Syllabus Algebra 2015/16

The course was based on my own lecture notes, these are available at:

www2.math.ou.edu/∼cremling/teaching/ln.html

The qualifying exams (in Aug 16 and Jan 17) will be open notes.

1. basic properties of groups (and monoids): Cayley's theorem, cyclic groups, Lagrange's theorem, congruences and quotient groups, isomorphism theorems, permutations (2.1–3.1)
2. free groups, presentations of groups, group actions, Sylow theorems, normal series, commutator subgroups, Jordan-Hölder theorem (3.2–3.6)
3. rings: basic properties, types of rings, ideals, field of fractions (4.1–4.2)
4. polynomial rings (4.3–4.4)
5. divisibility, unique factorization in polynomial rings (4.5–4.6)
6. basic properties of field extensions: algebraic and transcendental elements, splitting fields and algebraic closure (5.1–5.2)
7. Galois theory: the fundamental theorem for finite Galois extensions, separable and normal extensions, finite and cyclotomic fields, solvability of equations (6.1–6.5)