1. **Title of the module**

BUSN9040 (CB9040) Machine Learning and Forecasting

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

Kent Business School

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)**

Spring

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

None

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

Compulsory module for MSc Business Analytics, optional module for MSc Logistics and Supply Chain Management.

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

8.1 Demonstrate advanced knowledge of the types of data analysis problems that can be appropriately dealt with using machine learning and forecasting techniques.

8.2 Understand and critically discuss research issues within the area of machine learning and forecasting.

8.3 Successfully develop machine learning and forecasting models and apply them to real-world problems.

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

9.1 Work with complex issues systematically, critically, and creatively.

9.2 Demonstrate self-direction and originality in tackling and solving problems through research design, data collection, preparation, analysis, synthesis, and reporting.

9.3 Demonstrate effective use of different forms of communication techniques to present complex ideas and arguments.

1. **A synopsis of the curriculum**

In this module, students will learn about the fundamentals of machine learning and forecasting techniques and gain hands-on experience with analysing and solving a variety of problems encountered in business and management.

Three indicative areas of the module could include:

1. Machine learning: The introduction of modern machine learning techniques used in business data analysis, including both supervised learning (e.g. regression, classification, and artificial neural networks) and unsupervised learning (e.g. association rule discovery and cluster analysis).

2. Forecasting: Students will learn about various forecasting methods, including exponential smoothing methods and the Box-Jenkins method (i.e. the ARIMA model and variants).

3. Data analysis report writing. Students will systematically carry out a data analysis project and write a data analysis report.

The data analysis packages such as R, SPSS, and Weka may be used in this module.

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

Students will also be required to read articles from academic journals like *Machine Learning*, *Journal of Machine Learning Research, Journal of Forecasting*, *International Journal of Forecasting*.

* Box, G.E.P., Jenkins, G.M., Reinsel, G.C., Ljung, G.M. (2015) *Time Series Analysis: Forecasting and Control, 5th Ed*n. Hoboken: Wiley. (ISBN: 978-1118674918)
* James, G., Witten, D., Hastie, T., Tibshirani, R. (2013) *An Introduction to Statistical Learning with Applications in R*. New York: Springer. (ISBN 978-1461471370)
* Hyndman, R.J., Athanasopoulos, G. (2018) *Forecasting: Principles and Practice*. OTexts. (ISBN 978-0987507112)
* Witten, I.H., Eibe, F. (2011) *Data Mining: Practical Machine Learning Tools and Techniques,* *3rd Edition*. San Francisco: Morgan Kaufmann. (ISBN: 978-0123748560)
1. **Learning and teaching methods**

Total contact hours: 36

Private study hours: 114

Total study hours: 150

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

In-course Test (45 minutes): 20%

Individual Assignment (1500 words): 30%

Data Analysis Report (up to 2500 words): 50%

* 1. Reassessment methods

Reassessment Instrument: 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* | *9.1* | *9.2* | *9.3* |
| **Learning/ teaching method** |  |  |  |  |  |  |
| Lectures | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Seminars/Computer Terminals | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Private Study | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| **Assessment method** |  |  |  |  |  |  |
| In-course test | ✓ | ✓ | ✓ |  | ✓ | ✓ |
| Individual assignment | ✓ | ✓ | ✓ |  | ✓ | ✓ |
| Data analysis report | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

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**

The datasets and examples are international in nature and the module is applicable across countries.

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**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) |
| 27/01/2019 | Major  | January 2020 | 1, 8, 10, 11, 12, 13, 17 |  |
|  |  |  |  |  |

Revised FSO Oct 2018