MATH 217 - Algebraic Structures with Applications

Fall Term 2008

Instructor:	Fady Alajaji – Jeffery Hall 402
	Phone: 533-2423
	Email: fady@mast.queensu.ca
	Web page: http://www.mast.queensu.ca/∼fady
Course Web Site:	http://www.mast.queensu.ca/∼math217
	All homeworks and announcements will be posted on this site
Time:	Lectures (Slot 3): Monday 10:30, Wednesday 9:30, Friday: 8:30
	Tutorial: Tuesday 1:30
Place:	Lectures: Jeffery Hall, Room 110
	Tutorial: Jeffery Hall, Room 102
Office Hours:	Friday 9:30 - 11:30, or by appointment
Text:	Class Notes
	J. F. Humphreys and M. Y. Prest, *Numbers, Groups and Codes*,
	Second Edition, Cambridge University Press, 2004
Grading:	Homeworks: 10%
	Midterm Exam: 30%
	Final Exam: 60%
Prerequisite:	APSC 174 (Introduction to Linear Algebra)
Note:	The Midterm Exam is tentatively scheduled for *Friday*
	October 31, 2008

Course Outline

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

1. Propositional logic, valid arguments, methods of proof; applications to switching and logic circuits.

2. Set theory and mappings.

3. Equivalence relations.

4. The integers: mathematical induction, the division algorithm, greatest common divisors, primes and unique factorization theorem, congruence classes.

5. Group theory: groups, subgroups, cyclic groups, cosets and Lagrange's theorem, quotient groups, homomorphisms and isomorphisms.

6. Applications to error-control codes: binary block codes for noisy communication channels, Hamming distance, nearest neighbor decoding, code error detection/correction capabilities, group (linear) codes, coset decoding, generator and parity check matrices, syndrome decoding.

7. Basic properties of rings and fields; Polynomials (time permitting).

Policy for Missing Exams: There will be no makeup exams. If a student misses the midterm due to severe illness or a personal tragedy, then the final exam will count towards 90% of the student's mark.

Students with Special Needs: Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability or health consideration that may require accommodations, please feel free to approach me and/or the Accessibility Services Office as soon as possible. The Accessibility Services staff are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations. The sooner you let them and me know your needs, the quicker we can assist you in achieving your learning goals in this course.