This Version is No Longer Current
The latest version of this module is available here

MODULE DESCRIPTOR

Module Title

Analytical and Problem Solving Skills

Reference	CM1704	Version	2
Created	June 2022	SCQF Level	SCQF 7
Approved	May 2019	SCQF Points	30
Amended	July 2022	ECTS Points	15

Aims of Module

To provide students with the understanding of the mathematical principles and techniques behind data science, artificial intelligence and machine learning. To develop relevant transferable analytical and problem solving skills.

Learning Outcomes for Module

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

1	Recognise and solve simple computational problems using appropriate mathematical techniques.
2	Apply basic statistical techniques and derive measures of probability for a given set of data.
3	Describe the steps involved in modelling systems and processes.
4	Apply analytical and modelling skills to a range of problems relevant to computing.
5	Demonstrate skills in problem solving and effective communication in a variety of settings, relevant to future study, research and in the workplace.

Indicative Module Content

Problem solving techniques and the modelling process. Categories of data. Categories of problem type: analytic, computational, geometric, and probabilistic. Coordinate geometry and function graphing. Distance metrics. Matrices and vectors. Functions: multivariate and iterating functions, computational complexity, logarithms, exponentials, trigonometric. Set theory. Sequences and series. Probability theory. Random number generation. Boolean algebra. Application of modelling techniques to real world examples. Use of computational tools and packages (e.g., R).

Module Delivery

The module is delivered in Blended Learning mode using structured online learning materials/activities and directed study, facilitated by regular online tutor support. Workplace Mentor support and work-based learning activities will allow students to contextualise this learning to their own workplace. Face-to-face engagement occurs through annual induction sessions, employer work-site visits, and modular on-campus workshops.

Module Ref:	CM1704 v2

Indicative Student Workload	Full Time	Part Time
Contact Hours	30	N/A
Non-Contact Hours	30	N/A
Placement/Work-Based Learning Experience [Notional] Hours	240	N/A
TOTAL	300	N/A
Actual Placement hours for professional, statutory or regulatory body	240	

ASSESSMENT PLAN

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

Component 1

Type:	Coursework	Weighting:	50%	Outcomes Assessed:	3, 4, 5
Description:	The coursework will consist of a written report describing a solution to a given problem.				

Component 2

Type:	Practical Exam	Weighting:	50%	Outcomes Assessed:	1, 2
Description:	This will consist of an online quiz.				

MODULE PERFORMANCE DESCRIPTOR

Explanatory Text

The module is assessed on a pass/unsuccessful basis. The Module Grade is based on performance in Component 1 (coursework) and Component 2 (practical exam) as detailed below.

Module Grade	Minimum Requirements to achieve Module Grade:
Pass	Pass in Component 1 and pass in Component 2.
Fail	Fail in Component 1 and/or fail in Component 2.
NS	Non-submission of work by published deadline or non-attendance for examination

Module Requirements

Prerequisites for Module	None, in addition to course entry requirements.
Corequisites for module	None.
Precluded Modules	None.

INDICATIVE BIBLIOGRAPHY

1	ROSEN, K.H., 2018. Discrete mathematics and its applications. New York, NY: McGraw-Hill Education.
2	EPP, S.S., 2011. Discrete mathematics: introduction to mathematical reasoning. Boston, MA: Brooks/Cole Cengage Learning.
3	WICKHAM, H. and GROLEMUND, G., 2017. R for data science: import, tidy, transform, visualize and model data. Sebastopol, CA: O'Reilly.
4	JAMES, G. et al., 2013. An introduction to statistical learning: with applications in R.New York, NY: Springer.