

## MODULE DESCRIPTOR

### Module Title

Optimisation For Decision Support

Reference	CM4128	Version	1
Created	September 2021	SCQF Level	SCQF 10
Approved	August 2022	SCQF Points	15
Amended		ECTS Points	7.5

### Aims of Module

To provide students with necessary practical skills and underlying knowledge to critically appraise and develop decision-support systems. To enable students to compare and contrast suitable optimization techniques for decision-support and select the most appropriate method for a given business context.

### Learning Outcomes for Module

On completion of this module, students are expected to be able to:

- 1 Use a suitable framework to model business data and apply statistical analysis techniques.
- 2 Identify, describe and compare different types of decision-support systems, their properties and appropriate business contexts for their use.
- 3 Theoretically discuss and practically apply optimization techniques to develop solutions for small to large-scale problems.
- 4 Critically evaluate and visualize the output of optimization techniques and analyse this output in relation to relevant outcomes within a given business context.

### Indicative Module Content

Basic data modelling: identification and selection of features from business data, evaluation and selection of methodologies. Data analysis techniques: Monte Carlo analysis, statistical techniques, forecasting, nearest neighbour retrieval. Context of decision-support systems: typical use-cases and data, evaluating decision-support systems and their outcomes. Developing decision-support systems: types of decision-support system, development strategies, alternatives. Optimization techniques: local optimization, global optimization, gradient-based techniques, evolutionary algorithms. Commercial modelling platforms, including GAMS.

### Module Delivery

This module uses the following delivery modes: ? Guided study (lectures, tutorials and other learning materials delivered through VLE + bibliography) ? Practical lab exercises ? Personal study Key concepts are introduced and illustrated through lectures (physical and virtual). The understanding of students is tested and further enhanced through interactive lab tutorials.

### Indicative Student Workload

	Full Time	Part Time
Contact Hours	36	N/A
Non-Contact Hours	114	N/A
Placement/Work-Based Learning Experience [Notional] Hours	N/A	N/A
TOTAL	150	N/A
<i>Actual Placement hours for professional, statutory or regulatory body</i>		

### ASSESSMENT PLAN

*If a major/minor model is used and box is ticked, % weightings below are indicative only.*

#### Component 1

Type:	Coursework	Weighting:	100%	Outcomes Assessed:	1, 2, 3, 4
Description:	Individual portfolio assessment comprised of a theoretical use-case analysis and practical programming exercise				

### MODULE PERFORMANCE DESCRIPTOR

#### Explanatory Text

The module assessment pattern consists on one component so the grade in the component is the grade for the module as a whole.

Module Grade	Minimum Requirements to achieve Module Grade:
<b>A</b>	A in Component 1
<b>B</b>	B in Component 1
<b>C</b>	C in Component 1
<b>D</b>	D in Component 1
<b>E</b>	E in Component 1
<b>F</b>	F in Component 1
<b>NS</b>	Non-submission of work by published deadline or non-attendance for examination

### Module Requirements

Prerequisites for Module	None.
Corequisites for module	None.
Precluded Modules	None.

**INDICATIVE BIBLIOGRAPHY**

- 1 BURSTEIN, F., HOLSAPPLE, C. W., 2008. Handbook on Decision Support Systems. Springer
- 2 EMC EDUCATION SERVICES, 2015. Data Science and Big Data Analytics: Discovering, Analysing, Visualizing and Presenting Data
- 3 KOCHENDERFER, M. J., and WHEELER, T. A., 2019. Algorithms for optimization. MIT Press.
- 4 MOHAMMED, J.Z. and WAGNER, M., 2014. Data mining and analysis: fundamental concepts and algorithms. Cambridge: Cambridge University Press.
- 5 MORENO-JIMENEZ, J. M. et al., eds. 2020. Decision Support Systems X: Cognitive Decision Support Systems and Technologies: 6th International Conference on Decision Support System Technology.
- 6 SIEGEL, E. 2016. Predictive Analytics: The Power to Predict Who Will Click, Buy, Lie, or Die. John Wiley & Sons.