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MODULE DESCRIPTOR

Module Title

Problem Solving And Modelling

Reference	CM1102	Version	2
Created	April 2017	SCQF Level	SCQF 7
Approved	July 2016	SCQF Points	30
Amended	August 2017	ECTS Points	15

Aims of Module

To provide students with the understanding of problems which arise in computing situations and the practical skills for the efficient solution of these problems.

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 concept of a software lifecycle; compare and contrast activities within lifecycle phases.
4	Apply basic object-oriented systems analysis and design techniques to a given problem and to model its solution using a CASE tool.
5	Develop both the relevant skills for constructive use of systems analysis and design in a variety of settings, and a range of transferable skills to be of value in employment.

Indicative Module Content

Problem solving: Coordinate geometry. Graph drawing, straight lines and other functions. Parameterisation. Distance metrics. Transformations: matrices, vectors, matrix-vector multiplication, types of transformations. Functions: multivariate and iterating functions, computational complexity. Sets and relationships between sets. Sequences and series and their relationship to loops. Descriptive statistics: Measures of central tendency and dispersion, linear regression and correlation, rank correlation. Probability: Probability trees, enumeration and fault analysis. Boolean Algebra: Boolean variables and operators, Boolean identities. Applications to real word examples, e.g. financial mathematics. Application of Modelling Techniques: Diagrammatic modelling of modern software processes. Abstraction and modularisation. Simple requirements analysis, use case scenarios, UML diagrams. Different lifecycles (linear and spiral models) and associated software process activities (waterfall, RUP, agile and prototyping).

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Module Delivery

This module is delivered throughout the teaching session using a mixture of lectures, tutorials and computer laboratory sessions (where appropriate).

Indicative Student Workload	Full Time	Part Time
Contact Hours	72	N/A
Non-Contact Hours	228	N/A
Placement/Work-Based Learning Experience [Notional] Hours	N/A	N/A
TOTAL	300	N/A
Actual Placement hours for professional, statutory or regulatory body		

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, 5
Description:	Component 1 - This is a coursework worth 100% of the total module assessment.				

MODULE PERFORMANCE DESCRIPTOR

Explanatory Text

The calculation of the overall grade for this module is based on 100% weighting of C1. An overall minimum grade D is required to pass the module

Module Grade	Minimum Requirements to achieve Module Grade:
A	The student needs to achieve an A in C1.
B	The student needs to achieve a B in C1.
C	The student needs to achieve a C in C1.
D	The student needs to achieve a D in C1.
E	The student needs to achieve an E in C1.
F	The student needs to achieve an F in C1.
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.

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INDICATIVE BIBLIOGRAPHY

1	VINCE, J., 2020, Foundation mathematics for computer science: a visual approach
2	ROSEN, K., 2019. Discrete Mathematics and Its Applications (8th ed). McGraw-Hill.
3	Campbell, M., 2019, Learn RStudio IDE: Quick, Effective, and Productive Data Science
4	E. Wolfgang. 2017. Introduction to Artificial Intelligence. Springer.
5	Yannakakis, G. N., Togelius, J. 2018. Artificial Intelligence and Games. Springer.