

Discipline: **Materials Engineering**

Candidate's Profile:

The person eligible to apply for admission to the CUT Doctoral School in the scientific discipline of **materials engineering** must have the professional title of Master in one of the primary study programmes: mathematics, physics, chemistry, biology, computer science and biotechnology, or of Master in Engineering in the whole range of technical study programmes.

Conditions of the entrance examination:

- Examination in the form of a test composed of 40 single-choice questions – date of the examination according to the [time schedule](#) of the CUT DS recruitment process;
- Candidate interview (on *inter alia* the individual research plan) – only those persons will be admitted who have obtained no less than 50% of the total possible score in the examination – date of the interview according to the [time schedule](#) of the CUT DS recruitment process;

Problem areas for the entrance examination:

- Structure of engineering materials, including: structure of the atom, atomic bonds, fundamentals of crystallography, types of polymerisation.
- Characteristics of primary groups of engineering materials, including their chemical composition, structure, physical and mechanical properties, principles of classification and scope of application. Fundamental knowledge of composites.
- Fundamental knowledge of strength of materials and mechanics in the scope of elasticity, including the basic definitions and methods of solving simple problems. Fundamentals of rheology.
- Structural phenomena occurring in materials subjected to the operation of mechanical and thermal energy, e.g. diffusion, phase transformations, crystallisation and recrystallisation, mechanisms of elastic and plastic deformations, fatigue or decohesion.
- Characteristics of technological processes of materials manufacture and transformation.
- Fundamentals of methodology of research into materials and criteria of engineering materials selection for technical applications.