

**COURSE DESCRIPTION**  
**ABSTRACT ALGEBRA**  
**MA 632-2B**  
**SPRING 2022**

DEPARTMENT OF MATHEMATICS  
UNIVERSITY OF ALABAMA AT BIRMINGHAM

**Course Instructor:** Professor Nikita Selinger

**Office:** UH 4016

**Phone#:** (205) 934-2154

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**Office Hours:** Before/after class, drop-in, or email for appointment.

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**Meeting times:** TuTh, 9:30 – 10:45 AM

**Textbook:** *I. N. Herstein: Abstract Algebra. John Wiley & Sons.* Third Edition.

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**Important dates:**

**First day of class:** January 10, 2022,

**Last day to drop/add:** January 18, 2022.

**Last day of class:** April 22, 2022.

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**Syllabus**

**Groups**

Definitions and examples, Subgroups, isomorphisms, Transformation groups, Cyclic groups, order of an element, Coset decomposition, Lagrange's theorem, Homomorphisms. Normal subgroups and factor groups, The homomorphism theorems, Cauchy's theorem, Direct products, Finite Abelian groups, The symmetric group: Cycle decomposition, even & odd permutations

**Ring Theory**

Definitions and examples, Subring, center, Ideals, homomorphisms, quotient rings, Maximal ideals, Polynomial rings and their structure, Number of roots of a polynomial, Polynomials over the rationals, The quotient field of an integral domain

**Elements of Theory of Fields**

Fields, prime fields, characteristics, Field extensions, Elements of Galois Theory

**Course policies:**

- Please make sure that you are able to receive e-mail through your Blazer-ID account. Official course announcements may be sent to that address.
- If you are contacted by the Early Alert Program, you should consider taking advantage of the services it offers. Various services to assist you are also listed in the *Student Resources* section of the *Blazernet* web site.
- If you wish to request a disability accommodation please contact DSS at 934-4205 or at *dss@uab.edu*.
- If a test is missed due to a serious verifiable circumstance or official university business, the test grade will be replaced with the properly rescaled final exam score. If you miss the final exam you will receive a zero score for this exam. In all cases you **must** contact your instructor of such circumstances **before** the exam takes place.

**Methods of teaching and learning:**

- Class meetings of 75 minutes consisting mainly of discussions of examples and homework problems.
- Students are expected to undertake **at least** 10 hours of private study and homework per week.

**Assessment procedures:**

- Student achievement will be assessed by the following measures:
  - **Class presentations.** Presenting homework problems in class will count as 30% towards the final grade.
  - **Midterm exams.** Midterm tests contribute 30% to the course average.
  - **A 150-minute comprehensive final examination.** The final contributes 40% to the course average.
- Your course performance is your course average (including the final exam score). This is a number between 0 and 100.
- Your final grade is determined according to the following table:

Course performance:	88-100	75-87	62-74	50-61	below 50
Final Grade:	A	B	C	D	F

- In addition your grade maybe raised by a strong performance on the final exam (normally at most one letter grade).