1. **Title of the module**

MACT5250 (MA525) / MACT8250 (MA825) Survival Analysis

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)**

MACT5250 Level 6; MACT8250: Level 7

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)**

Autumn

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

Level 6:

Prerequisite: MACT5160 (Actuarial mathematics 1); MAST5007 Mathematical statistics

Level 7:

None

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

Level 6: BSc (Hons) Actuarial Science (including programme with a Year in Industry), BSc (Hons) Actuarial Science with a Foundation year

Level 7: PDip in Actuarial Science, International Masters in Applied Actuarial Science

1. **The intended subject specific learning outcomes.  
   On successfully completing the level 6 module students will be able to:**

8.1 describe, interpret and discuss key aspects of survival models;

8.2 demonstrate the capability to deploy established approaches accurately to analyse and solve problems using a reasonable level of skill in calculation and manipulation of survival models;

8.3 demonstrate an appreciation of recent developments in survival models and the links between the theory of survival models and their practical application in well-defined contexts.

**On successfully completing the level 7 module students will be able to:**

8.4 describe, interpret and discuss key aspects and concepts involved in survival models;

8.5 demonstrate the capability to deploy established approaches accurately to analyse and solve complex problems using a high level of skill in calculation and manipulation of survival models;

8.6 demonstrate an appreciation of recent developments in survival analysis and modelling and the links between the theory of these topics and their practical application in loosely defined contexts.

8.7 apply the principles of survival analysis to complex financial instruments.

1. **The intended generic learning outcomes.  
   On successfully completing the level 6 or 7 module students will be able to:**

9.1 develop a logical mathematical approach to solving complex problems including cases where information/data is not complete

9.2 demonstrate skills in written communication to both technical and non-technical audiences,

9.3 demonstrate skills in the use of relevant information technology,

9.4 demonstrate skills in time management, organisation and studying so that tasks can be planned and implemented at a professional level.

**On successfully completing the level 7 module students will, in addition to the above, be able to:**

* 1. demonstrate an increased level of higher order numeracy and communication skills.

1. **A synopsis of the curriculum**

The aim of this module is to provide a grounding in mathematical and statistical modelling techniques that are of particular relevance to survival analysis and their application to actuarial work.

Calculations in life assurance, pensions and health insurance require reliable estimates of transition intensities/survival rates. This module covers the estimation of these intensities and the graduation of these estimates so they can be used reliably by insurance companies and pension schemes. The syllabus also includes the study of various other survival models, and an introduction to machine learning. This module will cover a number of syllabus items set out in Subject CS2 – Actuarial Mathematics published by the Institute and Faculty of Actuaries.

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

Study notes published by the Actuarial Education Company for Subject CS2.

Modelling Mortality with Actuarial Applications, MacDonald, Richards, Currie (2018)

1. **Learning and teaching methods**

Total contact hours: 42

Private study hours: 108

Total study hours: 150

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

Level 6:

Assessment 1 - In-course test Multiple Choice 45 minutes 10%

Assessment 2 – Timed practical assessment (computer based) requiring on average between 20 and 30 hours to prepare 20%

Examination 2 hours 70%

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

Level 7:

Assessment 1 - In-course test Multiple Choice 45 minutes 10%

Assessment 2 – Timed practical assessment (computer based) requiring on average between 20 and 30 hours to prepare 20%

Assessment 3 - Practical assessment (computer based) requiring on average between 10 and 15 hours to complete 10%

Examination 2 hours 60%

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)**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Level 6 Module learning outcome** | 8.1 | 8.2 | 8.3 | 9.1 | 9.2 | 9.3 | 9.4 |
| **Learning/ teaching method** |  |  |  |  |  |  |  |
| Private Study | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| Lectures | **x** | **x** | **x** | **x** | **x** | **x** |  |
| **Assessment method** |  |  |  |  |  |  |  |
| Assessment 1 | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| Assessment 2 | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| Examination | **x** | **x** | **x** | **x** | **x** |  | **x** |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Level 7 Module learning outcome** | 8.4 | 8.5 | 8.6 | 8.7 | 9.1 | 9.2 | 9.3 | 9.4 | 9.5 |
| **Learning/ teaching method** |  |  |  |  |  |  |  |  |  |
| Private Study | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| Lectures | **x** | **x** | **x** |  | **x** | **x** | **x** |  |  |
| **Assessment method** |  |  |  |  |  |  |  |  |  |
| Assessment 1 | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |  |
| Assessment 2 | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |  |
| Assessment 3 | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** | **x** |
| Examination | **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**

Actuarial Science is an international subject with techniques developed and refined by actuaries, mathematicians and statisticians across the globe. Mastery of the subject-specific learning outcomes (section 8) will equip students to apply the techniques of this module 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 and research.

Examples with an international dimension are included in the module where appropriate.

The support SMSAS provides to its students is also internationally attuned given our international student body.

**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) |
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Revised FSO Jan 2019