1. KentVision Code and title of the module

MAST7200 Machine Learning with R

# Division and School/Department or partner institution responsible for the module

CEMS/SMSAS

# The level of the module

Level 7

# The number of credits and the ECTS value which the module represents

20 credits (10 ECTS)

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

Any term to allow for a January start

# Delivery of the module

* 1. **Mode of study**

In person

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

Canterbury

# Prerequisite and co-requisite modules and/or any module restrictions

Prerequisite: MAST7210 Foundations of Data Science (or equivalent for students on other courses)

# The course(s) of study to which the module contributes

* 1. **The module is compulsory for the following courses**

MSc in Data Science, MSc in Data Science with an Industrial Placement

* 1. **The module is optional for the following courses**

None

# A synopsis of the curriculum

This module will develop machine learning skills in R through techniques such as: principal component analysis, factor analysis, clustering, classification (e.g., CART and random forests), simulation and sampling, support vector machines. There will be a focus on teamwork and collaborative working, including version control using platforms such as GitHub. RMarkdown or similar software for producing reports will be used. Ethical implications will be discussed throughout.

# Contact Hours

Private Study: 170

Contact Hours: 30

Total: 200

# Learning and teaching methods

The module will be delivered through a mixture of lectures and computer sessions.

# The intended subject specific learning outcomes

On successfully completing the module students will be able to:

*1)* Demonstrate a comprehensive understanding of key machine learning techniques and apply them systematically.

*2)* Apply machine learning techniques such as principal component analysis, factor analysis, clustering, classification, simulation and sampling, and support vector machines systematically in R.

*3)* Demonstrate a comprehensive understanding of version control techniques using platforms such as GitHub and apply them systematically.

*4)* Use software such as RShiny and RMarkdown to communicate conceptual and practical understanding and results effectively.

# The intended generic learning outcomes

On successfully completing the module students will be able to:

*1)* Deal with complex issues and make sound judgments in selecting appropriate techniques.

*2)* Communicate conclusions and/or results clearly.

*3)* Exercise initiative and personal responsibility.

*4)* Work effectively in groups when handling a large data science project.

*5)* Carry out independent learning.

# Assessment Strategy

* 1. **Main assessment methods**

Individual RShiny app or equivalent webpage – 40%

Group RMarkdown project – 60%

* 1. **How the assessment methods outlined above fit with the course assessment strategy?**

The course prepares students to become practicing data scientists. This role places a strong emphasis on the application of advanced machine learning skills to large, sometimes messy, sets of data and the ability to communicate information effectively in modern forms such as webpages, apps or RMarkdown documents. The assessment methods used in this module will help the students to develop strong skills in machine learning (within the topics covered by this module), and data visualisation and reporting skills. The assessment methods complement those used in other modules, building on those in the Foundations of Data Science module.

* 1. **Reassessment methods**

100% coursework. An individual RMarkdown project that is similar to the group project above will be submitted.

# Mapping of Learning Outcomes

Map of module learning outcomes (sections 12 & 13) to learning and teaching methods (section 11) and methods of assessment (section 14).

* 1. **Module learning outcomes against learning and teaching methods**

| **Module learning outcome** | 12.1 | 12.2 | 12.3 | 12.4 | 13.1 | 13.2 | 13.3 | 13.4 | 13.5 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Private Study | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** |
| Lectures | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** |  |
| Computer sessions | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** |  |

* 1. **Module learning outcomes against assessment methods**

| **Module learning outcome** | 12.1 | 12.2 | 12.3 | 12.4 | 13.1 | 13.2 | 13.3 | 13.4 | 13.5 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| App/webpage | **X** | **X** |  | **X** | **X** | **X** | **X** |  | **X** |
| RMarkdown project | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** |

# Reading list

The University is committed to ensuring that core reading materials are in accessible electronic format in line with the Kent Inclusive Practices.

The most up to date reading list for each module can be found on the university's [reading list pages](https://kent.rl.talis.com/index.html).

# Inclusive module design

The Division 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

# University Division responsible for the course CEMS

**MODULE RECORD**

**All revisions for this module are recorded in the table below for student and staff information.**

| **Date approved** | **New/ Material/ Major/ Minor revision** | **Start date of delivery of this version** | **Applies to new cohorts and/ or existing students** | **Sections revised (if applicable)** |
| --- | --- | --- | --- | --- |
| 09/02/2024 | NEW | 2024/25 | New |  |
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