

# **Course: Process engineering in circular economy**

**Teaching hours:** 15 h

**Prerequisites:** The course is primarily open to all PhD students at Gdansk University of Technology. This course is compulsory for PhD students assigned to Civil Engineering and Transport as well as Environmental Engineering, Mining and Power Engineering tracks at Doctoral School of GUT.

## **Course outline**

### **Content**

This module is all about getting the PhD student to be prepared to deal with different aspects of process engineering in circular economy. The course is designed to deliver to the PhD students knowledge on process engineering in uncertain situations. Throughout the course, the PhD students should gain appropriate skills related to the topics covered during the course.

### **General topics coverage:**

1. Definition and principles of the circular economy (CE).
2. CE policy and legislation (EU and Poland).
3. The transition from a linear model to a circular model.
4. Business models for the CE.
5. Circular design and innovation.
6. CE assessment – carbon footprint, life cycle assessment.
7. Case studies of the cities implementing the CE concept.
8. Wastewater treatment plants as an element of the CE.
9. Energy and nutrient recovery technologies in wastewater treatment plants.

### **Teaching mode**

The course consists of lectures. The teaching method is basically a lecturer's delivery. In the final part of the semester, the PhD students will deliver their presentations related to different aspects of process engineering in circular economy, based on literature sources.

### **Examination**

A wide range of formative feedback from the lecturer, questions and practical individual and group exercises will be used by the lecturer to aid learning as will exercises to encourage the researchers' abilities in critical and reflective learning. The exact nature of these assessment devices will be at the discretion of the lecturer. The PhD students will be required to demonstrate their presentation skills, knowledge and understanding of process engineering in circular economy in the form of presentations.