

INSTITUTE OF MATHEMATICS
College of Science
University of the Philippines Diliman

Math 110.1 Course Syllabus

A. Course Catalogue Description

Course Number	Math 110.1
Course Title	Abstract Algebra I
Course Description	Groups, group homomorphism; permutation groups; factor groups; rings, ring homomorphism, ideals, integral domains; introduction to fields, field of quotients
Prerequisite	Math 108/equiv. or COI
Course Credit	3 units
Number of Hours	3 hours/week

B. Course Content

- I. Course Introduction and Orientation
- II. Preliminaries
 1. Equivalence Relations
 2. Binary Operations
 3. Division Algorithm
 4. Modular Arithmetic
- III. Groups
 1. Definition and elementary properties of groups
 2. Group tables
 3. Order of a group and subgroups
 4. Lattice diagram of a group
 5. Isomorphism of groups
 6. Cyclic groups and subgroups
 7. The groups Z and Z_k
 8. Cosets and the Theorem of Lagrange
- IV. More Groups and Direct Products
 1. Permutation groups
 2. Orbits, cycles and transpositions
 3. Direct products
 4. Subgroups generated by a subset
 5. Finitely generated abelian group
- V. Homomorphisms and Factor Groups
 1. Definition and properties
 2. Kernel and image
 3. Normal subgroups
 4. Factor groups
- VI. Rings
 1. Definition and properties of rings
 2. Commutative rings
 3. Rings with unity
 4. Groups and units of a ring
 5. Subrings, ideals and factor rings
- VII. Ring Homomorphisms and Fields

1. Ring Homomorphism Theorems
2. Zero divisors
3. Characteristic of a ring
4. Integral domains
5. Fields
6. Field of Quotients

For a more detailed syllabus, send an email request to ddapr@math.upd.edu.ph.