	
	IV. BENEFIT RESERVES 5.1 Fully continuous benefit reserves 5.2 Fully discrete benefit reserves 5.3 Other benefit reserves(based on mthly benefit premiums, apportional premiums)	Week 10-11 (6 hours)	
	FINAL EXAMINATION	(3 hours)	

References

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

Online Resources

http://www.ssa.gov/OACT/NOTES/as120/LifeTables_Body.html
http://www.ssa.gov/OACT/STATS/table4C6.html
http://www.paho.org/english/dd/ais/be_v24n4_Life_tables.htm

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. ARTURO Y. PACIFICADOR, JR.
Chair, Department of Mathematics