אוניברסיטת
בן-גוריון בנגב

The Department of Mathematics

2022–23–B term

Course Name Field Theory and Galois Theory

Course Number 201.1.7041

Course web page
`https://www.math.bgu.ac.il//en/teaching/spring2023/courses/field-theory-and-galois-theory`

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Office Hours `https://www.math.bgu.ac.il/en/teaching/hours`

Abstract

Requirements and grading[1]

Course topics

- Fields: basic properties and examples, the characteristic, prime fields
- Polynomials: irreducibility, the Eisenstein criterion, Gauss's lemma
- Extensions of fields: the tower property, algebraic and transcendental extensions, adjoining an element to a field
- Ruler and compass constructions
- Algebraic closures: existence and uniqueness
- Splitting fields
- Galois extensions: automorphisms, normality, separability, fixed fields, Galois groups, the fundamental theorem of Galois theory.
- Cyclic extensions

[1] Information may change during the first two weeks of the term. Please consult the webpage for updates

- Solving polynomial equations by radicals: the Galois group of a polynomial, the discriminant, the Cardano-Tartaglia method, solvable groups, Galois theorem
- Roots of unity: cyclotomic fields, the cyclotomic polynomials and their irreducibility
- Finite fields: existence and uniqueness, Galois groups over finite fields, primitive elements