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| **Course title**Separation methods – ERASMUSMetody separacyjne – ERASMUS  | **ECTS code**13.3.1363 |
| **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. Eng. Anna Białk-Bielińska |
| **Forms of classes, the realization and number of hours**  | **ECTS credits 6**lecture 15 hclasses 45 htutorial classes 30 hstudent’s own work 60 hTOTAL: 150 h - 6 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, work in the lab |
| 1. **Number of hours**

15 h – lecture, 45 h - laboratory |
| **The academic cycle**winter |
| **Type of course**facultative | **Language of instruction**English |
| **Teaching methods**Lecture with a 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 tests, reports from the laboratory classes |
| **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*** introduction to basics of separation methods;
* introduction to the theoretical basis of chromatography;
* principles of gas chromatography (GC) and liquid chromatography (LC) - acquaintance with the construction of chromatographic systems and the basic parameters of its work;
* introduction to the extraction techniques;
* introduction into the basics of calculations necessary for the correct interpretation of the results of analyses;
* introduction to the principles of the selection of analytical conditions based on the physicochemical properties of the analytes;
* acquiring the skills of the design and implementation of selected separation method to the specific purpose;
* obtaining practical skills in the chromatographic laboratory.

**Convergent to:** analytical chemistry, environmental sciences |
| **Course contents**Classification of separation methods. Theoretical basis of the chromatographic process. Gas chromatography (GC): system construction (carrier gas, injector type, columns, detectors), mechanism of separation, field of application, selection of measurement parameters. High performance liquid chromatography (HPLC): system construction (pumps, injector, detectors, column - stationary phase types, mobile phases), mechanisms of separation, field of application, normal and reversed phase, gradient and isocratic mode. Introduction to qualitative and quantitative analysis in chromatography. Other chromatographic techniques such as TLC. Preparation of samples for analysis, types of extraction techniques, extraction of solid, liquid and gas samples. Laboratory exercises: extraction techniques; separation and analysis of chemical compounds by chromatographic techniques (GC, HPLC, TLC). |
| **Bibliography of literature** Appropriate literature or material will be given to the students. |
| **Knowledge**1. knows the basics of separation methods,2. knows and understands the theoretical basis of the chromatographic process,3. defines the basic parameters in the chromatographic analysis,4. knows the basic components of GC or HPLC systems and can describe how they are working,5. can present the basic methods of quantitative and qualitative analysis,6. draws simple conclusions from experimental data. |
| **Skills**1. can independently operate uncomplicated research equipment,2. talks about issues related to separation techniques in understandable language, using the correct nomenclature,3. can plan and perform simple experimental tests,4. is able to optimize the basic parameters of the measuring apparatus based on experimental data,5. knows the need to follow established analytical procedures,6. can perform simple quantitative and qualitative analysis. |
| **Social competence**1. understands the need for further education,2. shows responsibility for the effects of team work,3. promotes the importance of mathematical sciences in explaining many phenomena and processes,4. is responsible for the safety of own and other work: knows how to deal with emergencies, is careful when handling chemicals, is careful when handling measuring instruments. |