Salisbury University Department of Mathematical Sciences

MATH 315 : Fundamentals of Actuarial Mathematics
Syllabus (Tentative)

Description: An introduction to fundamentals of actuarial mathematics and methods useful in modeling, including foundational principles of ratemaking and reserving for short-term insurance, as well as an introduction to contingent payment models and their application to long-term insurance and other financial risks. 4 Hours Credit: Meets four hours per week.

Prerequisites: C or better in MATH 215 , and either MATH 214 or MATH 216

Intended Audience: Math majors electing the actuarial science concentration, actuarial minors, and others interested in the application of probability theory to insurance and finance.

Objective: o study the fundamentals of actuarial mathematics and their applications in short-term and long-term risk managements.

Textbooks: *Loss Models: From Data to Decisions, Fifth Edition*, Klugman, Panjer, and Willmot; Wiley, 2019.

Actuarial Mathematics for Life Contingent Risks, by Dickson, Hardy, and Waters; Cambridge University Press, 2020.

Technology: Common statistical packages such as R, Excel, Python, will be used for all analyses.

Topic	Weeks
Introduction to Short-Term Insurance	1
An introduction to short-term insurance, including relevant definitions, modifications, and calculations.	
Severity, Frequency, and Aggregate Models	2
Understand the characteristics of and the uses for commonly used severity, frequency, and aggregate models.	
Pricing and Reserving for Short-Term Insurance Coverages	2
Learn and apply basic methods to calculate premiums and reserves for shor-term insurance coverages under different settings.	
Introduction to Credibility	1
Uncerstand the concepts of credibility and perform calculations using classical credibility.	
Long-Term Insurance Coverages and Retirement Financial Security Programs	1
Introduciton to the key features of long-term insurance coverages and retirement financial security programs.	
Mortality Models	2
Understand the key concepts concerning parametric and non-parametric mortality models for individual lives.	
Present Value Random Variables for Long-Term Insurance Coverages	3
Learn and perform calculations on the present value random variables associated with benefits and expenses for long-term insurance coverages.	
Introduction to Premium Calculation for Long-Term Insurance Coverage	1
An introduction to the premium and policy value calculation processes for long-term insurance coverages.	
Projects and Tests	1
Total	**14**

Evaluation

Homework and quizzes	10%-20%
Projects	15%-20%
Tests	30%-40%
Final project	25%-40%

- Clear descriptions of thought processes, evidence of critical thinking, and effective communication must be demonstrated in written work.
- **Writing Across the Curriculum:** Students will be expected to communicate mathematics and mathematical ideas effectively in speech and writing. At the University Writing Center, trained consultants are ready to help you at any stage of the writing process. In addition to the important writing instruction that occurs in the classroom and during professors' office hours, the Center offers another site for learning about writing. **All students are encouraged to make use of these important services.**
- **NOTE:** Once a student has received credit, including transfer credit, for a course, credit may not be received for any course with material that is equivalent to it or is a prerequisite for it.