



Subject card

Subject name and code	Surface Science, PG_00039755						
Field of study	Materials Engineering, Materials Engineering, Materials Engineering						
Date of commencement of studies	October 2022		Academic year of realisation of subject		2022/2023		
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	1		ECTS credits		2.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Department of Solid State Physics -> Faculty of Applied Physics and Mathematics						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Jacek Ryl				
	Teachers		dr hab. inż. Jacek Ryl				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	0.0	15.0	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 goal of the subject is the presentation of basic problems resulting from the 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 outcome		Subject outcome		Method of verification		
	K7_W05		Student knows the theoretical basis of analytical techniques used to study surface processes and phenomena as well as nanomaterials		[SW1] Assessment of factual knowledge		
	K7_U01		Can survey for research concerning the broadly understood surface physicochemistry.		[SU1] Assessment of task fulfilment		

Subject contents	Introduction - ideal and real surface.		
	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.			
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Written work	50.0%	50.0%
	Multimedia assisted oral presentation	50.0%	50.0%
Recommended reading	Basic literature	K. W. Kolasinski: Surface Science - Foundations of Catalysis and Nanoscience	
	Supplementary literature	G. Bracco,B. Hols: Surface Science Techniques	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	Definition of surface energy and surface tension.		
	Discussion of the surface influence on semiconductor band structure.		
	Surface effects in technology.		
	Adsorption process description.		
	Analysis of reasons of the segregation effect in alloys.		
Work placement	Not applicable		