**Course Description:** We will study the following topics this term.

1. Rings, ideals
   1. Matrix rings
   2. Prime and maximal ideals
   3. Integral domains
   4. Finite fields
   5. Subfields and extensions
   6. Polynomials and factorization
   7. Field of fractions
   8. Algebraic and transcendental extensions
   9. Unsolvability
   10. Integers
   11. Weddeburn theorem
   12. Division rings
   13. Galois theory

2. Group theory
   1. Group actions
   2. Subgroup lattices
   3. Free groups
   4. Burnside problem
   5. Varieties of groups
   6. Direct and semidirect products
   7. Jonsson-Tarski extensions
   8. Finite abelian groups
   9. Nilpotent, solvable groups
   10. Schrier extension theorem
   11. Finite simple groups
   12. Matrix groups
   13. Reflection groups, Coxeter groups

3. Infinite abelian groups (Kaplansky)

4. Modules over a PID (Kaplansky)

5. Linear algebra

6. Coding theory

**Text:** *Abstract Algebra: an Introduction* by Hungerford, but any good text will do. We will also use Kaplansky’s *Infinite Abelian Groups.*

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*Date: January 10, 2012.*
Instructor: J. B. Nation, Keller Hall 406. Office hours Monday 1:00–3:00 and Thursday 9:00–11:00, and by appointment (956-4655).

Course Web Page: www.math.hawaii.edu/~jb

Grading: Homework counts 40%, quizzes 30%, and the final exam is 30%.

Homework: Homework assignments are due on Mondays, except when there is a holiday on Monday, and then the following Wednesday. You are allowed 2 late assignments; subsequent late assignments will be given half credit. No assignment will be accepted more than 1 week late. You may work together on homework, but avoid straight copying.

Academic Expectations: Cheating on quizzes or the exam will not be tolerated, and will result in failure of the course. We reserve the right to pursue further remedies in aggravated cases.

Learning mathematics requires both study and practice. The instructors cannot learn mathematics for you, we can only guide your efforts. The departmental statement of academic expectations on our web page (www.math.hawaii.edu) applies to all students.

Abstract algebra may be different from your previous mathematics courses. This is the real thing, and to be successful you must master new concepts and a new language. You must learn to think - and write - like a mathematician (for at least a semester). And since I can’t read minds, how well you write will be important.

Students must adequately complete all writing assignments to pass the course with a D grade or better. Students who do not complete all writing assignments will fail the course.