

The Department of Mathematics

2021–22–B term

Course Name Algebra 2 for CS

Course Number 201.1.7021

Course web page

<https://www.math.bgu.ac.il/en/teaching/spring2022/courses/algebra-2-cs>

Lecturer Prof. Ilya Tyomkin, <tyomkin@bgu.ac.il>, Office 213

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

Abstract

Requirements and grading¹

Course topics

- Rings. Ring of polynomials and its ideal structure. The prime factorization of a polynomial. Lagrange interpolation.
- Eigenvalues and eigenvectors of linear operators. Characteristic polynomial and Cayley–Hamilton theorem. The primary decomposition theorem. Diagonalization. Nilpotent operators. Jordan decomposition in small dimension. Jordan decomposition in general dimension- time permitting.
- Linear forms. Dual basis. Bilinear forms. Inner product spaces. Orthogonal bases. Projections. Adjoint linear transformation. Unitary and Hermitian operators. Normal operators and the spectral decomposition theorem. Singular value decomposition theorem and applications.

Optional topics:

- Quadratic forms.
- Sylvester theorem.
- Classification of quadrics in two-dimensional spaces.

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