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| **Course title**Practical chromatography in criminology and food safety – ERASMUS Chromatografia w kryminologii i bezpieczeństwie żywności w praktyce – ERASMUS  | **ECTS code**20.0.0182 |
| **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. Łukasz Haliński, prof. UG; dr hab. Eng. Anna Białk-Bielińska, prof. UG; mgr Anna Topolewska; dr Paulina Łukaszewicz; dr Klaudia Godlewska |
| **Forms of classes, the realization and number of hours**  | **ECTS credits 6**lectures 15 hlab exercises 45 htutorial classes 30 hstudent’s own work 50 hTOTAL: 140 h – 6 ECTS |
| 1. **Forms of classes, in accordance with the UG Rector’s regulations**

Lecture, laboratory exercises |
| 1. **The realization of activities**

In-class or on-line, work in the lab |
| 1. **Number of hours**

15 h – lecture; 45 h lab exercises |
| **The academic cycle**summer |
| **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 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** It is highly recommended to accomplish the course of **Separation methods** before taking this course.  |
| **Aims of education*** introduction to method development for determination of organic compounds in complex matrices;
* principles of extraction and purification methods used in food and biomedical analyses;
* choosing the right analytical technique: gas chromatography, liquid chromatography, mass spectrometry, rapid detection methods;
* limitations of different analytical approaches and methods in real-life scenarios;
* introduction to major groups of compounds in food safety and forensic science: plant and fungal toxins, alkaloids, narcotics and drugs, pesticides;
* designing the analytical process step by step;
* acquiring the skills of the method development to the specific purpose;
* obtaining practical skills in the complex chromatography-based procedure application.

**Convergent to**: analytical chemistry, food chemistry, food analysis, forensic science |
| **Course contents**The role of chromatography the criminology and food safety. Requirements of the analysis and results acquired in the criminology and food safety. Natural and synthetic toxins of major concern in food safety and forensic science. Presentation of the modern analytical techniques –advanced and practical aspects of liquid chromatography (LC) and gas chromatography (GC); hyphenated techniques (such has GC-MS and LC-MS) and mass spectrometry (MS), with focus on their practical applications in combination with selected extraction procedure. Rapid detection methods. Practical aspects of the quality assurance and control in the analytical laboratory (calibration *vs* validation process). Extraction techniques used in the criminology and food safety and their limitations. Designing of the whole analytical process. Limitations of analytical approaches in real-life scenarios: how to overcome them? |
| **Bibliography of literature** Material is given during the lecture. |
| **Knowledge*** can explain the principles of different modern analytical techniques;
* have knowledge about practical and technical aspects of these techniques at an advanced level;
* gained the knowledge on quality control and validation in connection with planning and performing chemical analyses;
* gained the knowledge about the application of chromatography techniques in criminology and food safety;
* understands difficulties in designing a complex analytical procedure;
* knows limitations of major analytical approaches.
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| **Skills*** acquired the skills to evaluate strengths and limitations of different separation and detection techniques with respect to sample properties and to specific analytical problem;
* is able to find, choose and plan the use of suitable analytical separation techniques for the specific advanced analytical problem;
* is able to design a complex analytical procedure to the specific purpose;
* acquired the skills to judge the quality of his/her own, or others', analytical results.
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| **Social competence**1. shows responsibility for the effects of team work,
2. promotes the importance of mathematical sciences in explaining many phenomena and processes,
3. 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.
4. understands the need for further education
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