MA4537: INTRODUCTION TO ACTUARIAL SCIENCE

Effective Term

Semester A 2024/25

Part I Course Overview

Course Title

Introduction to Actuarial Science

Subject Code

MA - Mathematics

Course Number

4537

Academic Unit

Mathematics (MA)

College/School

College of Science (SI)

Course Duration

One Semester

Credit Units

3

Level

B1, B2, B3, B4 - Bachelor's Degree

Medium of Instruction

English

Medium of Assessment

English

Prerequisites

MA2506 Probability and Statistics; or
MA2510 Probability and Statistics

Precursors

Nil

Equivalent Courses

Nil

Exclusive Courses

Nil

Part II Course Details

Abstract

The course introduces fundamental concepts in actuarial science. It helps students understand the interest theory, life contingencies and life insurance and equips them with the knowledge to solve related problems in actuarial science

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	calculate basic quantities involving survival distributions and life tables.	20	x		
2	analyze schemes of life insurance and annuities.	30		x	
3	compare and contrast mathematically various strategies of life insurance and annuities.	15		x	
4	explain clearly basic concepts of survival distributions and characteristics of life tables.	15	x		
5	create and formulate actuarial models in evaluating premiums for term and life insurance.	20			x

A1: Attitude
Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability
Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments
Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Learning and Teaching Activities (LTAs)

	LTAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Lectures	Learning through teaching is primarily based on lectures.	1, 2, 3, 4, 5	39 hours in total
2	Take-home assignments	Learning through take-home assignments helps students understand concepts of interest and insurance, and calculate insurance-related items.	1, 2, 3, 4, 5	after-class

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Quizzes/Test/Midterm	1, 2, 3	20	Questions are designed for the first part of the course to see how well the students have learned basic theory of interest, and survival distributions, as well as valuing securities.
2	Problem sets	1, 2, 3, 4, 5	10	The assignments provide students chances to demonstrate their achievements in actuarial science methods learned from this course.

Continuous Assessment (%)

30

Examination (%)

70

Examination Duration (Hours)

3

Additional Information for ATs

30% Coursework
70% Examination (Duration: 3 hours, at the end of the semester)
For a student to pass the course, at least 30% of the maximum mark for the examination must be obtained.

Assessment Rubrics (AR)

Assessment Task

1. Quizzes/Test/Midterm

Criterion

Essential

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

2. Problem sets

Criterion

Essential

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

3. Examination

Criterion

Main

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Part III Other Information

Keyword Syllabus

Life insurance, premium, interest rate, survival distributions, life tables, life annuities.

Reading List

Compulsory Readings

	Title
1	Fundamentals of Actuarial Mathematics, 3rd Edition, S. David Promislow, 2015, Wiley
2	Actuarial Mathematics, 2nd edition, Newton L. Bowers, Hans U. Gerber, James C. Hickman, Donald A. Jones, Cecil J. Nesbitt, 1997, Society of Actuaries

Additional Readings

	Title
1	Nil