

## COURSE DESCRIPTION CARD

Faculty of Mechanical Engineering									
Field of study	Biomedical Engineering							Degree level and programme type	Bachelor
Specialization/ diploma path	Medical Constructions and Materials							Study profile	
Course name	Medical Equipment Design							Course code	IS-FME-00147S
								Course type	L
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	4
	30			30				No. of ECTS credits	5
Entry requirements	Fundamentals of Biomedical Constructions								
Course objectives	Acquainting students with the basic issues related to the methodology of designing medical equipment. Developing the ability to select the right techniques to solve design tasks related to the development of new medical equipment designs. Teaching students the practical use of creative problem solving techniques. Individual design of a medical device with an average degree of complexity. Preparation of information about the project results in the form of a multimedia presentation.								
Course content	Lecture: Legislation regarding medical equipment. The specifics of designing medical equipment. An algorithm for the design of medical devices. Design strategies. Design and product quality - modern quality engineering. Concurrent design. Designing as a creative act. Creativity in design - brainstorming, synectics, morphological table. Theory of solving inventive tasks (TRIZ). Brainstorming and Zwicky's morphological table in the development of the concept of design task solution. The use of CAD software to prepare technical documentation of the construction of a simple medical device. Project: Design of a medical device with an average scale of complexity - morphological analysis, calculations, technical documentation.								
Teaching methods	Lecture, project								
Assessment method	Written exam, Project: assessment of completed projects, current progress at work, discussion and activity in the classroom								
Symbol of learning outcome	Learning outcomes							Reference to the learning outcomes for the field of study	
LO1	student: classifies medical devices in accordance with the relevant normative provisions							IBK_W02	
LO2	student: student: lists the techniques of creative solving of project tasks							IBK_W04	
LO3	student: creates an algorithm for the design of medical devices including the phases of construction, manufacturing							IBK_W04 IBK_W09	

	and operation		
LO4	student: uses selected techniques of creative problem solving to develop the concept of a new medical device	IBK_W09 IBK_U10	
LO5	student: prepares the technical documentation of a design and presents the principle of its operation	IBK_U09	
LO6	student: can work in a team	IBK_K04	
Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed	
LO1	Written exam	L	
LO2	Written exam	L	
LO3	Written exam	L	
LO4	Written exam	L	
LO5	Project	P	
LO6	Project	P	
Student workload (in hours)		No. of hours	
Calculation	Participation in lectures	4	
	Participation in consultations	5	
	Preparation for the exam and participation in it	15	
	Participation in project	30	
	Preparation in exam and participation in its	24	
	Preparation to project	27	
	Performing design tasks (including preparation of presentations)	12	
	Preparation for passing project tasks	8	
TOTAL:		135	
Quantitative indicators		HOURS	No. of ECTS credits
Student workload – activities that require direct teacher participation		66	2,5
Student workload – practical activities		79	3
Basic references	1. El-Haik B.B., Mekki K.S.: Medical device design for six sigma: a road map for safety and effectiveness. J. Wiley – Interscience, NY 2008. 2. Haik Y., Shahin T.M.: Engineering process design. 2nd edition. Cengage learning, Stanford 2011. 3. Pahl G., Beitz W. : Learning to construct. WNT, Warsaw 1984.		
Supplementary references	Altszuller A.G. : Elements of the theory of engineering creativity. WNT, Warsaw 1983.		
Organisational unit conducting the course	Department of Biocybernetics and Biomedical Engineering	12.03.2019	
Author of the programme	Eugeniusz Sajewicz, PhD, DSc		

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