

# The Department of Mathematics

2024–25–A term

**Course Name** Algebra 2 for CS

**Course Number** 201.1.7021

**Course web page**

<https://math.bgu.ac.il/en/teaching/fall2025/courses/algebra-2-cs>

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

## Abstract

## Requirements and grading<sup>1</sup>

### 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.

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