



Subject card

Subject name and code	Surface physical chemistry, PG_00062729						
Field of study	Technologies for Industry 5.0						
Date of commencement of studies	October 2026	Academic year of realisation of subject			2027/2028		
Education level	first-cycle studies	Subject group			Obligatory subject group in the field of study 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	2	Language of instruction			Polish		
Semester of study	3	ECTS credits			6.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Department of Solid State Physics -> Faculty of Applied Physics and Mathematics -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Jacek Ryl					
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	30.0	0.0	15.0	75
	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	75	5.0	70.0	150		
Subject objectives	The aim of the course is to familiarize students with the issues related to phenomena occurring on the surface limiting material objects. Discussion of the consequences of the occurrence of surface energy. Analysis of the possibilities of using surface phenomena in industrial technologies, with particular emphasis on the topics related to the functioning of sensors, degradation and corrosion processes and the properties of semiconductors.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_U01] applies knowledge of mathematics, physics, chemistry, IT tools and other engineering disciplines to solve theoretical, engineering and technological problems	The student is able to use interdisciplinary knowledge to solve problems related to surface engineering, is able to select measurement tools to assess specific surface phenomena			[SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools		
	[K6_W01] demonstrates knowledge and understanding of mathematics, physics, chemistry and IT tools at the level necessary to formulate and solve typical engineering and technological problems	The student has knowledge of the processes and phenomena occurring at the surface and interface between materials, has knowledge of measurement tools for surface processes.			[SW1] Assessment of factual knowledge		
	[K6_K03] effectively, clearly and unambiguously conveys information, describes activities and communicates their results and opinions of a specialist engineer using appropriate communication methods and tools	The student is able to describe issues related to the physicochemistry of surfaces, referring to their influence on the functional properties of materials and devices.			[SK4] Assessment of communication skills, including language correctness		

Subject contents	<p>Course content – lecture Introduction - ideal and real surface.</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>Electrochemistry vs surface chemistry</p> <p>Modification and functionalization of sensors surface</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="448 965 794 999">Subject passing criteria</th> <th data-bbox="794 965 1141 999">Passing threshold</th> <th data-bbox="1141 965 1487 999">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="448 999 794 1032">Exam</td> <td data-bbox="794 999 1141 1032">60.0%</td> <td data-bbox="1141 999 1487 1032">40.0%</td> </tr> <tr> <td data-bbox="448 1032 794 1088">Multimedia assisted oral presentation</td> <td data-bbox="794 1032 1141 1088">60.0%</td> <td data-bbox="1141 1032 1487 1088">20.0%</td> </tr> <tr> <td data-bbox="448 1088 794 1126">Laboratory mark</td> <td data-bbox="794 1088 1141 1126">60.0%</td> <td data-bbox="1141 1088 1487 1126">40.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Exam	60.0%	40.0%	Multimedia assisted oral presentation	60.0%	20.0%	Laboratory mark	60.0%	40.0%
Subject passing criteria	Passing threshold	Percentage of the final grade													
Exam	60.0%	40.0%													
Multimedia assisted oral presentation	60.0%	20.0%													
Laboratory mark	60.0%	40.0%													
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														
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>														
Practical activities within the subject	Not applicable														

Document generated electronically. Does not require a seal or signature.