MATH 506 – 15500
Introduction to Number Theory

Spring 2003

Mon, Wed, Fri, CW144, 9:30–10:20

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Office Hours: WF 10:30–11:30, M 11:30–12:30, U 3:30-4:30, or by appt.

Text: *Elementary Number Theory,* Charles vanden Eynden, 2nd edition, McGraw-Hill.

Prerequisites: MATH 220 & 221 recommended but all that is required is a sound knowledge of College Algebra and some mathematical maturity.

Course Outline. Number theory is essentially the study of the natural numbers $1, 2, 3, ...$ and their properties. It is one of the oldest branches of mathematics but continues to be an active area of research. For example a major modern day application is cryptography (the National Security Agency is the largest employer of Number Theorists in the country). Its unsolved problems, often simple to state, have in many cases challenged the greatest mathematicians for centuries.

We should cover much of Vanden Eynden. In particular divisibility, primes, uniqueness of factorization, congruences, induction, Chinese Remainder Theorem, Cryptography, Pythagorean triples (eg $3^2 + 4^2 = 5^2$) and other Diophantine equations, Perfect Numbers (eg $6 = 1 + 2 + 3$ is the sum of its proper divisors), rational versus irrational, arithmetic functions, and rational approximation (eg π is close to 22/7, 355/113 is better; how do we obtain approximations like these?). We may ocassionally include material outside of the text.

Grading Scheme

Weekly assignments worth 200 points,
Three mid-terms worth 100 points each.
Tentative dates: Wed Feb 12, Wed March 12, Wed April 16.
Final Exam worth 150 points, Fri May 16, 11:50-1:40.