1.	**Field of study**	**Materials Science and Engineering**
2.	Faculty	Faculty of Science and Technology
3.	Academic year of entry	2019/2020 (winter term), 2020/2021 (winter term), 2021/2022 (winter term), 2022/2023 (winter term), 2023/2024 (winter term), 2024/2025 (winter term)
4.	Level of qualifications/degree	second-cycle studies (in engineering)
5.	Degree profile	general academic
6.	Mode of study	full-time

Module: Specialised subject 1. Phase transitions in amorphous and nanocrystalline materials

Module code: IM2A_ PS1_PFAN

1. Number of the ECTS credits: 3

2. Learning outcomes of the module

code	description	learning outcomes of the programme	level of competence (scale 1-5)
IM2A_PS1_PFAN_1	Understanding phenomena of phase transitions, interpreting relationships between the structure and phase transitions, analysing and explaining processes affecting phase transitions.	IM2A_W01 IM2A_W12	1 5
IM2A_PS1_PFAN_2	The skill to analyse phase transitions and to select methods for forming, in respect of phase transitions, materials for technical applications.	IM2A_K05 IM2A_U18	1 5
IM2A_PS1_PFAN_3	Development of the awareness of the need to model and form materials in respect of phase transitions.	IM2A_K04	3

3. Module description

Description	The module Phase transitions in amorphous and nanocrystalline materials shall enable students classifying phase transitions and understanding, interpreting and analysing phenomena related to phase transitions and their influence on properties of amorphous and nanocrystalline materials. Owing to that students will be capable of reconstructing, explaining, planning and using technologies utilising phase transitions in amorphous and nanocrystalline materials. They will have a possibility to adapt the existing and to design new technologies.
Prerequisites	It is required to achieve effects of education of the modules: physics, chemistry, crystallography, materials testing methods and thermodynamics.

4. Assessment of the learning outcomes of the module

code	type	description	learning outcomes of the module
IM2A_PS1	Written credits	Verification of the knowledge based on the lectures content, recommended literature and	

_PFAN_w_1		attended laboratory classes.	IM2A_PS1_PFAN_1, IM2A_PS1_PFAN_2, IM2A_PS1_PFAN_3
IM2A_PS1 _PFAN_w_3	Test	Assessment of mastering the basic knowledge necessary for individual performance of a practical exercise.	IM2A_PS1_PFAN_1, IM2A_PS1_PFAN_2, IM2A_PS1_PFAN_3
IM2A_PS1 _PFAN_w_4	Report	Assessment of the skill to understand phase transitions mechanisms and to connect them with engineering materials properties by a correct formulation of conclusions.	IM2A_PS1_PFAN_1, IM2A_PS1_PFAN_2, IM2A_PS1_PFAN_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_PS1 _PFAN_fs_1	lecture	The lecture shall enable understanding issues related to phase transitions: phenomena, processes, and mechanisms enabling affecting phase transitions. The lecture is delivered with the use of multimedia and demonstrations.	30	The work with the recommended literature comprising independent acquisition of knowledge related to basic issues.	35	IM2A_PS1_PFAN_w_1
IM2A_PS1 _PFAN_fs_3	laboratory classes	The application of learned theoretical knowledge in practical learning of phase transitions and their mechanisms. Exercises are performed by students individually with the use of equipment of teaching and scientific laboratories.	15	Preparation of theoretical basics and issues related to the topic of performed exercise. Independent preparation of a theoretical introduction. Individual preparation of exercise results.	15	IM2A_PS1_PFAN_w_3 IM2A_PS1_PFAN_w_4