Discipline: **Mechanical Engineering**

Candidate's Profile:

The persons eligible to apply for admission to the CUT Doctoral School in the scientific discipline of **mechanical engineering** must have the professional title of Master or Master in Engineering in a technical study programme or in one of the following study programmes: mathematics, physics or computer science.

Conditions of the entrance examination:

- The examination is done in the form of a test of choice (20 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:

- **Mathematics** (elements of linear algebra and analytical geometry, fundamentals of mathematical statistics, fundamentals of differential and integral calculus)
- **Mechanics and strength of materials, technical thermodynamics** (models of bodies, models of boundary conditions/constraints, friction, models of loads / generalised forces, Newton's laws of motion, work and energy, models of fluids, pressure, types of liquid flows, fluid viscosity, the concept of the deformable body, analysis of the tension and deformation states, equations of state, computational methods in mechanics, types of thermodynamic transformations, ideal and real gases, specific heat capacity of gases, mechanisms of heat exchange, heat conduction)
- **Structure and operation of machines, manufacturing techniques** (classic and unconventional methods of materials processing, structural and tool materials, measurement uncertainty and its sources, coordinate metrology, fundamentals of automatic control and robotics, automation in manufacturing processes, CAD/CAM/CAE systems, operation of technical devices)