By-The-Week Plan

July-28-10
4:00 PM

Pre-Plan:

1. Basic properties of groups and non-commutative Gaussian elimination, group homomorphisms, kernels and images.
2. Free groups, product groups, quotient groups, the isomorphism theorems and Jordan-Holder.
3. Symmetric groups, conjugation, signatures, simplicity of A_n (following Hungerford?).
4. Group actions, indices, divisibilities, Sylow theorems.

Plan as of the end of week 5:

6. Semi-direct products, braids, groups with "simple" orders, solvable groups.
7. Term test, start with rings - defs, ideals, quotients, isomorphism theorems.
8. Maximal and prime ideals, polynomial rings, the basic definitions for modules and the isomorphism theorem for modules.
9. (1 hour) Exact sequences, tensor products.
10. Free and projective modules, localization and fractions.
11. Noetherian rings and modules, UFDs.
12. PIDs, the Euclidean algorithm.
13. (2 hours) Modules over PIDs

Too dense?

Backward Planning, 4 weeks to go.

Must do: structure of f.g. modules over a PID

1. statement [need PIDs]
2. Applications: 1. F.G. Abelian groups. [$\mathbb{Z}$ is a PID]
   2. Jordan forms. [$F[x]$ is a PID]
   [primes in $F[x]$, over alg. closed fields, Cayley-Hamilton]
3. Proof. Needs: Fields of fractions, tensor products, Free modules and their ranks.

Now Forward:

9. (1 hour) Tails, modules, free modules, tensor products, bases of free modules.
10.
11. Fractions, tensor products, the free part of the main theorem.
12. The structure theorem (torsion part), Abelian groups.
13 (2 hours) Cayley-Hamilton & Jordan forms

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plan for last 5 hours.

2 hours: Finish uniqueness, structure for Abelian groups and localizations, fractions.

The automorphisms of $\mathbb{Z}/p$, JCF, Cayley-Hamilton.

1 hour:

2 hours: