


**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>	
Principles and applications of fluorescence spectroscopy		13.3.1222	
<b>Name of unit administrating study</b>			
Faculty of Chemistry			
<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 inż. Krzysztof Żamojć			
<b>Forms of classes, the realization and number of hours</b>		<b>ECTS credits</b>	
<b>Forms of classes</b>		4	
Laboratory classes, Lecture		classes - 30 h	
<b>The realization of activities</b>		tutorial classes - 30 h	
classroom instruction		student's own work - 40 h	
<b>Number of hours</b>		TOTAL: 100 h - 4 ECTS	
Lecture: 15 hours, Laboratory classes: 15 hours			
<b>The academic cycle</b>			
2023/2024 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>- Lecture with the use of the multimedia presentation on fluorescence spectroscopy;</li> <li>- Practical laboratory work – chemical experiments, analysis of obtained results and discussion</li> </ul>		<b>Final evaluation</b>	
		Graded credit	
		<b>Assessment methods</b>	
		Lecture – exam with open and closed questions	
		Laboratory classes – reports and short tests	
		<b>The basic criteria for evaluation</b>	

	<p>Lecture: a positive note from an exam with approximately 20 open and closed questions:</p> <p>91-100%: 5.0 81-90%: 4.5 71-80%: 4.0 61-70%: 3.5 51-60%: 3.0 &lt; 51%: 2.0</p> <p>Laboratory classes: a positive note from all short tests and reports; final note is an average from notes from tests and reports:</p> <p>91-100%: 5.0 81-90%: 4.5 71-80%: 4.0 61-70%: 3.5 51-60%: 3.0 &lt; 51%: 2.0</p>
<b>Method of verifying required learning outcomes</b>	
<b>Required courses and introductory requirements</b>	
<p><b>A. Formal requirements</b> lack</p> <p><b>B. Prerequisites</b> lack</p>	
<b>Aims of education</b>	
<p>Familiarize students with the basic and more advanced aspects of fluorescence spectroscopy. Familiarize students with the use of spectrofluorometer.</p>	
<b>Course contents</b>	
<p>Topics of the lecture: absorption of the light; ground and excited states; types of electronic transitions; absorption, excitation, and emission spectra; photophysical processes in the excited state; fluorescence quenching; the studies of the mechanisms of reactions - qualitative and quantitative methods; instrumentation.</p> <p>Topics of laboratory classes: spectrofluorometer operation; basic definitions and laws related with fluorescence spectroscopy; the studies of the mechanisms of fluorescence quenching; determination of aggregation number, cmc and hydrophobicity of the surfactants' micelles with the use of steady-state fluorescence emission spectra; the studies of the influence of various factors on the fluorescence emission spectra; determination of the stoichiometry and association constants of complexes.</p>	
<b>Bibliography of literature</b>	
<p>Extracurricular readings J.R. Lakowicz – Principles of fluorescence spectroscopy B. Valeur – Molecular fluorescence</p>	
<b>The learning outcomes (for the field of study and specialization)</b>	<b>Knowledge</b>
<p>Chemical Business: K_BChII_W06 knows and understands tasks in the field of chemistry, environmental protection and economics that are the subject of human activity to a degree that allows independent work on a research, scientific and measurement position 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_K04 is willing to properly assess the acquired knowledge, respect it and disseminate it in order to solve specific cognitive and practical issues Chemistry: K_W01</p>	<p>Students: know and interpret main photophysical processes in ground and excited states as well as basic definitions and laws related with fluorescence spectroscopy; define types of electronic transitions; know differences and similarities between absorption, excitation and emission spectra; know the definitions and main mechanisms of fluorescence quenching; know main qualitative and quantitative methods of the studies of mechanisms or reactions; know the build of spectrofluorometer; define various factors which have an influence on the fluorescence emission spectra.</p>
	<b>Skills</b>
	<p>Students: present plainly – in both speech and writing – correct chemical argumentation, interpret and analyze information connected with fluorescence spectroscopy presented as text, tables, plots, schemes, figures, can use spectrofluorometer, can experimentally determine the mechanism of fluorescence quenching, aggregation number, cmc and hydrophobicity of the surfactants' micelles, can determine the influence of various factors on the fluorescence</p>

<p>uses in-depth knowledge of spectroscopic methods of chemical compound analysis K_U01 plans and implements chemical experiments of extended complexity K_U02 critically assesses the results of conducted, performed observations and theoretical calculations and discusses errors K_U04 applies acquired knowledge of chemistry and related scientific disciplines K_K02 works in a team taking on various roles in it 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_U07 has advanced skills in presenting the results of their own research, discussions based on literature data and public speaking, including leading a debate K_OŚII_K02 recognises threats, creates safe work conditions and is responsible for the safety of own and other people's work K_OŚII_K07 is willing to undertake individual and team activity; to professionally plan and organise its course and set priorities for their actions</p>	<p>emission spectra as well as the stoichiometry and association constants of complexes, interpret information, formulate conclusions and explain opinions.</p>
	<p><b>Social competence</b></p> <p>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>
<p><b>Contact</b></p> <p>krzysztof.zamojc@ug.edu.pl</p>	