Attachment to the Resolution of the Scientific Council of the CUT Faculty of Environmental Engineering and Energy no. 17/RN/11/2022 of the 14th December 2022.

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, Earth sciences.
The decision on the eligibility of candidates holding the title obtained in other study programmes is to be taken by the Qualifying Committee appointed by the Head of the Scientific Council and composed of at least 3 persons.

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 sludge 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)