

COURSE OFFERED IN THE DOCTORAL SCHOOL

Code of the course	4606-V-ES-00001	Name of the course	Polish	Zaawansowane materiały funkcjonalne		
			English	Advanced Functional Materials		
Type of the course	Special courses					
Course coordinator	Prof. Robert Dominko		Course teacher	Prof. Robert Dominko		
Implementing unit	WCh	Scientific discipline / disciplines*	Chemical Sciences/Physical Sciences/Chemical Engineering/Materials Engineering			
Level of education	Doctoral studies	Semester	winter			
Language of the course	English					
Type of assessment	exam	Number of hours in a semester	15	ECTS credits	2	
Minimum number of participants	10	Maximum number of participants	100	Available for students (BSc, MSc)	Yes/No	
Type of classes		Lecture	Auditory classes	Project classes	Laboratory	Seminar
Number of hours	in a week		-	-	-	-
	in a semester	10	5	-	-	-

* does not apply to the Researcher's Workshop

1. Prerequisites

Not required

2. Course objectives

After completing the course, the student will acquire theoretical knowledge about advanced functional materials, including knowledge in the field of materials chemistry regarding the preparation and testing of materials and knowledge about their principles of operation. Student will be able to propose the use of appropriate types of advanced functional materials for various applications, taking into account technical, economic and environmental parameters.

3. Course content (separate for each type of classes)

Lecture

1. Introduction to advanced functional materials.
2. Physicochemical basis of advanced functional materials.
3. Overview of currently used advanced functional materials.
4. Detailed discussion of advanced functional materials, including:
 - a) aspects of the chemistry of functional materials
 - b) raw material facilities and component supply chain
 - c) a method of manufacturing of advanced functional materials
 - e) issues related to safety of use and environmental friendliness.
5. An overview of future advanced functional materials technologies.

Laboratory

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4. Learning outcomes

Type of learning outcomes	Learning outcomes description	Reference to the learning outcomes of the WUT DS	Learning outcomes verification methods*
Knowledge			
K01	Student has a solid foundation of knowledge about the chemistry and application of advanced functional materials.	SD_W3, SD_W2	exam
Skills			
S01	Student can determine the technological parameters and characteristics of advanced functional materials.	SD_U4, SD_U6	exam
Social competences			
SC01	Student has the ability to independently study selected topics.	SD_K1, SD_K2	exam

*Allowed learning outcomes verification methods: exam; oral exam; written test; oral test; project evaluation; report evaluation; presentation evaluation; active participation during classes; homework; tests

5. Assessment criteria

The lecture is assessed on the basis of a written exam.

6. Literature

Primary references:

Literature including books, book chapters and scientific articles will be pointed by the Lecturer during the course.

7. PhD student's workload necessary to achieve the learning outcomes**

No.	Description	Number of hours
1	Hours of scheduled instruction given by the academic teacher in the classroom	15
2	Hours of consultations with the academic teacher, exams, tests, etc.	15
3	Amount of time devoted to the preparation for classes, preparation of presentations, reports, projects, homework	10
4	Amount of time devoted to the preparation for exams, test, assessments	10
Total number of hours		50
ECTS credits		2

** 1 ECTS = 25-30 hours of the PhD students work (2 ECTS = 60 hours; 4 ECTS = 110 hours, etc.)

8. Additional information

Number of ECTS credits for classes requiring direct participation of academic teachers	1
Number of ECTS credits earned by a student in a practical course	1