

The Department of Mathematics

2025–26–B term

Course Name Arithmetic Methods in Cryptography

Course Number 201.1.3121

Course web page

[https://math.bgu.ac.il/en/teaching/spring2026/courses/arithmetical-methods-in-cry](https://math.bgu.ac.il/en/teaching/spring2026/courses/arithmetical-methods-in-cryptography)

Lecturer Prof. Amnon Besser, <bessera@bgu.ac.il>, Office 212

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

Abstract

Requirements and grading¹

Course topics

An introduction to applications of algebra and number theory in the field of cryptography. In particular, the use of elliptic curves in cryptography is studied in great detail.

- Introduction to cryptography and in particular to public key systems, RSA, Diffie-Hellman, ElGamal.
- Finite fields, construction of all finite fields, efficient arithmetic in finite fields.
- Elliptic curves, the group law of an elliptic curve, methods for counting the number of points of an elliptic curve over a finite field: Baby-step giant step, Schoof's method.
- Construction of elliptic curves based cryptographic systems.
- Methods for prime decomposition, the elliptic curves method, the quadratic sieve method.
- Safety of public key cryptographic methods.

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