

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

Module: Specialised subject 3. Non-magnetic nanomaterials

Module code: IM2A_PS3_NMN

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_PS3_NMN_1	Understanding relationships between the structure and properties of non-magnetic nanomaterials, understanding phenomena of processes resulting in those materials properties changes.	IM2A_W12	5
IM2A_PS3_NMN_2	Learning phenomena, processes, manufacturing methods and mechanisms responsible for changing physical properties of non-magnetic nanomaterials.	IM2A_W11	3
IM2A_PS3_NMN_3	The skill to analyse the structure and properties of non-magnetic nanomaterials and to select manufacturing methods of non-magnetic nanomaterials for technical applications.	IM2A_K05 IM2A_U17 IM2A_U18	1 5 5
IM2A_PS3_NMN_4	Development of the awareness of the need to produce and to affect the structure to change non-magnetic nanomaterials properties.	IM2A_K04	5

3. Module description	
Description	The module Non-magnetic nanomaterials shall enable that students are knowledgeable about non-magnetic nanomaterials structure and about methods, phenomena, and processes enabling those materials manufacturing and properties changing. Owing to that students shall achieve a better understanding of correlations between manufacturing methods, non-magnetic nanomaterials structure and mechanisms affecting their properties. The understanding of relationships and correlations between those materials properties and their structure shall result in honing the skill to form materials of expected physical properties for applications in technology.
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_PS3_NMN_w_1	Written examination	Verification of the knowledge based on the lectures content, recommended literature and attended classes.	IM2A_PS3_NMN_1, IM2A_PS3_NMN_2, IM2A_PS3_NMN_3, IM2A_PS3_NMN_4
IM2A_PS3_NMN_w_3	Test	Assessment of mastering the basic knowledge necessary for individual performance of a practical exercise.	IM2A_PS3_NMN_1
IM2A_PS3_NMN_w_4	Report	Assessment of the skill to understand manufacturing mechanisms in connection with non-magnetic nanomaterials properties by a correct formulation of conclusions.	IM2A_PS3_NMN_3, IM2A_PS3_NMN_4

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_PS3_NMN_fs_1	lecture	The lecture shall enable understanding issues related to the structure of non-magnetic nanomaterials, phenomena, processes, and mechanisms enabling affecting their properties shaping. 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.	10	IM2A_PS3_NMN_w_1
IM2A_PS3_NMN_fs_3	laboratory classes	The application of acquired theoretical knowledge to experimental learning of non-magnetic nanomaterials structure and of mechanisms enabling shaping their properties. 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.	20	IM2A_PS3_NMN_w_3, IM2A_PS3_NMN_w_4