1. **Title of the module**

MAST5010 (MA501) - Statistics for Insurance

1. **School or partner institution which will be responsible for management of the module**

School of Mathematics, Statistics and Actuarial Science

1. **The level of the module (Level 4, Level 5, Level 6 or Level 7)**

Level 5

1. **The number of credits and the ECTS value which the module represents**

15 credits (7.5 ECTS)

1. **Which term(s) the module is to be taught in (or other teaching pattern)**

Spring

1. **Prerequisite and co-requisite modules**

Either:

Pre-requisite: MAST5007 Mathematical Statistics

Co-requisite: MAST5001 Applied Statistical Modelling 1

Or:

Pre-requisite: MACT5290 Probability and Statistics for Actuarial Science 2 / MACT7290 Probability and Statistics for Actuarial Science

1. **The programmes of study to which the module contributes**

BSc Actuarial Science, BSc Financial Mathematics, BSc Mathematics and Statistics , BSc Mathematics and Accounting and Finance (including programmes with a Year in Industry), BSc Actuarial Science with a Foundation Year, Postgraduate Diploma in Actuarial Science,  MSc Actuarial Science (and with an Industrial Placement), MSc in Applied Actuarial Science (International Master’s) (and with an industrial placement).

1. **The intended subject specific learning outcomes.  
   On successfully completing the module students will be able to:**

8.1 explain basic concepts and models of Bayesian statistics and apply them to credibility theory;

8.2 construct risk models appropriate to short term insurance contracts and make the related statistical inference;

8.3 describe and apply the fundamental concepts of loss distributions;

8.4 describe and apply the basic methodology of generalised linear models;

8.5 explain basic concepts and models of extreme value theory and apply them in insurance.

1. **The intended generic learning outcomes.  
   On successfully completing the module students will be able to:**

9.1 demonstrate probabilistic and statistical skills in solving financial problems;

9.2 demonstrate enhanced conceptual skills and logical reasoning ability;

9.3 demonstrate a broad understanding of the range of application of statistics to financial processes;

9.4 demonstrate ability to use appropriate statistical software to model financial data sets.

1. **A synopsis of the curriculum**

This module covers aspects of Statistics which are particularly relevant to insurance. Some topics (such as risk theory and credibility theory) have been developed specifically for actuarial use. Other areas (such as Bayesian Statistics) have been developed in other contexts but now find applications in actuarial fields. Indicative topics covered by the module include Bayesian Statistics; Loss Distributions; Reinsurance and Ruin; Credibility Theory; Risk Models; Ruin Theory; Generalised Linear Models; Extreme Value Theory. This module will cover a number of syllabus items set out in Subjects CS1 and CS2 – Actuarial Statistics published by the Institute and Faculty of Actuaries.

1. **Reading list (Indicative list, current at time of publication. Reading lists will be published annually)**

Boland, P.J. Statistical and Probabilistic Methods in Actuarial Science, Chapman & Hall, 2007.

Study notes published by the Actuarial Education Company for Subjects CS1 and CS2.

1. **Learning and teaching methods**

Total contact hours: 48

Private study hours: 102

Total study hours: 150

1. **Assessment methods**
   1. Main assessment methods

Assessment 1 Exercises, requiring on average between 5 and 7 hours to complete 10%

Assessment 2 Exercises, requiring on average between 5 and 7 hours to complete 10%

Assessment 3 Computer assessment, requiring on average between 10 and 15 hours to complete 10%

Examination 3 hours 70%

Assessment 3 will assess the ability to fit a generalised linear model to a data set and interpret the output.

The coursework mark alone will not be sufficient to demonstrate the student’s level of achievement on the module.

13.2 Reassessment methods

Like-for-like

1. **Map of module learning outcomes (sections 8 & 9) to learning and teaching methods (section12) and methods of assessment (section 13)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Module learning outcome** | 8.1 | 8.2 | 8.3 | 8.4 | 8.5 | 9.1 | 9.2 | 9.3 | 9.4 |
| **Learning/ teaching method** |  |  |  |  |  |  |  |  |  |
| **Private Study** | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** |
| Lectures/example classes | **X** | **X** | **X** | **X** | **X** | **X** |  | **X** | **X** |
| **Assessment method** |  |  |  |  |  |  |  |  |  |
| Examination | **X** | **X** | **X** | **X** | **X** | **X** |  | **X** |  |
| Assessment 1 and 2 | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** |  |
| Assessment 3 | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** |

1. **Inclusive module design**

The School recognises and has embedded the expectations of current equality legislation, by ensuring that the module is as accessible as possible by design. Additional alternative arrangements for students with Inclusive Learning Plans (ILPs)/declared disabilities will be made on an individual basis, in consultation with the relevant policies and support services.

The inclusive practices in the guidance (see Annex B Appendix A) have been considered in order to support all students in the following areas:

a) Accessible resources and curriculum

b) Learning, teaching and assessment methods

1. **Campus(es) or centre(s) where module will be delivered**

Canterbury

1. **Internationalisation**

This module covers key principles, theories and concepts of finance that are used in a global environment. Mastery of the subject-specific learning outcomes (section 8) will equip students to apply these principles, theories and concepts in a wide range of international contexts. The module team is drawn from the School of Mathematics, Statistics and Actuarial Science, which includes many members of staff with international experience of teaching, research collaboration and of working within the financial sector.

Examples covering various international economic/financial frameworks are included in the module where appropriate.

**FACULTIES SUPPORT OFFICE USE ONLY**

**Revision record – all revisions must be recorded in the grid and full details of the change retained in the appropriate committee records.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Date approved | Major/minor revision | Start date of the delivery of revised version | Section revised | Impacts PLOs (Q6&7 cover sheet) |
| July 2023 | Minor | September 2023 | 13 |  |
|  |  |  |  |  |