

ROWAN UNIVERSITY
Department of Mathematics

Syllabus
Math 01.341 - Modern Algebra II

CATALOG DESCRIPTION:

Math 01.341 Modern Algebra II

3 s.h.

Prerequisite: Math 01.340 Modern Algebra I with a grade of C- or better

This course extends the study begun in Modern Algebra I to a more detailed investigation of abstract algebraic structures. Included are Sylow theorems, rings and ideals, polynomial rings, ring and field extension and Galois theory.

CONTENT:

1. Group Theory

- 1.1 Normal subgroup
- 1.2 Fundamental Theorem of Groups (Quotient Group)
- 1.3 Group isomorphism theorems
- 1.4 Cauchy's Theorem for abelian groups
- 1.5 Group automorphisms
- 1.6 Cayley's Theorem
- 1.7 Permutation groups
- 1.8 Sylow Theorems

2. Ring Theory

- 2.1 Ideal and prime ideals
- 2.2 Euclidean rings and principle ideal rings
- 2.3 Polynomials and zeros of a polynomial
- 2.4 Polynomial factorization theorem
- 2.5 Irreducibility criteria
- 2.6 Systemetric functions

3. Theory of Fields

- 3.1 Subfields and prime fields
- 3.2 Field adjunction
- 3.3 Simple field extensions
- 3.4 Linear dependence over a skew field
- 3.5 Linear equations over a skew field

- 3.6 Algebraic field extensions
- 3.7 Normal extension fields
- 3.8 Roots of unity
- 3.9 Finite commutative fields (Galois fields)
- 3.10 Separable and inseparable extensions
- 3.11 Perfect and imperfect fields

TEXTS:

*Joseph Gallian, CONTEMPORARY ABSTRACT ALGEBRA, Houghton Mifflin, 6th Edition

Rotman, J.J. A FIRST COURSE IN ABSTRACT ALGEBRA, Prentice Hall 2000 (2nd ed)

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

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