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: Monographic lecture 1. Nuclear techniques in materials testing

Module code: IM2A_WM1_TJB

1. Number of the ECTS credits: 2

2. Learning outcomes of the module

code	description	learning outcomes of the programme	level of competence (scale 1-5)
IM2A_WM1_TJB_1	Understanding the role and importance of nuclear spectroscopic techniques in materials testing.	IM2A_W13	5
IM2A_WM1_TJB_2	Knowledge of basic terms and definitions used in the description of nuclear spectroscopic methods. Understanding the terms used to describe phenomena being the basis of nuclear spectroscopic methods used in materials science with special emphasis on issues related to materials.	IM2A_W13	5
IM2A_WM1_TJB_3	Knowledge of basic instruments and principles of Moessbauer spectra and positron lifetime spectra measurement and the basis of numerical analysis of experimentally obtained data.	IM2A_W05	5
IM2A_WM1_TJB_4	The skill to analyse and interpret parameters obtained in the process of numerical processing of spectra and their application to describe selected properties of materials.	IM2A_U07	5
IM2A_WM1_TJB_5	The skill to describe and characterise nuclear spectroscopic methods using an understandable language, a free talk about obtained results and their interpretation.	IM2A_U01 IM2A_U04	5 5
IM2A_WM1_TJB_6	Development of the awareness of the importance of nuclear spectroscopic methods with particular emphasis on positron lifetime spectra and Moessbauer effect spectra in modern materials science and materials.	IM2A_K05 IM2A_K06	5 1

3. Module description

Description	The module Nuclear techniques in materials testing shall enable students learning those nuclear physics issues, which constitute the basis for nuclear techniques applications in materials testing and also which are necessary to understand the way of analysis of obtained experimental results and nuclear research methods used in the materials science. Owing to that students shall understand the importance of nuclear techniques not only in the description of materials physio-chemical properties, but also in designing new engineering materials for technical and medical applications. The accomplishment of

	the above objectives will require learning a number of issues from the field of physics, solid state physics, chemistry, mathematics, numerical methods, and also of mathematical statistics.
Prerequisites	The knowledge of physics, chemistry, mathematics, numerical methods, and also of mathematical statistic obtained in the basic module of materials science is required.

4. Assessment of the learning outcomes of the module

code	type	description	learning outcomes of the module
IM2A_WM1_TJB_w_1	Credits test	Verification of the knowledge based on the lectures content, recommended literature and attended classes.	IM2A_WM1_TJB_1, IM2A_WM1_TJB_2, IM2A_WM1_TJB_3, IM2A_WM1_TJB_4, IM2A_WM1_TJB_5, IM2A_WM1_TJB_6

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_WM1_TJB_fs_1	lecture	The lecture shall enable understanding of basic terms and definitions used in the description of nuclear spectroscopic methods. Understanding the terms used to describe phenomena being the basis of nuclear spectroscopic methods used in materials science with special emphasis on issues related to materials. The lecture is aimed at teaching nuclear physics issues, which constitute the basis for nuclear techniques applications in materials testing and also which are necessary to understand the way of analysis of obtained experimental results and nuclear research methods used in the materials science. The lecture is delivered with the use of multimedia based on a selected set of handbooks.	30	The work with the recommended literature comprising independent acquisition of knowledge related to issues presented during the lectures.	35	IM2A_WM1_TJB_w_1