
MA 315 Galois Theory / January-April 2014

(Int PhD. and Ph. D. Programmes)

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Lectures : Monday and Wednesday ; 11:30–13:00

Venue: MA LH-4 / LH-1

Syllabus and References

- **Review of Groups :** Group actions, Composition series, Jordan Hölder theorem, Solvable groups.
 - **Review of Rings :** Polynomial rings, Zeros of polynomials, Elementary symmetric functions and Fundamental Theorem on Symmetric Functions. Resultants and Discriminants, Euclidean rings, Principal ideal domains and Factorial rings, Factorization in polynomial rings.
 - **Field theory :** Finite Fields, Finite and Algebraic extensions. Algebraic closure, Algebraically closed fields. Proof of Fundamental Theorem of Algebra. Separable polynomials and Separable extensions. Splitting fields, Normal extensions, Galois extensions, Galois group of a polynomial. Fundamental Theorem of Galois theory, Radical extensions, Solvability by radicals, Computation of Galois groups.
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Texts/References

- [1] **Artin, E. :** *Galois Theory*, University of Notre Dame Press, ²1944.
 - [2] **Artin, M. :** *Algebra*, Prentice-Hall, 1994.
 - [3] **Ghatak, A. ; Tandon, A. :** *Galois theory and solvable equations of prime degree*, J. Indian Inst. Sci. **91** (2011), no. 1, 47-74.
 - [4] **Jacobson, N. :** *Lectures in Abstract Algebra*, Vols. I, II & III, D. Van Nostrand Co. Inc., Princeton, New Jersey, 1966.
 - [5] **Jordan, C. :** *Traité des substitutions et des équations algébriques*, Gautjier-Villars, Paris, 1870.
 - [6] **Lang, S. :** *Algebra*, Graduate Texts In Mathematics, Vol. 211, Springer-Verlag, ³2002.
 - [7] **Weber, H. :** *Lehrbuch der Algebra*, Band I, II, III, Braunschweig ²1898, ²1899, ²1908.
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