MAT 106 Introduction to Algebra

Summer 2024

Course Credits: 4
Contact Hours: 56 hours
Instructor: TBA
Email:TBA

COURSE OBJECTIVES

This course provides an introduction to abstract algebra, focusing on group theory and ring theory. Students will learn the fundamental concepts of algebra, including groups, subgroups, group homomorphisms, rings, ideals, and ring homomorphisms. The course will also cover topics such as factorization, polynomial rings, and field extensions. Emphasis will be placed on the development of rigorous mathematical reasoning and proof techniques.

Upon Completion of this Course, students will be able to:

1. Understand how to construct mathematical proofs and communicate mathematical ideas effectively
2. Learn how to apply abstract algebraic methods to solve problems
3. Understand the basic concepts and tools of algebra
4. Recognize technical terms and appreciate some of the uses of algebra
5. Develop critical thinking skills and the ability to analyze and synthesize mathematical concepts

PREREQUISITES

N/A

GRADING

Grades will be determined by accumulating points, with 100 points being the maximum, as follows:

ITEM	POINTS

Homework	20 Points
Midterm 1	15 Points
Midterm 2	15 Points
Problem Sets	20 Points
Final Exam	30 Points
Total	100 Points

Late submissions will be graded at the end of the course. Grades will be assigned according to the following rule:

$A \geq 90 > B \geq 80 > C \geq 70 > D \geq 60 > F$.

We reserve the right to make adjustments to the overall grading policy.

COURSE MATERIALS

Required Texts:

Dummit, David S., and Richard M. Foote, ***Abstract Algebra***, 3rd Edition, John Wiley & Sonsl, 2003.

Recommended (Optional) Texts or Other Materials:

None

COURSE TOPICS

MODULE	TASKS
Module 1	**Topics:** Topic 1: Introduction to Groups Topic 2: Subgroups Topic 3: Quotient Groups and Homomorphisms Topic 4: Group Actions **Assessments:** Homework#1
Module 2	**Topics:** Topic 5: Direct and Semidirect Products and Abelian Groups Topic 6: Further Topics in Group Theory Topic 7: Introduction to Rings Topic 8: Euclidean Domains, Principal Ideal Domains and Unique Factorization Domains **Assessments:**

	Homework#2 Problem Set#1
Module 3	**Topics:** Topic 9: Polynomial Rings Topic 10: Introduction to Module Theor Topic 11: Vector Spaces Topic 12: Modules over Principal Ideal Domains **Assessments:** Midterm#1 Problem Set#2
Module 4	**Topics:** Topic 13: Field Theor Topic 14: Galois Theory Topic 15: Commutative Rings and Algebraic Geometr Topic 16: Artinian Rings, Discrete Valuation Rings, and Dedekind Domains **Assessments:** Midterm#2
Module 5	**Topics:** Topic 17: Introduction to Homological Algebra and Group Cohomology Topic 18: Representation Theory and Character Theory Topic 19: Examples and Applications of Character Theory Topic 20: Theorems of Burnside and Hall **Assessments:** Final Exam

ATTENDANCE

1) Class attendance is required. Missing classes without permission will lead to decrease in overall grade.

Missing less than two classes: no penalty.

Missing more than two classes: 7% will be taken off from the overall grade.

If the instructor reports a student's frequent missing of class to the Soochow University Academic Administration Office, the student might get a written warning and might be prohibited from attending final exam.

2) Participants in this course are expected to arrive in class promptly and adequately prepared. The primary objective of this course is to critically engage with the readings and the subject matter. Therefore, course participants are expected to have completed the reading prior to class and prepare thoughtful reflections/commentaries to share

with fellow colleagues.

LEARNING REQUIREMENTS

1) Late assignments are not acceptable and are subjected to grade deductions.
2) Assignments submitted in the wrong format will be counted as not submitted.
3) Failure to submit or fulfill any required course component results in failure of the class.
4) Make-up for midterm and final exams only with valid excuses, as defined by the University.
5) In order to earn a Certificate of Completion, participants must thoughtfully complete all assignments by stated deadlines and earn an average quiz score of 50% or greater.

TECHNOLOGY POLICY

The use of electronic devices in class is distracting, both for the user and for the rest of the class. Only non-programmable calculators can be used in the tests and exam. Any attempts to use cell phones and other electronic communication devices will be seemed as cheating. Laptops are discouraged, unless you use them for activities DIRECTLY related to the course (eg., note taking, reading course documents).

ACEDEMIC INTEGRITY POLICY

Soochow University highly values the academic integrity and aims to promote the academic fairness, honesty and responsibility. Any academic dishonesty behaviors and any attempts to cheats and plagiarism will be reported to the university administration office. A written warning and the relevant penalties will be imposed. The record might be shown on the official university transcript.

DISABILITY ACCOMMODATION

Soochow University is committed to maintaining a barrier-free environment so that students with disabilities can fully access programs, courses, services, and activities at Soochow University. Students with disabilities who require accommodations for access to and/or participation in this course are welcome.

Note:

Please contact the University Administrative Office immediately if you have a learning disability, a medical issue, or any other type of problem that prevents professors from seeing you have learned the course material.