

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: Specialised subject 3. Modelling implants properties by means of FEM

Module code: IM2A_PS3_MES

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_MES_1	Understanding the finite element method (FEM) and its application to design implants; learning possibilities and limitations of the finite element method and the FEM application to simulate physical properties of implants.	IM2A_W02 IM2A_W03 IM2A_W07 IM2A_W08 IM2A_W15	5 2 2 2 2
IM2A_PS3_MES_2	The skill to analyse implants properties based on results obtained by the finite element method.	IM2A_K05 IM2A_U08	1 5
IM2A_PS3_MES_3	Development of the awareness of the need to model and produce implants.	IM2A_K02	5

3. Module description	
Description	The module Modelling implants properties by means of FEM shall enable that students are knowledgeable about possibilities of the finite element method application to model materials for implants. Owing to that students shall achieve a better understanding of materials modelling problems and of correlations between results and the actual materials and their properties, which shall result in deepening the skill of implants shaping with the use of structure and properties of engineering materials for medical applications.
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_MES_w_1	Exam	Verification of the knowledge based on the lectures content, recommended literature and attended classes.	IM2A_PS3_MES_1, IM2A_PS3_MES_2, IM2A_PS3_MES_3
IM2A_PS3_MES_w_2	Report	The assessment of the skill to use the FEM and results interpretation by correct formulation of conclusions.	IM2A_PS3_MES_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_PS3_MES_fs_1	lecture	The lecture shall enable understanding issues related to the modelling of implants, processes and mechanisms enabling affecting their properties shaping. The lecture is delivered with the use of multimedia, demonstrations and the FEMM and FLUX 2D/3D software.	30	The work with the recommended literature comprising independent acquisition of knowledge related to basic issues.	10	IM2A_PS3_MES_w_1
IM2A_PS3_MES_fs_3	laboratory classes	The application of learned theoretical knowledge in practical modelling of implants. Classes are performed by students individually with the use of software.	30	Preparation of theoretical basics and issues related to the topic of performed simulation. Independent preparation of a theoretical introduction. Individual preparation of results.	20	IM2A_PS3_MES_w_2