

## COURSE DESCRIPTION CARD – SPECIMEN

Faculty of Mechanical Engineering									
Field of study	Biomedical Engineering							Degree level and programme type	MSc degree
Specialization/ diploma path								Study profile	
Course name	Current Issues of Biomaterials Engineering							Course code	IS-FME-00171S
								Course type	elective
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	summer
	15		15					No. of ECTS credits	3
Entry requirements	Basic knowledge about biomaterials								
Course objectives	Familiarizing students with the contemporary achievements in the engineering of biomaterials and trends in their development. Teaching a strategy for the selection of biomaterials. Developing the principles and skills of planning biomaterials research.								
Course content	<p>Lecture: Classification and requirements for biomaterials. Contemporary achievements in biomaterials engineering: biomimetics, nanotechnology, intelligent materials, biomaterials for tissue and genetic engineering, biomaterials used in the construction of artificial heart, stents for minimally invasive surgery, plastic surgery. Design and selection of biomaterials. Advanced methods of biomaterials research. Trends in the development of biomaterials. Laboratory: Health and Safety Rules. Preparation of model biological fluids. Investigations of the hydrolytic degradation of magnesium-based resorbable metallic alloys. Investigation of biofilm on the surface of selected biomaterials. Research on the shape memory alloys. Research on the influence of fillers on the properties of composite bone cements. Electrolytic oxidation of titanium implantation alloys.</p>								
Teaching methods	Presentations, laboratory classes and self-learning								
Assessment method	Lecture – written test, Laboratory classes – evaluation of reports								
Symbol of learning outcome	Learning outcomes							Reference to the learning outcomes for the field of study	
LO1	classifies and characterizes the basic groups of biomaterials							IB2_W06	
LO2	describes contemporary achievements in biomaterials engineering							IB2_W06, IB2_U04	

<b>L03</b>	knows and applies the principles of the biomaterial selection strategy	IB2_W06, IB2_U04	
<b>L04</b>	knows how to plan advanced research of biomaterials	IB2_U06, IB2_U13	
<b>L05</b>			
<b>L06</b>			
<b>Symbol of learning outcome</b>	<b>Methods of assessing the learning outcomes</b>	<b>Type of tuition during which the outcome is assessed</b>	
<b>L01</b>	test	L	
<b>L02</b>	test	L	
<b>L03</b>	test	L	
<b>L04</b>	evaluation of reports, discussion and observation of work during laboratory classes	LC	
<b>L05</b>			
<b>L06</b>			
<b>Student workload (in hours)</b>		<b>No. of hours</b>	
<b>Calculation</b>	lecture attendance	15	
	participation in laboratory classes	15	
	preparation for passing the lecture test	5	
	preparation for laboratory classes	15	
	working on projects, reports, etc.	15	
	participation in student-teacher sessions related to the project	5	
	<b>TOTAL:</b>	70	
<b>Quantitative indicators</b>		<b>HOURS</b>	<b>No. of ECTS credits</b>
<b>Student workload – activities that require direct teacher participation</b>		<b>35</b>	<b>1,5</b>
<b>Student workload – practical activities</b>		<b>35</b>	<b>1,5</b>
<b>Basic references</b>	1. Leo D.J., Engineering analysis of smart material systems. John Wiley & Sons, Inc., Hoboken, New Jersey, 2007. 2. Ma P.X., Elisseeff J., Scaffolding in tissue engineering. Taylor & Francis Group, Boca Raton-London-New York, 2006. 3. Venina dos Santos, Rosmary Nichele Brandalise, Michele Savaris, Engineering of Biomaterials, Springer, 2017		
<b>Supplementary references</b>	1. Schulz M.J., Kelkar A.D., Sundaresan M.J., Nanoengineering of structural, functional and smart materials. Taylor & Francis Group, Boca Raton-London-New York, 2006. 2. Gzik M., Tkacz E., Paszenda Z., Piętko E., Innovation in Biomedical Engineering. Springer Int. Publ., 2017.		
<b>Organisational unit conducting the course</b>	<b>Institute of Biomedical Engineering</b>	<b>Date of issuing the programme</b>	
<b>Author of the programme</b>	<b>Marcin Klekotka, PhD</b>	<b>17.03.2021</b>	

L – lecture, C – classes, LC – laboratory classes, P – project, SW – specialization workshop, FW - field work,

**S – seminar**