1. **Title of the module**

MAST5955 (MA5955) Predictive 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 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)**

Autumn

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

Pre-requisite: None

Co-requisite: None

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

\*Standard Programme Title\* with a Year in Data Analytics

1. **The intended subject specific learning outcomes.
On successfully completing the module students will be able to:**
2. demonstrate knowledge and critical understanding of the underlying concepts and principles of statistical modelling;
3. demonstrate the capability to use a range of established techniques and a reasonable level of skill and manipulation in the following areas: measures of relationship, ANOVA and ANCOVA, linear regression, logistic regression and time series analysis;
4. apply the concepts and principles of statistical modelling in well-defined contexts beyond those in which they were first studied, showing the ability to evaluate critically the appropriateness of different tools and techniques;
5. make appropriate use of R and IT tools to analyse data and report results.
6. **The intended generic learning outcomes.
On successfully completing the module students will be able to:**
7. make effective use of IT facilities for solving problems;
8. communicate straightforward arguments and conclusions reasonably accurately and clearly;
9. manage their own learning and development;
10. communicate technical and non-technical material competently.
11. demonstrate critical thinking skills.
12. **A synopsis of the curriculum**

This module will develop the ideas introduced in Introduction to Data Analytics by introducing new statistical models. These include the commonly used Analysis of Variance (ANOVA), Analysis of Covariance (ANCOVA), simple and multiple linear regression. These models are suitable for continuous responses and their practical use will be the main focus. The module will conclude by considering more complicated models for binary data (logistic regression) and data observed over time. All methods will be taught using a suitable computer package.

Syllabus: Introduction: What is a statistical model; what is prediction; ANOVA and ANCOVA; Linear regression (simple and multiple): parameter estimation, diagnostics, variable selection, model interpretation and prediction; Logistic regression: particularities, estimation, analysis of deviance, applications (e.g. text analysis); Prediction: prediction (interpolation and extrapolation) using linear regression and logistic regression; Introduction to time series analysis.

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

Dietz, D.M., Barr, C.D., and Cetinkaya-Rundel, M. (2015) *OpenIntro Statistics*, 3rd Edition. https://drive.google.com/file/d/0B-DHaDEbiOGkc1RycUtIcUtIelE/view.

Horton, N.J., Pruim, R and Kaplan, D.T. (2015) *A Student’s Guide to R*. https://cran.r-project.org/doc/contrib/Horton+Pruim+Kaplan\_MOSAIC-StudentGuide.pdf

Darlington, R.B., Hayes, A.F. (2016) *Regression Analysis and Linear Models: Concepts, Applications, and Implementation (Methodology in the Social Sciences)*. Guilford Press.

Faraway, J.J. (2004) *Linear Models with R*. Chapman and Hall/CRC

1. **Learning and teaching methods**

30 contact hours

120 hours of private study

Total number of study hours: 150

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

Report 1 – up to 10 pages (50%)

Report 2 – up to 10 pages (50%)

13.2 Reassessment methods

100% coursework

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 | 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** | **X** |
| Workshops | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** |
| **Assessment method** |  |  |  |  |  |  |  |  |  |
| Report 1 | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** |
| Report 2 | **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**

Data analysis is an international language with internationally recognised techniques developed and refined by statisticians and analysts across the globe. Mastery of the subject-specific learning outcomes, 8.1 to 8.4, 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/School of Social Policy, Sociology and Social Research, 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/SSPSSR 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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