



**FACULTY:** ENVIRONMENTAL AND POWER ENGINEERING

**COURSE TITLE:** Water and wastewater treatment

**Number of contact hours:** 90

**Duration:** 1 semester

**ECTS credits:** 9

**Programme description:**

The course is designed to provide a broad theoretical and practical foundation within water and wastewater treatment technology and understanding of the relationship between water management practices and the environment. The course will focus on processes and technologies for the treatment of water, wastewater and sewage sludge processing with the purpose of minimization of emissions to environment and energy efficiency. Topics to be covered include water sources and water quality requirements, physical, chemical and biological processes used for water and wastewater treatment, optimal design of water and wastewater treatment trains, sewage sludge processing and utilization, energy recovery from biogas and application of computer simulation for wastewater treatment plant design and optimization. The students will learn how to design water and wastewater treatment facilities effectively. In the lab students will carry out typical water and wastewater analysis for process control and monitoring. Following potential students' interests also other topics may be explored, such as water reuse or application of membranes for water and wastewater treatment.

Specific problems discussed during lectures, board and design exercises will cover:

- sources of water in the context of water quality, drinking water standards and available treatment technologies
- physical and chemical processes and technologies used for water treatment
- wastewater quality and quantity in the context of available treatment technologies
- physical, chemical and biological processes and technologies used for wastewater treatment, including advanced biological processes used for nutrient removal from wastewater
- sewage sludge processing methods and technologies

Students will gain



- theoretical knowledge on water and wastewater treatment processes, technologies and installations
- the ability to perform typical analyses of water and wastewater samples for process monitoring and control.
- knowledge and practical skills in designing of water and wastewater treatment processes and systems
- practical skills in application of computer simulation for wastewater treatment processes

**Course type (hours):** lectures (40), board classes (15), labs (15), project classes (14)  
computer labs (6)

**Literature:**

1. Metcalf and Eddy "Wastewater Engineering", 4th ed., McGraw-Hill, 2003
2. Spellman F. R. "Handbook of Water and Wastewater Treatment Plant Operations", 3rd ed. CRC Press, 2013

**Assessment method:** Final exam (60%), design calculations (30%), board classes (on-going evaluation of student performance 10%)

**Lecturer:** dr hab. inż. Stanisław M. Rybicki, prof. PK, dr hab. inż. Jerzy Mikosz

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