MA3992: Actuarial mathematics: Life contingencies 1, pricing and reserving

Module Details	
Title Short:	Actuarial mathematics: Life contingencies 1, pricing and reserving APPROVED
Language of Instruction:	English

Module Code:	MA3992

ECTS Credits:	5

NFQ Level:	8	**EQF Level:**	6	**EHEA Level:**	First Cycle

Valid From:	2021-22 (01-09-21 – 31-08-22)
Teaching Period:	Semester 1
Module Delivered in	2 programme(s)
Module Owner:	NOELLE GANNON
Module Discipline:	MA_ST_AM - School of Mathematics, Statistics and Applied Mathematics
Module Data:	1 - 4 NON LAB
Module Description:	This module covers topics in Financial Mathematics (more specifically Actuarial Mathematics) that follow on from a more introductory module in this area. The material presented includes: defining and analysing insurance company contracts including describing and calculating their premiums and reserves. Projecting and analysing future expected cashflows for some insurance company products incorporating multi-decrement models as appropriate. Students also solve problems on this material using excel.

Learning Outcomes	
On successful completion of this module the learner will be able to:	
LO1	Define various assurance and annuity contracts.
LO2	Develop formulae for the means and variances of the payments under various assurance and annuity contracts, assuming constant deterministic interest rate.
LO3	Define the gross random future loss under an insurance contract, and state the principle of equivalence.
LO4	Describe and calculate gross premiums and reserves of assurance and annuity contracts.
LO5	Define and calculate, for a single policy or a portfolio of policies (as appropriate): death strain at risk; expected death strain; actual death strain; mortality profit for policies with death benefits payable immediately on death or at the end of the year of death; for policies paying annuity benefits at the start of the year or on survival to the end of the year; and for policies where single or non-single premiums are payable.
LO6	Project expected future cashflows for whole life, endowment and term assurances, annuities, unit-linked contracts, and conventional/unitised with-profits contracts, incorporating multiple decrement models as appropriate.
LO7	Show how, for unit-linked contracts, non-unit reserves can be established to eliminate (zeroise) future negative cashflows, using a profit test model.
LO8	Use Excel to solve practical problems.

Module Content & Assessment

Indicative Content

Actuarial mathematics: Life contingencies 1, pricing and reserving
Assurance and annuity contracts and their means & variance, gross premiums and reserves; gross random future loss, principle of equivalence; death strain at risk, expected death strain, actual death strain, mortality profit for policies; expected future cashflows for whole life, endowment and term assurances, annuities, unit-linked contracts, and conventional/unitised with-profits contracts, incorporating multiple decrement models; unit-linked contracts and establishing non-unit reserves to eliminate (zeroise) future negative cashflows, using a profit test model; problem solving using excel.

Written Assessment

Assessment Type	Assessment Description	Outcome addressed	% of total	Marks Out of	Pass Marks	Sitting	Assessment Period	Assessment Date	Duration	Mandatory
Paper 1 - Written	n/a	1,2,3,4,5,6,7	70	100	40	First Sitting	Semester 1	n/a	2:00	True
Assessment is marked as bondable but has no matching assessments										
Paper 1 - Written	n/a	1,2,3,4,5,6,7	70	100	40	Second Sitting	Autumn	n/a	2:00	True
Assessment is marked as bondable but has no matching assessments										

Continuous Assessment

Assessment Type	Assessment Description	Outcome addressed	% of total	Marks Out of	Pass Marks	Sitting	Assessment Period	Assessment Date	Duration	Mandatory
Continuous Assessment 1	n/a	1,2,3,4,5,6,7,8	30	100	40	First Sitting	Semester 1	n/a	0	True
Continuous Assessment 1	Continuous assessment mark brought forward from 1st sitting.	1,2,3,4,5,6,7,8	30	100	40	Second Sitting	Autumn	n/a	0	True

No Oral, Audio Visual or Practical Assessment

No Department-based Assessment

No Research

No Study Abroad

No Computer-based Assessment

The institute reserves the right to alter the nature and timings of assessment

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Module Workload

Workload: Full Time

Workload Type	WorkLoad Description	Learning Outcomes	Hours	Frequency	Average Weekly Learner Workload
Lecture	1 hour duration	1,2,3,4,5,6,7,8	24	Per Semester	2.00
Tutorial	1 hour duration	1,2,3,4,5,6,7,8	10	Per Semester	0.83
Independent Learning	No Description	1,2,3,4,5,6,7,8	86	Per Semester	7.17
				Total Hours	120.00
				Total Weekly Learner Workload	10.00
				Total Weekly Contact Hours	2.83

This module has no Part Time workload.

Module Resources

This module does not have any book resources

This module does not have any article/paper resources

This module does not have any other resources

Module Full Time Equivalent

Module Full Time Equivalent	
Discipline	*%*
School of Mathematics, Statistics and Applied Mathematics	100

Module Delivered in

Course Stream Code	*Course Stream Title*
BS9	BS9 B.Sc. Degree (Undenominated) (Approved)
FM2	FM2 Bachelor of Science (Financial Mathematics and Economics) Honours (Approved)

Module Instructors

Module Instructors	
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