

ROWAN UNIVERSITY  
Department of Mathematics

Syllabus

**Math 01.340 - Modern Algebra I**

**CATALOG DESCRIPTION:**

Math 01.340 Modern Algebra I 3 s.h.

Prerequisites: Math 03.150 Discrete Mathematics, Math 01.210 Linear Algebra, and Phil 09.130 Introduction to Symbolic Logic with a C- or better in all three courses

This course includes: the introductory theory of groups, rings, integral domains, and fields. Also included are homomorphisms and isomorphisms, subgroups, kernels, rings and ideals, and polynomial rings. At the option of the instructor, computer use can be required.

**OBJECTIVES:**

This course is designed to begin the student's development in the area of abstract algebra and mathematical reasoning.

**1. Introduction**

- 1.1 Logic, sets, relations, functions
- 1.2 Equivalence relations, equivalence classes

**2. Groups**

- 2.1 Definition and examples
- 2.2 Basic group theorems
- 2.3 Cyclic groups
- 2.4 Subgroups, normal subgroups
- 2.5 Quotient groups
- 2.6 Homomorphisms, isomorphisms
- 2.7 Internal and External Direct Products

**3. Rings**

- 3.1 Definition and examples
- 3.2 Ring theorems
- 3.3 Homomorphisms
- 3.4 Ideals
- 3.5 Integral Domains, Division Rings, Fields
- 3.6 Polynomials

**4. Integral Domains**

4.1 Definition and examples

4.2 Ordered integral domains

4.3 Congruence and residue domains

**TEXTS:**

Rotman, J.J. A FIRST COURSE IN ABSTRACT ALGEBRA, Prentice Hall (7th ed)

Pinter, C.C. A BOOK OF ABSTRACT ALGEBRA, (2nd ed) MacCraw Hill, 1990.

Herstein, I.N. TOPICS IN ALGEBRA, 2nd. Ed., Xerox, Mass., 1975.

Herstein, I.N. and Kaplansky, I. MATTERS MATHEMATICAL, Harper and Row, NY, 1974.