1. **Title of the module**

MAST8820 (MA882) - Statistical Data Modelling

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 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**

None

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

MSc in Statistical Data Science, also with an Industrial Placement

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

8.1 demonstrate a systematic understanding of regression analysis and analysis of variance, and be able to apply these techniques critically to real world data using statistical packages;

8.2 interpret the results of analysis, and communicate these clearly and concisely to other statisticians and to non-statisticians;

8.3 demonstrate an appreciation of the limitations of standard regression and analysis of variance models for discrete data, and a clear understanding of how these models can be generalised so as to be more appropriate for discrete data.

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

9.1 apply a logical, mathematical approach to their work;

9.2 appropriately manipulate data for regression analysis;

9.3 demonstrate an appreciation of the need for techniques used to be appropriate to the type of data available.

1. **A synopsis of the curriculum**

**Linear model**. Least squares. General linear model; simple and multiple regression, polynomial regression. Model selection, residuals, outliers, diagnostics. Analysis of variance. Generalised linear model.

**Discrete data analysis**. Review of Binomial, Poisson, negative binomial and multinomial distributions. Properties, estimation, hypothesis tests.

**Contingency tables**. Tests for independence. Measures of association. Logistic models.

Multidimensional tables. Log–linear models; fitting and model selection.

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

Draper, N. R., and Smith, H. (1998). Applied Regression Analysis, 3rd ed. New York, Wiley.

McCullagh, P., and Nelder, J. A. (1989). Generalized Linear Models, 2nd ed. London, Chapman and Hall.

Everitt, B.S. (1992). The Analysis of Contingency Tables. London, Chapman and Hall.

1. **Learning and teaching methods**

Total contact hours: 36

Private study hours: 114

Total study hours: 150

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

Assessment 1 Exercises, requiring on average between 10 and 15 hours to complete 10%

Assessment 2 Exercises, requiring on average between 10 and 15 hours to complete 10%

Examination 2 hours 80%

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* | *9.1* | *9.2* | *9.3* |
| **Learning/ teaching method** | | | | | | |
| Private Study | **X** | **X** | **X** | **X** | **X** | **X** |
| Lectures & computing classes | **X** | **X** | **X** | **X** | **X** | **X** |
| **Assessment method** | | | | | | |
| Examination | **X** | **X** | **X** | **X** |  | **X** |
| Assessment 1 | **X** | **X** | **X** | **X** | **X** | **X** |
| Assessment 2 | **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 is based on mathematical principles. Mathematics and statistics are international languages with techniques developed and refined by mathematicians and statisticians across the globe. Mastery of the subject-specific learning outcomes, 8.1 to 8.3, will equip students to apply the theories and 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 collaboration.

In compiling the reading list, consideration has been given to the range of texts that are available internationally and a selection of texts has been identified to complement the delivery of the material.

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.

**DIVISIONAL USE ONLY**

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

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| --- | --- | --- | --- | --- |
| Date approved | Major/minor revision | Start date of delivery of revised version | Section revised | Impacts PLOs (Q6&7 cover sheet) |
| 11/04/2022 | Minor | September 2022 | 12 | No |
|  |  |  |  |  |