

**Faculty of Science Course Syllabus
Department of Mathematics & Statistics
MATH 3070 – Theory of Numbers
Fall 2019**

Instructor(s): Karl Dilcher dilcher@mathstat.dal.ca Chase 325

Lectures: Tuesdays and Thursday, 13:05 – 14:25 LSC-C244

Office Hours: To be determined

Course Description (calendar entry):

The following topics are discussed: congruences and residues; elementary properties of congruences; linear congruences; theorems of Fermat, Euler and Wilson; Chinese remainder theorem; quadratic residues; law of quadratic reciprocity; Legendre, Jacobi and Kronecker symbols, arithmetic functions; algebraic fields; algebraic numbers and integers; uniqueness of factorization, definition and elementary properties of ideals; ideal classes and class number. (Note: The material starting with "properties of ideals" will not be covered).

Course Prerequisites

MATH 2040 or MATH 2135

Course Objectives/Learning Outcomes

The student will gain a solid understanding of classical elementary number theory, especially the theories of divisibility of integers, congruences, and solving quadratic congruences, with both classical and modern applications. This course also serves as a partial prerequisite for MATH 4070/5070: Algebraic Number Theory.

Course Materials

- Course Notes (required): "Elementary Number Theory" (will be available in the Dal Bookstore).
- Textbook (recommended): "Elementary Number Theory, 2nd Ed., by U. Dudley, Dover Publications, 2008, Paperback (will be available in the Dalhousie Bookstore).

Course Content

1. Introduction
2. The Factorization of Integers
3. Congruences
4. Quadratic Residues
5. Sums of Squares
6. Continued Fractions
7. Number Theoretic Function
8. Algebraic and Transcendental Numbers
9. Applications of Number Theory (if time allows)

Course Assessment

Component	Weight (% of final grade)	Date
<i>Midterm test</i>	30%	<i>To be announced</i>
<i>Final exam</i>	40%	<i>(Scheduled by Registrar)</i>
<i>Assignments</i>	30%	<i>weekly</i>

Conversion of numerical grades to Final Letter Grades follows the Dalhousie Common Grade Scale

A+ (90-100)	B+ (77-79)	C+ (65-69)	D	(50-54)
A (85-89)	B (73-76)	C (60-64)	F	(<50)
A- (80-84)	B- (70-72)	C- (55-59)		

Course Policies

Late assignments will normally not be accepted. However, reasonable accommodations will be made in the case of special circumstances. Detailed guidelines and instructions concerning assignments will be handed out with the first assignment.