



Unit Outline (Higher Education)

Institute / School:	Institute of Innovation, Science & Sustainability
Unit Title:	PUZZLES, PATTERNS AND PROOFS (ADVANCED LEVEL)
Unit ID:	MATHS3007
Credit Points:	15.00
Prerequisite(s):	(At least one intermediate level mathematics course)
Co-requisite(s):	Nil
Exclusion(s):	(MA655 and MATHS2005)
ASCED:	010101

Description of the Unit:

This unit is aimed at students who are interested in the role of both logic and imagination in mathematics. It would be particularly valuable to prospective teachers of mathematics at primary and secondary level and to students interested in improving their understanding of basic mathematical principles and techniques. In the latter case this unit can be used by students interested in pursuing more advanced mathematical units.

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	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Intermediate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Advanced	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Learning Outcomes:

Knowledge:

- K1.** use elementary ideas in number theory;
- K2.** explain and be able to carry out proofs by mathematical induction
- K3.** describe the proof of the four colour theorem
- K4.** apply basic concepts of graph theory
- K5.** explain arithmetic operations from a theoretical point of view

Skills:

- S1.** express concepts, relationships and structures in mathematical form, and draw conclusions about the situations studied by abstract argument
- S2.** use elementary ideas about sets and their properties in problem solving
- S3.** investigate topological ideas

Application of knowledge and skills:

- A1.** construct mathematical proofs using a variety of proof techniques
- A2.** express in mathematical terms and solve a range of counting problems
- A3.** research and impart mathematical knowledge to others

Unit Content:

This unit introduces a broad range of mathematical concepts of wide applicability. It contains material which will be of interest and relevant to computing students who seek a theoretical understanding of their subject, as well as to mathematics students. Much of the material is starting to appear in secondary mathematics curricula, and the rest provides valuable enrichment material for those students intending to teach mathematics.

Learning Task and Assessment:

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1-5, S1-3, A1, A2	Participate in class activities	Portfolio of completed work	0 - 20%
A3	Self directed or group exploration	Projects / Presentation	30 - 50%
K1-5, S1-3, A1, A2	Review and skills practice	Tests / Examination(s)	50 - 60%

Adopted Reference Style:

APA

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

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