



Catalog Description:

Prime numbers, modular arithmetic, Diophantine equations, combinatorial analysis; introduction to concepts of abstract algebra.

Purpose:

To introduce students to some topics in number theory at the upper undergraduate level and make connections to other areas of mathematics, such as combinatorics and abstract algebra.

Prerequisite:

C- or better in 3345 or 4181H; or credit for 345 or 264H.

Exclusions:

Not open to students with credit for Math 5576H, 576H or 573.

Follow-up Courses:

4580-4581; or for students with an honors background, 5590H-5591H

Text:

An Introduction to the Theory of Numbers, 5th edition, by Niven, Zuckerman & Montgomery, published by TBS, ISBN: 9780471625469

Topics List:

1. Prime numbers and factorization
2. Congruences and modular arithmetic; the Euler phi-function $\phi(n)$.
3. Fermat's "Little" Theorem. Primitive roots.
4. Quadratic Reciprocity
5. Numerical Functions of number theory; multiplicative functions and Moebius inversion
6. Diophantine equations.
7. Number theory from an algebraic viewpoint; groups, rings and fields.
8. Possible additional topics: continued fractions, Pell's equation, and elliptic curves.