

FIRST SUPPLEMENT TO HANDBOOK FOR THE UNDERGRADUATE MATHEMATICS COURSES

Amendment to Part A Synopses 13th January 2009

Please note the revised Syllabus and Synopsis for Part A Introduction to Fields

Introduction to Fields

Revised Syllabus

Fields, subfields, finite extensions; examples. Degree of an extension, the Tower Theorem. Simple algebraic extensions; splitting fields, uniqueness (proof not to be examined); examples. Characteristic of a field. Finite fields: existence; uniqueness (proof not to be examined). Subfields. The multiplicative group of a finite field. The Frobenius automorphism.

Revised Synopsis

Fields, subfields and their intersections. Statement of the Fundamental Theorem of Algebra; the splitting field for a rational polynomial as the minimal subfield of \mathbb{C} that contains all its roots, its Galois group over \mathbb{Q} (basic concept only). The link between the structure of the Galois group and the solubility of equations (not examinable). [$1\frac{1}{2}$ lectures]

The characteristic of a field, prime subfields. [$\frac{1}{2}$ lecture]

Extensions of fields; examples. Degree of a finite extension, the Tower Theorem. [1 lecture]

Simple algebraic extensions; splitting fields, uniqueness (proof sketched but not examinable); examples. [2 lectures]

Finite fields: existence and uniqueness (proof sketched but not examinable), subfields. The multiplicative group of a finite field, the Frobenius automorphism. [3 lectures]