



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	<p>Introduction - ideal and real surface.</p> <p>Surface crystallography.</p> <p>Surface relaxation and reconstruction.</p> <p>Surface tension and surface thermodynamics.</p> <p>Chemical and physical adsorption and its influence on surface properties.</p> <p>Physics of semiconductor surface.</p> <p>Surface effects in technology (flotation, detergention, etc.).</p> <p>Friction - dry friction theories, boundary friction.</p> <p>Natural and artificial coatings.</p> <p>Colloids.</p> <p>Selected technologies of thin layers deposition.</p>											
Prerequisites and co-requisites												
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="456 1028 794 1057">Subject passing criteria</th> <th data-bbox="799 1028 1137 1057">Passing threshold</th> <th data-bbox="1142 1028 1469 1057">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="456 1064 794 1093">Written work</td> <td data-bbox="799 1064 1137 1093">50.0%</td> <td data-bbox="1142 1064 1469 1093">50.0%</td> </tr> <tr> <td data-bbox="456 1099 794 1128">Multimedia assisted oral presentation</td> <td data-bbox="799 1099 1137 1128">50.0%</td> <td data-bbox="1142 1099 1469 1128">50.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Written work	50.0%	50.0%	Multimedia assisted oral presentation	50.0%	50.0%
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Multimedia assisted oral presentation	50.0%	50.0%										
Recommended reading	<p>Basic literature</p> <p>Supplementary literature</p> <p>eResources addresses</p>	<p>K. W. Kolasinski: Surface Science - Foundations of Catalysis and Nanoscience</p> <p>G. Bracco, B. Hols: Surface Science Techniques</p>										
Example issues/ example questions/ tasks being completed	<p>Definition of surface energy and surface tension.</p> <p>Discussion of the surface influence on semiconductor band structure.</p> <p>Surface effects in technology.</p> <p>Adsorption process description.</p> <p>Analysis of reasons of the segregation effect in alloys.</p>											
Work placement	Not applicable											