Liverpool John Moores University

Title:	EXPERIMENTAL NUMBER THEORY
Status:	Definitive
Code:	**6111MATHS** (127644)
Version Start Date:	01-08-2021
Owning School/Faculty:	Computer Science and Mathematics
Teaching School/Faculty:	Computer Science and Mathematics

Team	Leader
Amir Asghari	Y

Academic Level:	FHEQ6	**Credit Value:**	20	**Total Delivered Hours:**	57
Total Learning Hours:	200	**Private Study:**	143		

Delivery Options
Course typically offered: Semester 1

Component	Contact Hours
Lecture	22
Practical	33

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Portfolio	AS1	A collection of exploratory problems	60	
Exam	AS2	Examination	40	2

Aims

Experimental Number Theory aims to familiarise students with the concepts of number theory from a computational perspective. It seeks to introduce students to some topics in elementary number theory based on formulation of conjectures from experimental data.

Learning Outcomes

After completing the module the student should be able to:

1 Undertake the experimental underpinning of number theory: collecting and working with data, conjecturing, and formalizing statements.
2 Apply different types of proof in the context of number theory.
3 Implement some applications of number theory.

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

Exploratory problems	1	3
Examination	2	

Outline Syllabus

Integers, Divisors and the Division Algorithm, Greatest Common Divisor and the Euclidean Algorithm, Prime Numbers and Unique Factorization, Modular Arithmetic, Linear Congruences and the Chinese Remainder Theorem, Quadratic Reciprocity, Cryptography.

Learning Activities

Lectures, seminars, workshops, guided reading, online tasks, independent study.

Notes

Students will be expected to engage with the learning on this module in a sound combination of experimental and theoretical manner, starting from data to formulate conjectures, testing the conjectures and trying to prove the conjectures.