The Department of Mathematics
2019–20–B term

Course Name  Field Theory and Galois Theory
Course Number  201.1.7041
Lecturer  Prof. Ilya Tyomkin, <tyomkin@bgu.ac.il>, Office 213
Office Hours  https://www.math.bgu.ac.il/en/teaching/hours

Requirements and grading

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

1Information 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