



Subject card

Subject name and code	Supramolecular Chemistry and Technology, PG_00045475						
Field of study	Chemical Technology						
Date of commencement of studies	February 2024	Academic year of realisation of subject			2024/2025		
Education level	second-cycle studies	Subject group			Optional subject group Subject group related to scientific research in the field of study		
Mode of study	Full-time studies	Mode of delivery			at the university		
Year of study	1	Language of instruction			Polish		
Semester of study	2	ECTS credits			2.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Chemistry and Technology of Functional Materials -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Ewa Wagner-Wysięcka					
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	0.0	0.0	30
	E-learning hours included: 0.0						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours		Self-study	SUM	
	Number of study hours	30	5.0		15.0	50	
Subject objectives	The aim of the course is to familiarize students with the basics of supramolecular chemistry and its applications in science and technology.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K7_K01	The student is able to propose solutions to a technical or technological problem using supramolecular chemistry methodology, is able to analyze known solutions and assess their advantages and disadvantages			[SK1] Assessment of group work skills [SK5] Assessment of ability to solve problems that arise in practice [SK3] Assessment of ability to organize work		
	K7_W03	The student defines the terms: the complexation constant and the HOST - GUEST interactions. The student lists and compares the types of interactions (other than covalent bonding) leading to supramolecular structures, and defines nano-scale systems. The student distinguishes the following terms: templating effect, macrocyclic effect, chelating effect. Student explains the terms: preorganization and complementarity. The student identifies individual classes of host molecules, shows the similarities of the properties of natural and synthetic ionophores. The student lists and explains the similarities and differences in the structure of hosts that complex anions, cations or neutral molecules. Student can indicate the applications of supramolecular systems and selected nanostructures in technology, medicine and environmental protection.			[SW1] Assessment of factual knowledge		

Subject contents	<p>Lecture: Historical aspects of the development of supramolecular chemistry. Basic concepts and definitions in supramolecular chemistry. Concepts: ligand, substrate, receptor, host, guest. Types of interactions in supramolecular structures and methods of investigations of guest-host interactions. Pearson's theory of hard and soft acids and bases. Supramolecular systems their role in nature. Artificial complexing compounds (podands, coronands, cryptands, spherands, calixarenes, hetero- and homo-calixarenes, metalloporphyrins and others). Strategy for the synthesis and preparation of supramolecular systems including macrocyclic compounds (template effect, preorganization, dilution method, high pressure method). Construction of exemplary supramolecular structures and selectivity of interactions. Supramolecular systems in science and technology and their connections with other fields (nanotechnology, medicine, pharmacy, environmental protection).</p> <p>Laboratory:</p> <ol style="list-style-type: none"> 1. Absorption properties of MOFS network exemplified with KOH / -cyclodextrin network 2. Synthesis and investigation of the properties of quantum dots 3. Synthesis of urea and thiourea clathrates. Investigation of physicochemical properties 4. Chromogenic ion receptors in analytical applications 5. Supramolecular complexes of organic compounds with cyclodextrins 											
Prerequisites and co-requisites												
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="456 696 794 723">Subject passing criteria</th> <th data-bbox="799 696 1137 723">Passing threshold</th> <th data-bbox="1142 696 1481 723">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="456 730 794 801">praktyczne odrobienie wszystkich zajęć, zaliczenie kolokwium i przygotowanie sprawozdań</td> <td data-bbox="799 730 1137 801">100.0%</td> <td data-bbox="1142 730 1481 801">45.0%</td> </tr> <tr> <td data-bbox="456 808 794 835">zaliczenie pisemne</td> <td data-bbox="799 808 1137 835">50.0%</td> <td data-bbox="1142 808 1481 835">55.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	praktyczne odrobienie wszystkich zajęć, zaliczenie kolokwium i przygotowanie sprawozdań	100.0%	45.0%	zaliczenie pisemne	50.0%	55.0%
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Example issues/ example questions/ tasks being completed	<p>Discuss the relationship between the structure of crown ethers and their selectivity towards metal cations.</p> <p>Discuss the strategy for the synthesis of macrocyclic compounds.</p>											
Work placement	Not applicable											