MTH 4/510: Topics in Number Theory, 3 credits
Winter 2021

Text: Lecture notes by instructor. Freely available: `http://web.pdx.edu/~veerman/0_mainfile.pdf`

Additional text: none.

Goal: familiarizing the student with the principal notions of the different branches of analytic number theory (the density of primes), and algebraic number theory (unique factorization in rings).

Course description: This course describes a few of the most important developments in number theory of the 20th century. A substantial part of the course will be dedicated to doing homework problems. Here are the topics.
1. (Approximately 1/2) Basic principles of algebraic number fields, rings, and ideals and ow they relate to unique factorization.
2. (Approximately 1/2) We study the prime number theorem (giving the density of primes) using Zagier's exposition of Donald Newman's method.

Remark: This course serves as a sequel to MTH 4/549. The lecture notes for that course can be consulted here: `http://web.pdx.edu/~veerman/0_mainfile.pdf`

Learning Objectives: To become familiar with basic theoretical aspects of the different branches of number and an understanding of how they fit together. To understand and be able to work with some of the most common applications. Ability to constructively think about and solve elementary problems in different areas of number theory. To have a basis of skills in these areas that helps the student to successfully engage in further research whether theoretical or applied.

Prerequisites: MTH 256, MTH 261, MTH 312.

Recommended prerequisites: MTH 343, MTH 4/549.