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| **Course title**Environmental remediation techniques – ERASMUS Techniki remediacji środowiska – ERASMUS  | **ECTS code**13.3.1251 |
| **Name of unit administrating study** Faculty Chemistry |
| **Studies**

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| **Field of study** | **Type** | **Form** |  |
| Chemistry | Bachelor  | Full-time studies  |  |
| Chemistry | Master | Full-time studies |  |
| Environmental sciences | Bachelor | Full-time studies |  |

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| **Teaching staff**prof. dr hab. Ewa Siedlecka; dr Aleksandra Bielicka-Giełdoń |
| **Forms of classes, the realization and number of hours**  | **ECTS credits 4**classes 30 htutorial classes 20 hstudent’s own work 50 hTOTAL: 100 h - 4 ECTS |
| 1. **Forms of classes, in accordance with the UG Rector’s regulations**

lecture, laboratory classes |
| 1. **The realization of activities**

In-class or on-line |
| 1. **Number of hours**

15 h - lecture15 h - laboratory |
| **The academic cycle**winter |
| **Type of course**facultative | **Language of instruction**English |
| **Teaching methods**Lecture with multimedia presentationLaboratory experiments | **Form and method of assessment and basic criteria for evaluation or examination requirements**  |
| **A. Final evaluation, in accordance with the UG study regulations** course completion (with a grade) |
| **B. Assessment methods**Writing examWriting test  |
| **C. The basic criteria for evaluation** or exam requirements Evaluation criteria in accordance with the UG Studies Regulations; |
| **Required courses and introductory requirements** no requirements |
| **Aims of education**Students will classify common type of pollutants and pollutant source in municipal and industrial wastewaterStudents will classify of common type of pollutants and pollutant source in waterStudents will classify of remediation methodsStudents will plan and describe water technologiesStudent will classify plan and describe wastewater treatment**Convergent to**: general chemistry, analytical chemistry, environmental sciences |
| **Course contents**A. LectureBasic 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, disinfection) advanced oxidation processes. Preliminary unit operations and processes in water and industrial wastewaters treatment. Drinking and industrial water purification.B. Laboratory experimentsBasics of laboratory work, performance of thematic exercises related to the removal of contaminants from contaminated environment compartments |
| **Bibliography of literature** 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 |
| **Knowledge**1.The student defines the basics of risk assessment of the spread of pollution in the environment2. Understands the relationship between the structure and properties of a chemical compound and its behaviorin the environment3. Understands the relationship between the properties of pollution, and the choice of remediation technique for contaminated media4. Is able to assess the exposure of individual components of the environment to the presence of chemicalcompounds depending on the manner and scale of their use5. Lists and classifies technologies used for environment remediation |
| **Skills**1. Classifies types and sources of pollution2. Demonstrates the ability to perform basic physicochemical and technological measurements important forremoving contaminants from the environment3. Plans and develops technologies for remediation of contaminated land4. Plans and conducts simple experiments in the field of environmental remediation technologies. |
| **Social competence**1. Classifies types and sources of pollution2. Demonstrates the ability to perform basic physicochemical and technological measurements important forremoving contaminants from the environment3. Talks about issues of environmental remediation technology in understandable language, using the correctnomenclature.4. Evaluates selected properties of contaminated soils and assesses the effectiveness of remediation ofcontaminated soils (by bioremediation and washing) |