

**MA 407-002
COURSE SYLLABUS**

**Department of Mathematics
North Carolina State University
Fall, 2017**

Instructor Information:

Dr. Kailash C. Misra
Office: SAS 3112
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Office Hour: W 3:00 - 4:00; Th,F 11:00-12:00
Class Time: MWF 1:55-2:45, Room: SAS 2102

Goal & Objective:

This is the first course in Abstract algebra. It is the first course where students learn to work with abstract mathematical objects defined by symbols and axioms. The course will start with basic properties of numbers, sets, functions and equivalence relations. Students will use a mathematical techniques called mathematical induction which is often used in mathematical proofs. Then students will be introduced to basic algebraic objects called groups and rings and study their properties. After completion of this course the students should be able to write short mathematical proofs and be able to understand longer proofs of abstract algebraic concepts in groups and rings.

Text Book: Contemporary Abstract algebra, (9th ed.), author: Joseph A. Gallian, publisher: Cengage Learning

Topics to be covered:

Preliminaries:

Properties of integers, mathematical induction, equivalence relations, modular arithmetic and functions.(6 lectures)

Group Theory:

Definitions and examples of groups and subgroups. (3 lectures)

Cyclic groups and permutation groups. (4 lectures)

Cosets and Lagrange's theorem. (3 lectures)

Group isomorphisms and their properties. (3 lectures)

Normal subgroups, factor groups and direct product groups. (4 lectures)

Group Homomorphisms and Fundamental theorem of finite abelian groups. (3 lectures)

Ring Theory:

Definitions and examples of rings, subrings. (3 lectures)

Ideals, factor rings, integral domains and fields. (3 lectures)

Ring homomorphisms and their properties. Polynomial rings and their properties. (4 lectures)

Test dates and Grading Policy:

There will be three in-class mid-semester tests (Test 1: Sept.15, Friday; Test 2: Oct. 18, Wednesday; Test 3: Nov. 17, Friday) and a cumulative Final examination on Dec. 13, Wednesday (1:00-4:00pm). Homework will be assigned after each lecture. It is extremely important that you do the homework problems in a timely manner. There will be periodic pop-quizzes based on homework. We will go over some homework problems as time permits. The in-class tests will count 60%, quizzes will count 10% and Final exam will count 30%. Plus/minus grades will be used.

Make-up may be given for in-class mid-semester tests for very good documented reasons with prior permission of the instructor. There will be no make up for missing pop-quiz under any circumstances. It is very important that you attend each class and take the tests on scheduled dates. Attendance will be used in boarder line cases.

Other Remarks: Credit is not allowed for both MA 403 and MA 407.

Prerequisite: MA 225

Drop/Revision deadline:: Friday, Oct. 13, 2017.

Attendance: Class attendance is strongly encouraged. However, the University attendance policy will be followed. See:
http://www.ncsu.edu/policies/academic_affairs/courses_undergrad/REG02.20.3.php

Academic Integrity: Students are expected to abide by the University policy on Academic Integrity found at:
http://www.ncsu.edu/policies/student_services/student_discipline/POL11.35.1.php