ROWAN UNIVERSITY
Department of Mathematics

Syllabus

Math 01.524 - Abstract Algebra I

CATALOG DESCRIPTION:

Math 01.524 Abstract Algebra I 3 S.H.

Topics will include the construction of number systems, theory of groups, rings, integral domains and fields. Other than on recommendation of the advisor, this course should not be chosen if a corresponding similar course has been part of the student's undergraduate study.

OBJECTIVES:

Secondary school algebra is today marked by much greater attention to mathematical structure and proof. Instructional competence in algebra may thus be seriously handicapped by a lack of formal background in the content and concepts of modern algebra. It is the purpose of this course to provide opportunity to acquire this background. The course is, however, in general inappropriate for recent graduates.

CONTENT:

1. Introduction
1.1 Sets, relations, functions
1.2 Equivalence relations, partitions
1.3 Cardinal numbers
1.4 Integers

2. Groups
2.1 Definitions and examples
2.2 Basic group theorems
2.3 Cyclic groups
2.4 Subgroups, normal subgroups
2.5 Quotient groups
2.6 Homeomorphism, automorphism

3. Rings
3.1 Definitions and examples
3.2 Ring theorems
3.3 Homeomorphisms
3.4 Ideals
3.5 Euclidean rings
3.6 Polynomial rings

4. Integral Domains

4.1 Definitions and examples
4.2 Ordered integral domains
4.3 Congruence and residue classes
4.4 Homomorphism

5. Modules

5.1 Definitions and examples
5.2 Review of vector spaces
5.3 Dual spaces
5.4 Theorems regarding modules

6. Fields

6.1 Definition and examples
6.2 Extension fields
6.3 Polynomial fields
6.4 Rational numbers
6.5 Real numbers
6.6 Complex numbers
6.7 Finite fields
6.8 Splitting fields
6.9 Field isomorphisms
6.10 Galois theory

TEXTS:

Fraleigh, J.B., *A FIRST COUSE IN ABSTRACT ALGEBRA,*. Addison Wesley Longman, 1999.

Burton, David, *ABSTRACT ALGEBRA*, W.C. Brown Publishing Co., Dubuque, IA, 1990.

Herstein, I.N., *ABSTRACT ALGEBRA,* Second Ed., Macmillan, New York, 1990.
Pedersen, Franklin, *MODERN ALGEBRA*, W.C. Brown Publishing Company, Dubuque, IA, 1993.