

# Course Content

## Course Outline

### Notes

- Week 1: Groups and cyclic groups (DF Chapter 1 and Section 2.3)
  - Day One
  - Day Two
- Week 2: Subgroups and quotient groups (DF Chapter 2 and 3)
  - Day Three
  - Day Four
- Week 3: Isomorphism theorems and group actions (DF Chapter 3 and 4)
  - Day Five
  - Day Six
- Week 4: Cauchy and Sylow Theorems; Abelian groups (DF Chapter 4 and 5)
  - Day Seven
  - Day Eight
- Week 5: Direct and semi-direct products; applications and classification results (DF Chapter 5)
  - Day Nine
  - Day Ten
- Week 6: Rings and ideals (DF Chapter 7)
- Week 7: Ring morphisms; fraction fields; euclidean and principal idael domains (DF Chapter 7 and 8)
- Week 8: Polynomial rings and unique factorization (DF Chapter 9)
- Week 9: Additional topics on ring theory
- Week 10: Vector spaces and subspaces (DF Chaper 11)
- Week 11: Duality (DF Chapter 11)
- Week 12: Traces and determinants (DF Chapter 11)
- Week 13: Bilinear forms and the spectral theorem (DF Chapter 11)
- Week 14: Additional topics on linear algebra

### Problem Sets

- Set 1: Due September 11, 2022
- Comments on Set 1

- Set 2: Due October 2, 2022

## **Prelim Exam**

The study guide to the algebra prelim is available [here](#).

DF refers to *Abstract Algebra, third edition* by Dummit and Foote.