

**Subject card**

<b>Subject name and code</b>	Fluorescence spectroscopy for beginners, PG_00080770						
<b>Field of study</b>	Chemical Business, Chemistry, Environmental Protection						
<b>Date of commencement of studies</b>	October 2024	<b>Academic year of realisation of subject</b>			2026/2027		
<b>Education level</b>	Bachelor's studies	<b>Subject group</b>			Optional subject group		
<b>Mode of study</b>	full-time studies	<b>Mode of delivery</b>			at the university		
<b>Year of study</b>	3	<b>Language of instruction</b>			English		
<b>Semester of study</b>	6	<b>ECTS credits</b>			2.0		
<b>Learning profile</b>	academic	<b>Assessment form</b>			credit		
<b>Conducting unit</b>	Faculty of Chemistry -> Rector						
<b>Name and surname of lecturer (lecturers)</b>	<b>Subject supervisor</b>		dr inż. Krzysztof Żamojć				
	<b>Teachers</b>						
<b>Lesson types</b>	<b>Lesson type</b>	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	<b>Number of study hours</b>	0.0	0.0	15.0	0.0	0.0	15
	E-learning hours included: 0.0						
<b>Learning activity and number of study hours</b>	<b>Learning activity</b>	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	<b>Number of study hours</b>	15		2.0		33.0	50
<b>Subject objectives</b>	Familiarize students with the basic aspects of fluorescence spectroscopy.						
	Familiarize students with the use of spectrofluorometer.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[CHEML3_W10] Enumerates and describes the basic aspects of the construction, operation and use of measuring apparatus and equipment used in experimental works in the field of chemistry and related sciences.	Students: know and interpret types of electronic transitions as well as basic definitions and laws related with fluorescence spectroscopy; know differences and similarities between absorption, excitation and emission spectra; know the build of spectrofluorometer; define the influence of solvent's polarity on the fluorescence emission and absorption spectra, know how to determine the concentration of a fluorophore and its quantum yield.	[SW4] test/exam - oral or written [SW2] presentation/project/paper/report
	[CHEML3_W12] Characterises the basic principles of health and safety at work in a chemical laboratory; knows and describes the hazards associated with working with hazardous substances, ways to counteract these hazards and rules of conduct during an accident.	Students: know and interpret types of electronic transitions as well as basic definitions and laws related with fluorescence spectroscopy; know differences and similarities between absorption, excitation and emission spectra; know the build of spectrofluorometer; define the influence of solvent's polarity on the fluorescence emission and absorption spectra, know how to determine the concentration of a fluorophore and its quantum yield.	[SW4] test/exam - oral or written [SW2] presentation/project/paper/report
	[CHEML3_U04] Plans and performs simple chemical experiments and analyses the results obtained.	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 register absorption, fluorescence excitation and emission spectra; can experimentally determine fluorescence quantum yields and the influence of solvent's polarity on the fluorescence emission spectra; can interpret information, formulate conclusions and explain opinions; can determine the concentration of a fluorophore with the use of fluorescence spectroscopy.	[SU2] presentation/project/paper/report [SU4] test/exam - oral or written
	[CHEML3_K02] Works individually demonstrating initiative and independence of activity and cooperates in a team fulfilling various roles in it.	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.	[SK2] presentation/project/paper/report [SK4] test/exam - oral or written

	Course outcome	Subject outcome	Method of verification
	[CHEML3_U07] Prepares documented elaboration on a specific problem in the field of selected chemical and physical issues.	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 register absorption, fluorescence excitation and emission spectra; can experimentally determine fluorescence quantum yields and the influence of solvent's polarity on the fluorescence emission spectra; can interpret information, formulate conclusions and explain opinions; can determine the concentration of a fluorophore with the use of fluorescence spectroscopy.	[SU2] presentation/project/paper/report [SU4] test/exam - oral or written
Subject contents	Spectrofluorometer operation; basic definitions and laws related with fluorescence spectroscopy; registration of absorption, fluorescence excitation and emission spectra; determination of fluorescence quantum yields; the studies of the influence of solvent's polarity on the fluorescence emission spectra; quantitative determination of the selected fluorophores.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Laboratory report	51.0%	25.0%
	Written test	51.0%	75.0%
Recommended reading	Basic literature	1. J.R. Lakowicz Principles of fluorescence spectroscopy 2. B. Valeur, Molecular fluorescence 3. Z. Kęcki, Podstawy spektroskopii molekularnej	
	Supplementary literature	Not applicable.	
	eResources addresses		
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		

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