



**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*, 5<sup>th</sup> 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.