Course Outline

Title: GRAPHS, DIGRAPHS AND NETWORKS

Code: MATHS2012

Faculty / Portfolio: Faculty of Science

Program Level:

	AQF Level of Program					
	5	6	7	8	9	10
Level						
Introductory						
Intermediate			✔			
Advanced						

Pre-requisites: (1 Undergraduate mathematical course)

Co-requisites: Nil

Exclusions: (MA662)

Progress Units: 15

ASCED Code: 010101

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

Values and Graduate Attributes:

Course Outline

MATHS2012 GRAPHS, DIGRAPHS AND NETWORKS

Values:

V1. appreciate the role of graph-based modelling in a technical society

Graduate Attributes:

Attribute	Brief Description	Focus
Continuous Learning	This course will encourage students to engage with areas within their discipline that would not normally be available to them, thus increasing their knowledge base in mathematics.	Medium
Self Reliance	Students will be required to complete some self directed tasks as part of the assessment in this course.	Low
Engaged Citizenship	Not applicable	Low
Social Responsibility	Not applicable	Low

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

Assessment:

Learning Outcomes Assessed	Assessment Task	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

Presentation of Academic Work:

https://federation.edu.au/students/assistance-support-and-services/academic-support/general-guide-for-the-presentation-of-academic-work