

MATH 217 - Algebraic Structures with Applications

Fall Term 2006

Instructor: Kathleen Petersen
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Web Site: www.mast.queensu.ca/~math217

Time: Lectures: Monday 8:30, Tuesday 10:30, Thursday 9:30 (Slot 1)
Tutorial: Friday 14:30

Place: 225 Jeffery Hall

Office Hours: Tuesdays 14:30-16:00

Text: Class Notes

J.F. Humphreys & M.Y. Prest, *Numbers, Groups & Codes* 2nd Edition, Cambridge University Press 2004

Marking: Assignments: 20%
Midterm Exam: 25%
Final Exam: 55%

There will be *no make up exams*. If a student missed the midterm due to severe illness or personal tragedy, then the final exam will count towards 80% of the student's mark. The final exam will be comprehensive.

Prerequisite: APSC 174 (Introduction to Linear Algebra)

Assignments: There will be 12 assignments, due each Monday *in class*. (Exceptions: Assignment 4 will be due Tuesday October 10 *in class*. Assignment 12 will be due Friday December 1 *in tutorial*.) Late assignments will *not* be accepted. The assignments and solutions will be posted on the class web site; no paper copies will be handed out. The lowest two marks will be dropped.

Midterm Exam: The Midterm is tentatively scheduled for Monday October 30.

Course Outline

The purpose of this course is to provide an introduction to abstract algebraic systems, and to illustrate the concepts with applications to communication engineering. Topics covered are:

1. Symbolic logic: truth-functional operations, connectives, truth tables, tautologies and contradictions, logical implication and logical equivalence, valid arguments, methods of proof.
2. Set theory and mappings
3. Equivalence relations
4. The integers: mathematical induction, the division algorithm, greatest common divisors, primes and unique factorization theorems, congruence classes
5. Group theory: groups, subgroups, cyclic subgroups, cosets and Lagrange's theorem, quotient groups, homomorphisms and isomorphisms
6. Applications to error-control codes and cryptography