Discipline : **Environmental Engineering, Mining and Energy**

Candidate's Profile:

The person eligible to apply for admission to the CUT Doctoral School in the scientific discipline of **environmental engineering, mining and energy** must have the professional title of Master or Master in Engineering in a technical or agricultural study programme or in one of the following study programmes: mathematics, physics, chemistry, computer science, biotechnology or Earth sciences.

Conditions of the entrance examination:

- Profiling groups: **Environmental Engineering, Energy**
- Candidates are divided according to the **declared profiling group**
- The examination in the form of a test of choice (20 closed 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:

Profiling group – Environmental engineering:

- **Water and sewage technology** (water treatment plants – technology and equipment; sewage treatment – technologies and equipment)
- **Sewage slugde and waste management** (sewage sludge processing methods, physical and energy properties of municipal waste, techniques and technologies of waste recovery and recycling; technologies of thermal waste processing)
- **Waterworks and sewers** (water intakes and transportation; water supply systems; municipal sewage and meteoric water disposal systems)
- **Hydrology, hydrogeology and water management** (Poland's ground and underground water resources**;** floods and draughts – causes, endangered areas, mitigating actions; water management)
- **Spatial development** (smart cities, circular economy, urbanised areas revitalisation)

Profiling group – Energy:

- **Fluid mechanics** (types of flows, models of fluids, pressure losses, physical properties of fluids, flows in convergent and divergent channels, characteristic numbers)

- **Conventional energy** (the Clausius – Rankine cycle and ways of improving its efficiency, power plant efficiency, capacitor cooling systems, types of steam turbines)
- **Renewable energy** (wind energy, photovoltaic cells, energy storage, solar and geothermal energy)
- **Thermodynamics and heat exchange** (types of thermodynamic transformations, ideal and real gases, gas specific heat capacity, mechanisms of heat exchange, heat exchangers, determined and non-determined heat conduction)