Unit Outline (Higher Education)

Institute / School:	Institute of Innovation, Science & Sustainability
Unit Title:	GRAPHS, DIGRAPHS AND NETWORKS
Unit ID:	MATHS2012
Credit Points:	15.00
Prerequisite(s):	Nil
Co-requisite(s):	Nil
Exclusion(s):	Nil
ASCED:	010101

Description of the Unit:

The focus of this unit will be on studying the fundamentals of Graph Theory and on modelling real world problems using both directed and undirected graphs. Students will study the structure and properties of graphs, as well as the techniques to analyse a variety of applications.

Grade Scheme: Graded (HD, D, C, P, MF, F, XF)

Work Experience:

No work experience: Student is not undertaking work experience in industry.

Placement Component: No

Supplementary Assessment: Yes

Where supplementary assessment is available a student must have failed overall in the Unit but gained a final mark of 45 per cent or above, has completed all major assessment tasks (including all sub-components where a task has multiple parts) as specified in the Unit Description and is not eligible for any other form of supplementary assessment

Course Level:

Level of Unit in Course	AQF Level of Course					
	5	**6**	**7**	**8**	**9**	**10**
Introductory						
Intermediate			✔			
Advanced						

Learning Outcomes:

The focus of this unit will be on studying the fundamentals of Graph Theory and on modelling real world problems using graphs, both directed and undirected. In the situations that will be investigated, students will select those features that can be represented as graphs (directed graphs) or networks (weighted graphs and digraphs). After successfully completing this course, students should be able to:

Knowledge:

K1.   demonstrate an understanding of the fundamentals of Graph Theory

Skills:

S1.   investigate properties of graphs such as degree sequence, diameter, radius, and adjacency matrix

S2.   solve graph-theoretic problems

S3.   design simple graph algorithms

S4.   apply graph-theoretic models to a range of real world situations

Application of knowledge and skills:

A1.   recognise real world problems, which can be modelled as graphs, digraphs or networks

A2.   use appropriate technology to assist in the solution and investigation of real world problems

Unit Content:

Topics may include:

- Graphs, basic properties of graphs, subgraphs
- Eulerian and Hamiltonian graphs
- Directed graphs
- Matrix representations
- Tree structures, counting trees
- Greedy algorithms, path algorithms
- Paths and connectivity
- Menger`s theorem
- Planar graphs, Euler formula, planarity testing
- Applications

Learning Task and Assessment:

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1, S1-4, A1,A2	Individual and/or group exploration in solving problems presented as graphs	Projects / Assignments / Presentation	30 - 50%
K1, S1-4	Review and skills practice	Tests / Examinations	50 - 70%

Adopted Reference Style:

APA

Refer to the library website for more information

Fed Cite - referencing tool