Course title: Environmental remediation technologies	**Kod ECTS**

Studies

Specialty	Semester	Number of ECTS	Number of hours in the class	Form
Foreign students	**winter**	**1**	**5**	**Lecture**

Name of lecturer: dr hab. Ewa Siedlecka, prof. UG

Objective of the course (expected learning outcomes and competences to be acquired)

Students will classify common type of pollutants and pollutant source in municipal and industrial wastewater
Students will classify of common type of pollutants and pollutant source in water
Students will classify of remediation methods
Students will plan and describe water technologies
Student will classify plan and describe wastewater treatment

Prerequisites:

Basic knowledge of inorganic chemistry, organic chemistry and analytical chemistry.

Teaching methods:

· Lecture with multimedia presentation

Course content

Basic concepts of Environmental Technology. Pollution control technologies. Wastewater treatment systems. Planning, design and operation.Technology used in typical municipal sewage treatment plants in an industrialized country, (physicochemical processes, biological processes, desinfection) advanced oxidation processes. Preliminary unit operations and processes in water and industrial wastewaters treatment. Drinking and industrial water purification.

Recommended reading:

Cheremisinoff N.P., Handbook of water and wastewater treatment technologies, Elsevier 2001
Tchobanoglous G., Kreith F., Handbook of solid waste management, 2002 The McGraw-Hill Companies, Inc

Assessment methods:

- Writing exam

Language of instruction: English

Course title: Environmental remediation technologies	Kod ECTS

Studies

Specialty	Semester	Number of ECTS	Number of hours in the class	Form
Foreign students	winter	3	30	Laboratory

Name of lecturer: dr hab. Ewa Siedlecka, prof. UG; dr inż. Ewelina Grabowska, dr inż. Aleksandra Pieczyńska, mgr inż. Magdalena Diak

Objective of the course (expected learning outcomes and competences to be acquired)

Student will plan experimental work
Student will measure efficiency of water purification
Student will measure the efficiency of wastewater treatment by Fenton reaction and ozonation
Student will re-process waste paper
Student will measure the efficiency of SO2 removal from the gas phase
Student will produce biofuel (transestrification of waste cooking oil)

Prerequisites:

Basic knowledge of inorganic chemistry, organic chemistry and analytical chemistry.

Teaching methods:

· Laboratory classes - experiments

Course content

Water purification. Fenton reaction for wastewater treatment. Waste-paper processing. Biofuels production. Ozonation in wastewater treatment. Advances Oxidation Technologies (AOTs) for soil remediation. Air desulfurization.

Recommended reading:

Cheremisinoff N.P., Handbook of water and wastewater treatment technologies, Elsevier 2001
Tchobanoglous G., Kreith F., Handbook of solid waste management, 2002 The McGraw-Hill Companies, Inc
Riva G., Foppapedretti E., de Carolis C., Gikoumelos E., Malamatenios C., Signanini P., Giancarlo C., Di Fazio M., Gajdos J., Rucinsky R., Handbook on renewable energy sources, training nahdbook, ENER SUPPLY, 2012

Assessment methods:

- Reports
- Test
- Experimental work in laboratory

Language of instruction: English