Experimental Number Theory

Module Information

2022.01, Approved

Summary Information

Module Code	6111MATHS
Formal Module Title	Experimental Number Theory
Owning School	Computer Science and Mathematics
Career	Undergraduate
Credits	20
Academic level	FHEQ Level 6
Grading Schema	40

Teaching Responsibility

LJMU Schools involved in Delivery
Computer Science and Mathematics

Learning Methods

Learning Method Type	Hours
Lecture	22
Practical	33

Module Offering(s)

Display Name	Location	Start Month	Duration Number Duration Unit
SEP-CTY	CTY	September	12 Weeks

Aims and Outcomes

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.

After completing the module the student should be able to:

Learning Outcomes

Code	Number	Description
MLO1	1	Undertake the experimental underpinning of number theory: collecting and working with data, conjecturing, and formalizing statements.
MLO2	2	Apply different types of proof in the context of number theory.
MLO3	3	Implement some applications of number theory.

Module Content

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.
Module Overview	The aim of this module is to familiarise you with the concepts of number theory from a computational perspective. It seeks to introduce you to some topics in elementary number theory based on formulation of conjectures from experimental data.
Additional Information	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.

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Portfolio	Exploratory problems	60	0	MLO1, MLO3
Centralised Exam	Examination	40	2	MLO2

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
Amir Asghari	Yes	N/A

Partner Module Team

Contact Name	Applies to all offerings	Offerings