Core Curriculum for Graduate Study

Advanced Algebra I (221U3830)

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Fri. 3.4 (10:20-12:10), Fri. 7 (15:30-16:20)
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TA session: Fri. 8 (16:20-17:10)
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Course outline:

1. Set Theory
2. Group theory
   - Basics definitions and properties.
   - Group actions and symmetry.
   - Sylow’s theorem.
   - Finitely generated abelian groups.
   - Solvable and nilpotent groups.
3. Field Theory
   - Algebraic extensions.
   - Galois groups
   - Cyclotomic extension and cyclic extensions.
   - Radical extensions.
   - Transcendental extensions.
4. Ring and modules
   - Factorization in polynomial rings
   - Localization
   - Exact sequences
   - Hom
   - Tensor products.

Reference:

1. Hungerford, *Algebra, GTM 73*
2. Lang, *Algebra, GTM 211*
3. Herstein, *Noncommutative rings*
4. Atiyah, MacDonald, *Introduction to commutative algebra*

**Grading:**
1. Homework 30%
2. Midterm 30%
3. Final Examination 40%