CIT Institiúid Teicneolaíochta Chorcaí
Cork Institute of Technology

Title:	Mathematical Explorations APPROVED
Long Title:	Mathematical Explorations

Module Code:	MATH6028

Credits:	5

NFQ Level:	Fundamental

Field of Study:	Mathematics

Module Delivered in	**1 programme(s)**

Module Coordinator:	AINE NI SHE

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Module Description:	The objective of this module is to capture the beauty and power of mathematics through various explorations.

Learning Outcomes
On successful completion of this module the learner will be able to:

LO1	demonstrate skills in mathematical reasoning and presentation
LO2	describe the way in which mathematics is used in various areas of human endeavour
LO3	develop and understand mathematical arguments
LO4	identify the cultural role that mathematics has played throughout history
LO5	appreciate how mathematics can be used as a learning resource

Pre-requisite learning
Module Recommendations *This is prior learning (or a practical skill) that is strongly recommended before enrolment in this module. You may enrol in this module if you have not acquired the recommended learning but you will have considerable difficulty in passing (i.e. achieving the learning outcomes of) the module. While the prior learning is expressed as named CIT module(s) it also allows for learning (in another module or modules) which is equivalent to the learning specified in the named module(s).*
No recommendations listed
Incompatible Modules *These are modules which have learning outcomes that are too similar to the learning outcomes of this module. You may not earn additional credit for the same learning and therefore you may not enrol in this module if you have successfully completed any modules in the incompatible list.*
No incompatible modules listed
Co-requisite Modules
No Co-requisite modules listed
Requirements *This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed. You may not enrol on this module if you have not acquired the learning specified in this section.*
No requirements listed
Co-requisites
No Co Requisites listed

Module Content & Assessment

Indicative Content
The Logic of Discovery The familiar Suduko puzzle provides a nice introduction to problem solving using some basic logical reasoning. Other topics that reinforce the different steps necessary in the problem solving process include Tower of Hanoi, Magic Squares and Algebraic gems.
History and Culture The concept of conjecture and proof are fundamental to mathematics. This section develops these from a historical viewpoint with emphasis on elementary mathematics (e.g. primes and geometry).
Pleasures of Probability Illustrate how lots of everyday life occurrences can be analysed via probability. Examples include games, National lottery, betting/gambling.
Applications The power of mathematics is in its practical application to science, engineering and the world of business. This section uses a variety of examples to highlight this.

Assessment Breakdown	%
Course Work	100.00%

Course Work				
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Practical/Skills Evaluation	Computer Lab and In class Worksheets	1,2,3,4,5	50.0	Every Second Week
Other	Written final exam	1,2,3,4	50.0	Sem End

No End of Module Formal Examination

Reassessment Requirement
Repeat the module *The assessment of this module is inextricably linked to the delivery. The student must reattend the module in its entirety in order to be reassessed.*

The institute reserves the right to alter the nature and timings of assessment

Module Workload

Workload: Full Time

Workload Type	Workload Description	Hours	Frequency	Average Weekly Learner Workload
Lecture	Conventional Lecture	2.0	Every Week	2.00
Lab	Lab/Discussion	2.0	Every Week	2.00
Independent & Directed Learning (Non-contact)	Outside Class Workload	3.0	Every Week	3.00
			Total Hours	7.00
			Total Weekly Learner Workload	7.00
			Total Weekly Contact Hours	4.00

This module has no Part Time workload.

Module Resources

Recommended Book Resources

- **Anne Rooney 2009,** *The story of mathematics*, **Arcturis [ISBN: 9781841939407]**
- **Theoni Pappas 1989,** *The joy of mathematics*, **World Wide Publishers Tetra [ISBN: 0933174659]**
- **Tony Crilly,** *50 Mathematical Ideas You Really Need to Know* **[ISBN: 978-1-84724-147-4]**

Supplementary Book Resources

- **David Flannery 2006,** *The square root of 2*, **Praxis [ISBN: 978-0387-20220-4]**
- **Underwood Dudley 2008,** *Is mathematics inevitable?*, **Mathematical Association of America Washington, D.C. [ISBN: 9780883855669]**
- **George Polya 1990,** *How to solve it*, **Penguin [ISBN: 9780140124996]**
- **John Stillwell 1989,** *Mathematics and its history*, **Springer Verlag [ISBN: 3540969810]**
- **Devi Shakuntala,** *Figuring* **[ISBN: 0233965912]**

Recommended Article/Paper Resources

- **Martin Gardner** *A Quarter Century of Recreational Mathematics*, **Scientific American, August 1998, 68-75**
- **Michael Kleber** *The Best Card Trick Ever*, **The Mathematical Intelligencer, vol 24, no. 1 Winter 2002, 9-11**

Other Resources

- **Website:** *Wolfram's MathWorld*
  http://www.mathworld.com
- **Website:** *Maple Application Centre*
  http://www.maplesoft.com/applications/in dex.aspx
- **Website:** *Tower of Hanoi Applet*
  http://www.cut-the-knot.org/recurrence/h anoi.shtml
- **Website:** *Wikipedia Mathematics*
  http://en.wikipedia.org/wiki/Mathematics
- **Website:** *Koch's Curve Fractal*
  http://www.arcytech.org/java/fractals/ko ch.shtml
- **Website: Susan Holmes***Birthday Problem*
  http://www-stat.stanford.edu/~susan/surp rise/Birthday.html

Module Delivered in			
Programme Code	Programme	Semester	Delivery
CR_KCOMP_6	**Higher Certificate in Computing**	2	Elective