

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 1. Shape memory alloys

Module code: IM2A_PS1_SMA

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_PS1_SMA_1	Understanding of the nature of reversible martensitic transformation and phenomena classified as the shape memory effect occurring in metals, their alloys and polymers; learning the group of materials featuring shape memory effects.	IM2A_W06 IM2A_W07 IM2A_W10	2 2 5
IM2A_PS1_SMA_2	The skill to design material properties on account of shape memory effects occurrence.	IM2A_K05 IM2A_U03 IM2A_U15	1 1 5
IM2A_PS1_SMA_3	Understanding ethical, economic and ecological aspects of designing materials with shape memory effects for applications in medicine.	IM2A_K02 IM2A_W18	2 5

3. Module description

Description	The module Shape memory alloys shall enable students learning the nature of phenomena classified as the shape memory effect and factors having a decisive influence on martensitic transformation reversibility and on the shape memory effect inducing in alloys. This knowledge is necessary to obtain the skill to design alloys for specific applications, including medical applications.
Prerequisites	The achievement of effects of education in modules related to rudiments of materials science, materials science and modules related to engineering materials groups.

4. Assessment of the learning outcomes of the module			
code	type	description	learning outcomes of the module
IM2A_PS1_SMA_w_1	final test	Verification of the knowledge based on the lectures content, recommended literature and attended classes	IM2A_PS1_SMA_1, IM2A_PS1_SMA_2, IM2A_PS1_SMA_3
IM2A_PS1_SMA_w_2	Written test	Checking the knowledge of and the skill to interpret phenomena of shape memory effect and of reversible martensitic transformation.	IM2A_PS1_SMA_1, IM2A_PS1_SMA_2, IM2A_PS1_SMA_3
IM2A_PS1_SMA_w_3	Test	Assessment of mastering the basic knowledge necessary for individual performance of a practical exercise.	IM2A_PS1_SMA_1, IM2A_PS1_SMA_2, IM2A_PS1_SMA_3
IM2A_PS1_SMA_w_4	Report	Assessment of the skill to design properties of materials related to shape memory effects.	IM2A_PS1_SMA_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	
IM2A_PS1_SMA_fs_1	lecture	The lecture shall enable understanding of issues related to the nature of factors conditioning the occurrence of shape memory effects as well as basics enabling designing of engineering materials featuring the shape memory effect. The lecture is delivered with the use of multimedia.	30	The work with the recommended literature comprising independent acquisition of knowledge related to basic issues.	25	IM2A_PS1_SMA_w_1
IM2A_PS1_SMA_fs_2	laboratory classes	Application of the acquired theoretical knowledge in practical designing of materials and shaping properties on account of the shape memory effect Exercises are performed by students individually with the use of equipment of teaching and scientific laboratories.	15	Preparation to classes through independent studying of recommended issues.	20	IM2A_PS1_SMA_w_2, IM2A_PS1_SMA_w_3