

Math 4141, Number theory and applications,

Course outline - Fall 2023-2024

1. Course webpage:

Canvas (<https://canvas.ust.hk/courses/50925>)

2. Instructor:

Maosheng Xiong, mamsxiong@ust.hk, Rm. 3476

Office hours: Mon/Fri, 15:00—15:50am or make an appointment.

3. Teaching Assistant:

MA Junwei, (imaas@connect.ust.hk)

4. Meeting Time and Venue:

Lectures: Tue/Thur, 15:00—16:20, LSK1032

5. Course Description:

3 credit units. Prerequisite: Math 2131.

This course covers basic topics in elementary number theory: Prime numbers. Unique factorization. Congruence. Basic arithmetic functions. Primitive roots. Quadratic reciprocity. Finite fields. Diophantine approximation.

6. Intended Learning Outcomes

Upon successful completion of this course, students should be able to:

No.	ILOs
1	Recognize and use appropriately important terms and definitions in number theory.
2	Use number theory notation to reformulate other seemingly unrelated problems.
3	Apply number theory in familiar situations.
4	Solve real and hypothetical problems by identifying the underlying number theoretical problem.

7. Assessment Scheme

<u>Assessment</u>	<u>Assessing Course ILOs</u>
20% by homework assignment	1,2,3,4
25% by midterm exam	1,2,3,4
55% by final exam	1,2,3,4

8. Student Learning

Reference Textbook: Robert Freud, Edit Gyarmati, *Number theory*, Pure and Applied Undergraduate Texts 48, American Mathematical Society, 2020.

9. Teaching and Learning Activities -

- a. Lectures: focus on course materials, 3 hours per week

10. Course Schedule

- a. *Topics taught*: Prime numbers. Unique factorization. Congruence. Basic arithmetic functions. Primitive roots. Quadratic reciprocity. Prime number theorem. Diophantine equations. Diophantine approximation.
- b. Weeks or dates of teaching specific topics (optional)