

Faculty of Eng. & Natural Sci.

**MATH511-202101**

**Algebra I**

Instructor: Ayesha Asloob Qureshi

Name	Email	Office	Phone	Web	Office Hours
Ayesha Asloob Qureshi	aqureshi@sabanciuniv.edu	FENS-109 7	9943	<a href="http://myweb.sabanciuniv.edu/aqureshi/">http://myweb.sabanciuniv.edu/aqureshi/</a>	by appointment

**Course Content**

Introduction to group theory. Isomorphism theorems. Permutation groups and Cayley's theorem. Conjugacy classes. Lagrange's theorem and the Sylow theorems. principle ideal domains. Polynomial ring.

**Objectives**

Understanding the basic concepts of group theory and ring theory

**Textbook**

"Abstract Algebra", by David S. Dummit and Richard M. Foote, Third Edition, John Wiley & Sons, Inc., 2004

**Assessment Methods and Criteria**

Exam	Percentage(%)
Final	40
Midterm 1	30
Midterm 2	30

**Midterm 1 will be given after Lecture 5. Midterm 2 will be given after Lecture 10. Final exam will be given at the end of the course. Dates of exams will be announced later.**

**All exams will be held on Campus (PHYSICAL).**

### **Learning Outcomes**

Define and use Subgroups, Ideals, Homomorphisms and other basic concepts about Groups and Rings,

Analyze and produce proofs of statements involving Groups and Rings,

Use some fundamental examples such as the Symmetric Group and its Subgroups, Cyclic Groups, Matrix Groups, and Polynomial Rings,

Distinguish basic Algebraic structures from each other up to Isomorphism,

Use the three Isomorphism theorems for Groups and Rings,

Use Direct and Semi-direct Product Constructions,

Use Group Actions to study structures of Groups and to do effective counting in Groups,

Apply Sylow Theorem and the Structure Theorem on Finitely Generated Abelian Groups,

State basic Ring types such as Local Rings, Principal Ideal Domains, Unique Factorization Domains.