



**KAPITAŁ LUDZKI**  
NARODOWA STRATEGIA SPÓJNOŚCI

Projekt współfinansowany przez  
Unię Europejską w ramach  
Europejskiego Funduszu  
Społecznego

**UNIA EUROPEJSKA**  
EUROPEJSKI  
FUNDUSZ SPOŁECZNY



<b>Course title</b>		<b>ECTS code</b>	
HPLC - a technique for many occasions		13.3.1219	
<b>Name of unit administrating study</b>			
null			
<b>Studies</b>			
<b>faculty</b>	<b>field of study</b>	<b>type</b>	second tier studies (MA)
Faculty of Chemistry	Chemical Business	<b>form</b>	full-time
		<b>specialty</b>	all
		<b>specialization</b>	all
Faculty of Chemistry	Chemistry	<b>type</b>	second tier studies (MA)
		<b>form</b>	full-time
		<b>specialty</b>	all
Faculty of Chemistry	Environmental Protection	<b>specialization</b>	all
		<b>type</b>	second tier studies (MA)
		<b>form</b>	full-time
		<b>specialty</b>	all
		<b>specialization</b>	all
<b>Teaching staff</b>			
dr Maria Dzierżyńska; dr Ewa Wieczerek; dr Julia Witkowska			
<b>Forms of classes, the realization and number of hours</b>		<b>ECTS credits</b>	
<b>Forms of classes</b>		6	
Laboratory classes, Lecture		Classes – 45 h	
<b>The realization of activities</b>		Tutorial classes – 15 h	
blended learning, lectures in the classroom		Students's own work – 30 h	
<b>Number of hours</b>		Total: 90 h – 6 ECTS	
Lecture: 15 hours, Laboratory classes: 45 hours			
<b>The academic cycle</b>			
2022/2023 winter semester			
<b>Type of course</b>		<b>Language of instruction</b>	
an elective course		english	
<b>Teaching methods</b>		<b>Form and method of assessment and basic criteria for evaluation or examination requirements</b>	
<ul style="list-style-type: none"> <li>- conducting experiments</li> <li>- multimedia-based lecture</li> </ul>		<b>Final evaluation</b>	
		<ul style="list-style-type: none"> <li>- Graded credit</li> <li>- Examination</li> </ul>	
		<b>Assessment methods</b>	
		<ul style="list-style-type: none"> <li>- written exam with open questions</li> <li>- assignment work – completing a specific practical assignment</li> </ul>	
		<b>The basic criteria for evaluation</b>	
		Lecture:	
		• Achievement of at least 51 % of the total number of points from the written exam.	
		Seminar:	
		• Achievement of at least 51 % of the total number of points from each of the tests.	
		Student has the rights to one retake the failed exam / test. The retaken exam / test will be considered as passed when students achieves at least 51% of the total number of points from the retaken exam / test. Points from the first term and the retake do not sum up	
<b>Method of verifying required learning outcomes</b>			

Business Chemistry: Lecture – written exam with open questions about the presented subject  
 Laboratory classes – short tests before beginning the laboratory and short reports after completed tasks  
 Chemistry: Lecture – written exam with open questions about the presented subject Laboratory classes – short tests before beginning the laboratory and short reports after completed tasks  
 Environmental Protection: Lecture – written exam with open questions about the presented subject Laboratory classes – short tests before beginning the laboratory and short reports after completed tasks

### Required courses and introductory requirements

#### A. Formal requirements

English acquisition on the communicative level (B1)

#### B. Prerequisites

lack

### Aims of education

- familiarize students with application of HPLC
- presenting HPLC techniques as a tool in analytical chemistry

### Course contents

Topics of lecture: physicochemical fundamentals of separation on HPLC, basic terminology of HPLC, kinds of columns used in HPLC, different systems of HPLC, detectors in HPLC, modifiers of liquid phase in HPLC, gradient and isocratic mode, applications of HPLC, case studies.  
 Topics of laboratory work: calibration curve build, analyzing unknown analyte, sample preparation.

### Bibliography of literature

Literature required to pass the course:

- M. C. McMaster – HPLC: A Practical User's Guide  
 M. W. Dong - HPLC and UHPLC for Practicing Scientists

Extracurricular readings:

- S. Kromidas – Practical Problem Solving in HPLC  
 D. Corradini – Handbook of HPLC

### The learning outcomes (for the field of study and specialization)

Chemical Business:

K\_BChII\_W01 - knows and understands in-depth complex physicochemical processes and is able to analyse their course in connection with other fields of science

K\_BChII\_U01 - is able to based on the acquired knowledge, propose a solution to problems in chemistry, taking into account the economic aspect, using advanced measurement and analytical techniques

K\_BChII\_U04 - is able to independently plan and perform specific research tasks in the field or in the laboratory, interpret their results working individually or in a team, assuming various roles and functions in it

K\_BChII\_K01 - is willing to develop and disseminate appropriate best practices in the workplace and beyond Chemistry:

K\_W03 - demonstrates in-depth knowledge in the field of modern measuring techniques used in chemical analysis

K\_U01 - plans and implements chemical experiments of extended complexity

K\_K06 - undertakes research tasks consciously and responsibly, understanding the social aspects of the practical application of the acquired knowledge and skills and the responsibility related to it

Environmental Protection:

K\_OŚII\_W04 - chooses methods, techniques and research tools used in environmental protection

K\_OŚII\_W09 - applies safety and hygiene principles when working independently on a test or measurement stand in a laboratory or in the field

K\_OŚII\_U02 - uses advanced measurement and analytical

### Knowledge

Students are able to understand basics of HPLC, the physicochemical fundamentals of separation on chromatography column used in HPLC systems; know basic terminology used in HPLC; can recognize different column applications; can recognize different HPLC systems; can apply gradient and isocratic conditions of separation; understand different modifiers of liquid phase; application of calibration curve; understand

### Skills

Students are able to establish gradient and isocratic separation methods; build calibration curve; calculate concentration from calibration curve; read peak area; can analyze the results; can present results in coherent way.

### Social competence

Students understand need for learning, inspire other for learning; cooperate in group, taking different roles; exhibit creativity in determination of priorities necessary for realization of different tasks; understand social aspects of practical use of knowledge and abilities as well as connected with them responsibility.

<p>techniques used in environmental protection K_OŚII_K05 - critically assesses her/his own knowledge and the knowledge of the teams in which s/he works, can critically assess the content received</p>	
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