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| **Course title**Environmental and food radiochemistry – ERASMUS Radiochemia środowiska i żywności - ERASMUS | **ECTS code**20.0.0183 |
| **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**dr hab. Dagmara Strumińska-Parulska, prof. UG; dr Grzegorz Olszewski; mgr Aleksandra Moniakowska |
| **Forms of classes, the realization and number of hours**  | **ECTS credits 6**classes 15 hlab exercises 30 htutorial classes 30 hstudent’s own work 75 hTOTAL: 150 h - 6 ECTS |
| 1. **Forms of classes, in accordance with the UG Rector’s regulations**

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

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

15 h - lecture30 h - laboratory |
| **The academic cycle**summer |
| **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 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**Acquaint the students with environmental radiochemistry and radiochemical analysis**Convergent to:** physical chemistry, analytical chemistry, environmental sciences |
| **Course contents**Natural and anthropogenic radioactivity. Activity and its units. Radioactive elements in nature. Ionizing radiation doses. Radiotoxicity and its groups. Sources of radioactive contamination in the natural environment. Human absorption of radionuclides from air, food and water, and assessment of radiation doses. Radiological effects of smoking cigarettes. Radiometric methods in radiochemical analysis of natural and artificial radionuclides in environmental samples. The Chernobyl and the Fukushima accidents and their influence on the environment. Monitoring of radioactive contamination. Laboratory experiments - 210Po, 234U, 238U and 239+240Pu activities determination in environmental samples, radiometric measurements, spectra analysis |
| **Bibliography of literature** Dahlgaard H., Nordic Radioecology: The Transfer of Radionuclides through Nordic Ecosystems to Man, Elsevier, 1994,Frontasyeva M., Perelygin V., Vater P., Radionuclides and Heavy Metals in Environment, Springer, 2001Matishov D., Matishov G., Radioecology in Northern European Seas, Springer, 2004,Stabin M., Radiation Protection and Dosimetry, Springer, 2007.Skwarzec B., Determination of radionuclides in aquatic environment, Analytical measurements in aquatic environments, CRC Press, Taylor&Francis Group, 2010, |
| **Knowledge**1. knows and understands the basic concepts of radiochemistry, and radioecology,2. has knowledge about the influence of ionizing radiation on living organisms,3. has knowledge about the natural and artificial radioactive elements in the environment and sources of their origin,4. understands the idea of radiometric methods,5. knows the radiological effect of the catastrophes at Chernobyl and Fukushima nuclear power plants,6. knows the goals and tasks of monitoring environmental radioactive contamination,7. has knowledge about the origin of radionuclides in the human body,8. understands the radiological effects of the collection of radionuclides by humans as a result of breathing, eating and smoking, |
| **Skills**1. understands the basic concepts of radiochemistry and radiotoxicology,2. recognizes the most important natural and artificial radionuclides contained in environment and man,3. can assess the radiological consequences of human absorption of radionuclides from the air, water and food and as a result of smoking, 4. can determine the most important radionuclides5. understands the background of radiometric techniques, 6. is able to assess radiological threats arising as a result of local or global contamination of radioactivity. |
| **Social competence**1. understands the need for further education in the field of monitoring of radiochemical contamination of the environment,2. demonstrates creativity in limiting the absorption of radionuclides by humans and makes the society aware of the effects of excessive incorporation of radionuclides,3. can transfer knowledge in the society about sources of radiochemical contamination in building materials, |