1.	Field of study	Materials Science and Engineering
2.	Academic year of entry	2017/2018 (winter term)
3.	Level of qualifications/degree	second-cycle studies (in engineering)
4.	Degree profile	general academic
5.	Mode of study	full-time

Module: Surface structure and its modifications

Module code: IM2A_SPJM

1. Number of the ECTS credits: 4

2. Learning outcomes of the module

code	description	learning outcomes of the programme	level of competence (scale 1-5)
IM2A_SPJM_1	Understanding the engineering materials surface and surface layers structure; knowing phenomena and processes occurring on the material - environment interface; knowing methods for surface modification to improve functional properties of engineering materials.	IM2A_W06 IM2A_W07	2 1
IM2A_SPJM_2	Students have knowledge about modern testing methods for the structure and properties of material surface layers.	IM2A_W13	3
IM2A_SPJM_3	Students have the skill to choose appropriate protection methods or to improve surface properties of engineering materials.	IM2A_U11 IM2A_W06	2 3
IM2A_SPJM_4	Students have knowledge about economic and environmental aspects of surface modification.	IM2A_K02 IM2A_U13 IM2A_W18	2 1 5

3. Module description

Description	The module Surface structure and its modifications shall enable that students are knowledgeable about engineering materials surface structure, physio-chemical phenomena occurring on the interface, tribological properties as well as modification methods enabling improvement to functional properties of engineering materials; that they master modern testing methods for the structure and properties Owing to that students shall achieve a full understanding of the structure and properties relationships between the substrate, the layer and external conditions. The understanding of those relationships shall result in acquiring the skill to shape the surface structure so as to obtain better functional properties of engineering materials required in the intended use conditions.
Prerequisites	It is required to achieve effects of education in physics, chemistry, rudiments of materials science or materials science modules.

4. Assessment of the learning outcomes of the module			
code	**type**	**description**	**learning outcomes of the module**
IM2A_ SPJM _w_1	Written examination	Verification of the knowledge based on the lectures content, recommended literature and attended classes.	IM2A_SPJM_1, IM2A_SPJM_2, IM2A_SPJM_3, IM2A_SPJM_4
IM2A_ SPJM _w_2	Test	Assessment of mastering the basic knowledge necessary for individual performance of a practical exercise.	IM2A_SPJM_1, IM2A_SPJM_2, IM2A_SPJM_3
IM2A_ SPJM _w_3	Sprawozdanie	Assessment of the skill of understanding the need for shaping the surface layers structure and their influence on engineering materials functional properties	IM2A_SPJM_1, IM2A_SPJM_2, IM2A_SPJM_3

5. Forms of teaching						
code	**form of teaching**			**required hours of student's own work**		**assessment of the learning outcomes of the module**
	type	**description (including teaching methods)**	**number of hours**	**description**	**number of hours**	
IM2A_SPJM _fs_1	lecture	The lecture shall enable understanding the issues related to the surface structure, physio-chemical phenomena, the need for surface layers manufacturing to improve functional properties of engineering materials. The lecture is delivered with the use of multimedia.	30	The work with the recommended literature comprising independent acquisition of knowledge related to basic issues.	25	IM2A_ SPJM _w_1
IM2A_SPJM _fs_2	laboratory classes	Application of the acquired theoretical knowledge to a practical learning of surface modification methods to improve functional properties of materials. Exercises are performed by students individually with the use of equipment of teaching and scientific laboratories.	30	Preparation of theoretical basics and issues related to the topic of performed exercise. Independent preparation of a theoretical introduction. Individual preparation of exercise results.	35	IM2A_ SPJM _w_2, IM2A_ SPJM _w_3