科目ナンバリング	U-LAS10 10024 SE55						
授業科目名<英訳>	Quest for Mathematics II-E2 Quest for Mathematics II-E2			担当者所属職名・氏名	数理解析研究所 講師　　上田　福大		
群	自然科学科目群			分野(分類)	数学(基礎)	使用言語	英語
旧群	B群	単位数	2単位	週コマ数	1コマ	授業形態	ゼミナール（対面授業科目）
開講年度・開講期	2026・後期	曜時限	木4	配当学年	全回生	対象学生	全学向

[授業の概要・目的]

In this course, we will study certain topics in elementary number theory, including (but not limited to) divisibility, congruences, quadratic reciprocity, and quadratic forms. Some abstract algebra will be introduced in class as a tool of number theory.

[到達目標]

The class is meant to help students of all disciplines improve their knowledges in number theory and enhance their mathematical sophistication.

[授業計画と内容]

Below are the contents and schedules of the course. The lectures, as well as their orders, may be modified, depending on students' backgrounds and understanding of the course materials.

(1) Introduction (1 week)
-Some basics in set theory and logic, motivating examples and conjectures.
(2) Divisibility (3 weeks)
-The division algorithm, prime numbers;
-The fundamental theorem of arithmetic.
(3) Congruences (4 weeks)
-Congruence relations;
-Fermat's little theorem and Euler's generalization;
-The Chinese Remainder theorem, Hensel's lemma;
(4) Quadratic reciprocity (2 weeks)
-Legendre symbols, the reciprocity law;
-Gaussian integers, two squares theorem.
(5) Binary quadratic forms (4 weeks)
-The Jacobi symbols;
-Equivalence of binary quadratic forms.
(6) Feedback (1 week)

[履修要件]

特になし

[成績評価の方法・観点]

The evaluation consists of three weighted parts:
-Discussion performance in class (20%).
-Presentation (60%): Each student reviews a mathematical topic assigned by the instructor. Such a topic is typically a section from the textbook below.
-Report (20%): Your report covers the details of your presentation. Each student needs to email the report to the instructor no later than Friday of Week 15.

Quest for Mathematics II-E2(2)へ続く↓↓↓

Quest for Mathematics II-E2(2)

[教科書]

Andre Weil 『Number Theory for Beginners』（Springer, 1979）
Ivan Niven, Herbert Zuckerman, Hugh Montgomery 『An Introduction to the Theory of Numbers. 』（Wiley, 1991.）
There is no need to purchase the textbooks. Several pdf versions of the books are available online for free.

[授業外学修（予習・復習）等]

Along with preparation and review, students are encouraged to form study groups.

[その他（オフィスアワー等）]

[主要授業科目（学部・学科名）]