

Course Outline (Higher Education)

School:	School of Science, Engineering and Information Technology
Course Title:	SPACE, SHAPE & DESIGN (INTERMEDIATE LEVEL)
Course ID:	MATHS2009
Credit Points:	15.00
Prerequisite(s):	(One mathematics course or equivalent)
Co-requisite(s):	Nil
Exclusion(s):	(MA559 and MA659 and MATHS1009)
ASCED Code:	010101

Description of the Course :

This course is aimed at a broad audience with experience in the use of symbols and mathematical language, who are interested in studying the patterns and order evident in nature and the spatial design of art, architecture and industry. It will provide students with some experience of the thinking and techniques necessary to establish evidence of general patterns and calculations related to spatial measurement and design. This course will also include further experience of the formal use of mathematics to solve spatial problems. This course will be particularly valuable to prospective teachers of mathematics at both primary and secondary level and to other students interested in developing a broad understanding of 2-D and 3-D shapes.

Grade Scheme: Graded (HD, D, C, etc.)

Supplementary Assessment: Yes

Where supplementary assessment is available a student must have failed overall in the course but gained a final mark of 45 per cent or above and submitted all major assessment tasks..

Program Level:

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

Learning Outcomes:

Knowledge:

- K1.** construct various 2-D and 3-D shapes;
- K2.** demonstrate and discuss geometric properties associated with congruence, symmetry;
- K3.** investigate geometric properties of two and three dimensional shapes;

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- K4.** discuss Euclidean geometry and its applications;
- K5.** investigate and describe planar tessellations and topological ideas;
- K6.** construct simple mathematical proofs;
- K7.** use trigonometry to calculate angles and lengths of straight-sided figures;

Skills:

- S1.** explore man`s use of space, shape and design;
- S2.** illustrate the mathematical properties associated with aspects of space, shape and design;
- S3.** use and appreciate current technology to investigate and explore geometrical patterns and associated properties;
- S4.** solve real world problems though geometric modelling;
- S5.** use the proper language and symbols associated with the geometric concepts covered

Application of knowledge and skills:

- A1.** provide practical experiences with 2-D and 3-D construction;
- A2.** provide practical examples of the use of trigonometry in spatial problems;

Course Content:

Topics in this course may include an introduction to the concepts of Euclidean and elementary non-Euclidean geometry. Throughout the course, the ideas will be developed using practical applications and examples from nature, art, architecture and industry. Topics to be covered in this course will be taken from the following: 2-D and 3-D shapes, geometric properties, tessellations, scale, perspective, symmetry, topology, graph theory, fractals, kaleidoscopes, Golden Mean, and principles of trigonometry.

Values and Graduate Attributes:

Values:

- V1.** appreciate the role of geometry and modelling in a technical civilisation.
- V2.** appreciate the natural occurrence of shapes and patterns;
- V3.** appreciate the aesthetics of fractals;

Graduate Attributes:

Attribute	Brief Description	Focus
Continuous Learning	This course will provide a greater understanding and appreciation of geometrical properties encountered in the real world.	Low
Self Reliance	Self reliance will be demonstrated through the completion of homework tasks and assessment.	Low
Engaged Citizenship	Not applicable	
Social Responsibility	Some of the assessment in this course will utilise group work in which students will demonstrate personal commitment and responsibility in working with their peers.	Low

Learning Task and Assessment:

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Learning Outcomes Assessed	Learning Tasks	Assessment Type	Weighting
K1-K7; S1-S5; A1-A2	Participate in Class Activities	Portfolio of completed work	10 - 20%
K1-K7; S1-S5; A1-A2	Self Directed or Group Exploration	Projects	10 - 40%
K1-K7; S1-S5; A1-A2	Review and Skills Practice	Tests / Examination(s)	40 - 60%
K1-K7; S1-S5; A1-A2	Self Directed or Group Exploration	Presentations	0 - 20%

Adopted Reference Style:

APA