

# Bemidji State University

## MATH 4240: Number Theory

### A. COURSE DESCRIPTION

Credits: 3

Lecture Hours/Week: \*.\*

Lab Hours/Week: \*.\*

OJT Hours/Week: \*.\*

Prerequisites: None

Corequisites: None

MnTC Goals: None

Properties of integers, primes and their distribution, linear and quadratic congruences, number-theoretic functions, Diophantine equations, Fibonacci numbers, primitive roots and quadratic reciprocity.

Prerequisite: MATH 2210. (Might not be offered every year.)

**B. COURSE EFFECTIVE DATES:** 08/22/1997 - Present

### C. OUTLINE OF MAJOR CONTENT AREAS

1. Sums of powers, Pythagorean triples and Fermat's Last Theorem
2. Greatest common divisors, solving congruences and applications
3. Properties of prime numbers
4. Computing powers module  $m$  and applications to cryptography
5. Quadratic reciprocity
6. Pell's equations and Diophantine approximation

### D. LEARNING OUTCOMES (General)

1. Understand the fundamental concepts and methods of number theory.
2. Analyze problems, discern structure and pattern and make conjectures in number theoretic contexts.
3. Apply creative and analytic thinking to develop clear and valid number theoretic proofs.
4. Communicate mathematical ideas and understanding effectively.
5. Appreciate the beauty, structure and relationships that exist within the positive integers.

### E. Minnesota Transfer Curriculum Goal Area(s) and Competencies

None

### F. LEARNER OUTCOMES ASSESSMENT

As noted on course syllabus

### G. SPECIAL INFORMATION

None noted