

Unit Outline (Higher Education)

Institute / School:	Institute of Innovation, Science & Sustainability
Unit Title:	SPACE, SHAPE AND DESIGN (INTERMEDIATE LEVEL)
Unit ID:	MATHS2009
Credit Points:	15.00
Prerequisite(s):	(Two mathematics course or equivalent)
Co-requisite(s):	Nil
Exclusion(s):	(MA559 and MA659 and MATHS1009)
ASCED:	010101

Description of the Unit:

This unit 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 unit will also include further experience of the formal use of mathematics to solve spatial problems. This unit 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, 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:

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;
- 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 through 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;

Unit Content:

Topics in this unit may include an introduction to the concepts of Euclidean and elementary non-Euclidean geometry. Throughout the unit, the ideas will be developed using practical applications and examples from nature, art, architecture and industry. Topics to be covered in this unit 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.

Learning Task and Assessment:

Learning Outcomes Assessed	Assessment 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

Refer to the [library website](#) for more information

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