

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)
4. Level of qualifications/degree	first-cycle studies (in engineering)
5. Degree profile	general academic
6. Mode of study	full-time

Module: Object oriented programming and computer simulations

Module code: IM1A_PSK

1. Number of the ECTS credits: 4

2. Learning outcomes of the module			
code	description	learning outcomes of the programme	level of competence (scale 1-5)
IM1A_PSK_1	Understanding basic terms, the idea and principles of object oriented programming.	IM1A_W19 IM1A_W20	1 5
IM1A_PSK_2	The skill to analyse the content of an engineering task and to apply the object oriented programming method in simulations of physical phenomena and processes and of material properties.	IM1A_K05 IM1A_U07 IM1A_U10	1 5 4

3. Module description	
Description	The Object oriented programming and computer simulations module shall enable students learning the issues of practical application of the object oriented programming method in simulations of physical phenomena and processes. Owing to that students shall understand the importance of a computer experiment 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 the object oriented programming, such as: class declaration and definition, constructors and destructors, operators overloading, nested classes, derived classes, polymorphism and virtual functions.
Prerequisites	The knowledge of issues from the field of mathematics, physics, programming languages and numerical methods is required.

4. Assessment of the learning outcomes of the module			
code	type	description	learning outcomes of the module
IM1A_PSK_w	Written examination	Verification of the knowledge based on the lectures content, recommended literature and	IM1A_PSK_1, IM1A_PSK_2

_1		attended classes.	
IM1A_PSK_w_2	Written test	Periodical checking of the knowledge about theoretical foundations of the object oriented programming.	IM1A_PSK_1, IM1A_PSK_2
IM1A_PSK_w_3	Practical test	Checking the skill to create an object oriented algorithm in resolving a computational problem - a physical process simulation. Preparing the report on the class execution.	IM1A_PSK_1, IM1A_PSK_2
IM1A_PSK_w_4	Report	Justification of the selected method for the programming problem solving and discussion of the obtained results.	IM1A_PSK_1, IM1A_PSK_2

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_PSK_fs_1	lecture	The lecture shall enable understanding the object oriented programming terms and methods. The lecture is delivered with the use of multimedia based on a recommended set of handbooks.	30	The work with the recommended literature comprising independent acquisition of knowledge related to issues presented during the lectures.	40	IM1A_PSK_w_1
IM1A_PSK_fs_2	laboratory classes	Practical application of the object oriented programming and numerical methods to resolve computational problems. Creating numerical algorithms and programs. Classes on a common or individual topic are performed by students individually using the hardware and software available in the computer laboratory.	30	Preparation to classes through independent studying and testing of recommended issues.	30	IM1A_PSK_w_2, IM1A_PSK_w_3, IM1A_PSK_w_4