

Math 366

Elementary Number Theory II
Ömer Küçüksakallı - Spring 2013, METU

Course Webpage: <http://www.metu.edu.tr/~komer/366/>

Introduction: In this course, we will investigate mostly quadratic Diophantine equations which lead us to the study of quadratic fields. In mathematics, a Diophantine equation is an indeterminate polynomial equation that allows the variables to take integer values only. One of the most famous example is the Fermat's equation $x^n + y^n = z^n$. The following are traditional problems related with Diophantine equations, some of which remain unsolved for centuries.

- Are there any solutions?
- If so, finitely or infinitely?
- Can all solutions be found?

Textbook: *Introduction to Number Theory* by W. W. Adams and L. J. Goldstein.

Prerequisite: If you are planning to take this course, you should know

- *Arithmetic in Integers* (taught in 116, 367, 365): Divisibility, Greatest common divisor, Unique factorization, Congruences, etc...
- *Algebraic Structures* (taught in 116, 367): Groups, Rings, Modules, Fields, etc...

Tentative Course Outline:

1. *Diophantine Equations* (4 weeks)
2. *Gaussian Integers* (2 weeks)
3. *Arithmetic in Quadratic Fields* (3 weeks)
4. *Factorization Theory in Quadratic Fields* (3 weeks)
5. *Transcendental numbers* (2 weeks)

Grading: Your final letter grade will be determined by three exams and several quizzes. The quizzes will be given in lectures and **may not be announced** in advance.

- Midterm 1 (% 30 - March 21),
- Midterm 2 (% 30 - April 18),
- Final (% 40 - to be announced),
- Quizzes (% 10 - in lectures).

Course Policy:

- The worst quiz score will be dropped and there will be **no make-up for quizzes**.
- If you do not collect 10 points (out of 60) in the midterms, then you may not take the final exam and receive NA.
- Only one make-up examination will be offered. The excuse for not attending an examination must be proved with documents. The make-up examination will take place shortly after the final exam.