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

Module: Carbon and composite biomaterials

Module code: IM1A_BWK

1. Number of the ECTS credits: 5

2. Learning outcomes of the module

code	description	learning outcomes of the programme	level of competence (scale 1-5)
IM1A_BWK_1	An elementary knowledge comprising the structural design, biocompatibility criteria and properties of carbon and composite biomaterials; distinguishing basic carbon structures; distinguishing composite materials because of the matrix type; being knowledgeable about current development trends of the chemistry of carbon and composite materials used in medicine.	IM1A_W11 IM1A_W16 IM1A_W17	2 3 3
IM1A_BWK_2	The skill to evaluate basic features and possibilities of a selected carbon and composite material application in medicine.	IM1A_U14 IM1A_U25	3 2
IM1A_BWK_3	Development of the awareness of carbon and composite biomaterials application consequences in medicine.	IM1A_K02	1

3. Module description

Description	The Carbon and composite biomaterials module allows students to acquire a basic knowledge about carbon and composite materials used for medical purposes. Owing to that students should be capable of classifying the aforementioned materials, of showing basic criteria for their selection, as well as should be aware of the biodegradation processes occurrence. These skills will allow understanding the relations between the chemical and phase structure, the condition of carbon and composite biomaterials surface and the practical properties of the material. Students understand that a composite material, created from at least two components, of substantially different properties, is a new material of properties better as compared to components properties. Students will learn the current research trends related to the use of carbon and composite materials for medical purposes, in which the biomaterials of the newest generation are to influence organisms in a way that stimulates their regeneration.
Prerequisites	It is required to achieve effects of education of the modules: chemistry, physics, materials testing methods, and introduction to biomaterials.

4. Assessment of the learning outcomes of the module

code	type	description	learning outcomes of the module
IM1A_BWK_w_1	Written examination	Verification of the knowledge obtained based on lectures, suggested literature and carried out classes.	IM1A_BWK_1, IM1A_BWK_2, IM1A_BWK_3
IM1A_BWK_w_2	Written test	Assessment of the acquired skills of elementary description of carbon and composite biomaterials and also of their classification.	IM1A_BWK_1, IM1A_BWK_2, IM1A_BWK_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	
IM1A_ BWK_fs_2	laboratory classes	The classes are aimed at performing a practical analysis for basic issues related to carbon and composite biomaterials properties, and determining parameters characteristic of carbon and composite materials. Classes are conducted based on discussion and resolving tasks with the use of multimedia, and demonstrations.	30	Preparation to classes through independent studying of recommended issues	45	IM1A_BWK_w_2
IM1A_BWK _fs_1	lecture	The lecture shall provide students with the basic criteria for carbon and composite biomaterials division and selection for medical purposes. The lecture is delivered with the use of multimedia, demonstrations and exhibits.	30	The work with the literature materials recommended as sources, comprising an independent analysis and the acquisition of knowledge about the analysed issues.	45	IM1A_BWK_w_1