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| **Course title**Environmental technology – ERASMUS Technologia środowiska – ERASMUS  | **ECTS code**13.3.1266 |
| **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. Adriana Zaleska-Medynska |
| **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**

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

In-class  |
| 1. **Number of hours**

30 h - laboratory |
| **The academic cycle**summer |
| **Type of course**facultative | **Language of instruction**English |
| **Teaching methods**Laboratory 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 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 Students will classify of remediation methods Students will plan and describe water and wastewater treatment technologies Students will plan and describe air treatment technologies Students will plan and describe remediation technologies of polluted soil Students will plan and describe solid waste processing Student will classify renewable energy sources Student will describe the various renewable energy sources and the possible conversion paths to a useful form of energy.**Convergent to**: general chemistry, analytical chemistry, environmental sciences |
| **Course contents**Basic concepts of Environmental Technology. Pollution control technologies. Water and WastewaterTreatment Plants: planning, design and operation. Preliminary unit operations and processes in water andwastewater and industrial wastewaters treatment. Drinking and industrial water purification. Wastewatertreatment systems. Solid waste processing. Solid waste recycling. Air pollution control methods. Soil remediation technologies. Renewable energy. Basics 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 2001Tchobanoglous G., Kreith F., Handbook of solid waste management, 2002 The McGraw-Hill Companies, IncRiva 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 |
| **Knowledge**Student1. lists types of water and wastewater pollution and sources of their formation2. defines the parameters used to assess the quality of water and wastewater, describes the methods for theirdetermination3. draws diagrams of selected wastewater treatment plants and water treatment plants4. explains the processes that occur during wastewater treatment and water treatment.5. defines and characterizes objects and devices used for wastewater treatment and water treatment6. defines the basics of risk assessment of the spread of pollutants in the atmosphere.7. understands the relationship between the properties of pollution and the selection of air stream cleaningtechnology8. Distinguishes and characterizes individual technologies used to reduce the level of emissions of pollutantsinto the atmosphere |
| **Skills**1. identifies the sources of waste water generation.2. interprets types of pollutants in wastewater and describes possible methods of their removal.3. explains the choice of water treatment methods for plumbing purposes depending on its physical andchemical characteristics.4. explains the role of microorganisms in wastewater treatment and water treatment processes.5. classifies types and sources of pollution6. demonstrates the ability to perform basic physicochemical and technological measurements relevant forremoving air pollutants7. plans and conducts simple experiments in the field of technology for removing impurities from air streams8. Talks about the issues of atmosphere protection technology in understandable language, using the correctnomenclature. |
| **Social competence**1. complies with the safety rules in force in the chemical laboratory;2. understands the need for further education.3. cooperates in a team during laboratory exercises and developing results4. recognizes the need to apply environmental engineering technologies in industrial plants in relation to water and wastewater management and improving the quality of human life5. is responsible for the safety of his own work and that of others: he is careful in handling chemicals, he iscareful in handling measuring instruments. |