

Subject card

Subject name and code	Surface Science, PG_00039755								
Field of study	Materials Engineering, Materials Engineering								
Date of commencement of studies	October 2021		Academic year of realisation of subject			2023/2024			
Education level	first-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	3		Language of instruction			Polish			
Semester of study	5		ECTS credits			2.0			
Learning profile	general academic pro	ofile	Assessmer	nt form		assessment			
Conducting unit	Department of Solid S	State Physics -	> Faculty of Ap	plied Physics a	nd Mat	thematics			
Name and surname	Subject supervisor		dr hab. inż. Ja	acek Ryl					
of lecturer (lecturers)	Teachers		dr hab. inż. Ja	acek Ryl					
Lesson types and methods	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	Seminar	SUM	
of instruction	Number of study hours	15.0	0.0	0.0	0.0		15.0	30	
	E-learning hours inclu	uded: 0.0							
Learning activity and number of study hours	Learning activity	Participation i classes including		Participation i consultation h		Self-st	udy	SUM	
	Number of study hours	30		5.0		15.0		50	
Subject objectives	The goal of the subject is the presentation of basic problems resulting from he existence of interface between material objects and its surroundings. Discussion of the consequences arising from the existence of surface energy. Analysis of possible applications of surface phenomena in technology. Understanding of problems and benefits resulting from decreasing dimensions of objects with the special emphasis on the semiconductor band structure modification resulting from the surface charge distribution.								
Learning outcomes	Course out	come	Subj	ject outcome			Method of verification		
	K6_U07		Is able to perform research in the literature on topic of broadly understood surface physicochemistry.			[SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information			
	K6_W08		Understands the benefits and drawbacks of the ongoing miniaturisation of electronic components. He understands the increasing role played by the surface phenomena.			[SW1] Assessment of factual knowledge			
	K6_W07		Understands the role played by the surface and its influence on the materials properties. Understands physics of such processes as flotation, detergention, catalysis. Understands the role played by the surface charge layer in modification of band structure of semiconductors.			[SW1] Assessment of factual knowledge			
	K6_K01		Understands the necessity of studying more in depth many complementary fields of science, necessary to understand the surface phenomena.			[SK2] Assessment of progress of work			
	K6_U09		Analyses the scientific publication and prepares the oral presentation explaining main issues discussed in the paper.		[SU5] Assessment of ability to present the results of task [SU2] Assessment of ability to analyse information				

Data wydruku: 04.05.2024 13:08 Strona 1 z 2

Surface crystallography. Surface relaxation and reconstruction. Surface tension and surface thermodynamics. Chemical and physical adsorption and its influence on surface properties. Physics of semiconductor surface. Surface effects in technology (flotation, detergention, etc.). Friction - dry friction theories, boundary friction. Natural and artificial coatings. Colloids. Selected technologies of thin layers deposition. Prerequisities and cor-requisites Assessment methods and criteria Subject passing criteria Multimedia assisted oral presentation Written work 50.0% 50.0% Recommended reading Basic literature K. W. Kolasinski: Surface Science - Foundations of Catalysis and Nanoscience Supplementary literature G. Bracco, B. Hois: Surface Science Techniques Adress yna platformie enhauczanie: Flzykochemia Powerzorini - 23/24 - Moodle ID: 30872 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=30872 Example issues/ example questions/ Definition of surface energy and surface tension.		ntents Introduction - ideal and real surface.							
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Data wydruku: 04.05.2024 13:08 Strona 2 z 2