

**Course title: Mathematics 1**

**Course code: 63506A**

**ECTS: 6**

**Professor: Polona Oblak**

**Prerequisite knowledge:**

- mathematical induction, complex numbers, polar form of complex numbers, sequences, series
- real-valued functions, derivatives, partial derivatives, gradient, optimization, integral
- analytic geometry in  $\mathbb{R}^3$  (vectors, scalar product, vector product, lines and planes in  $\mathbb{R}^3$ , projections, distances)
- matrix calculus, eigenvalues, determinants, systems of linear equations

**Short course description:**

Computer science is closely related to mathematics and a thorough knowledge of the mathematical basics is a prerequisite for understanding the technical content in the study of computer science and informatics. The purpose of the course Mathematics 1 is to deepen the knowledge and understanding of mathematical basics:

- **Linear algebra:** matrix norms, Kronecker product, Schur complement, positive semidefinite matrices, Cholesky decomposition, vector spaces and linear transformations, geometry of linear transformations, affine transformations.
- **Analysis:** functions and vector functions of multiple variables, Jacobi matrix, multiple integral, local and global extrema, optimisation problems, Karush-Kuhn-Tucker conditions.