Course description	
Course title	Biocybernetics and Biomedical Engineering
Course code	
Faculty	Faculty of Math, Physics and Technology
Instytut/Katedra	Institute of Mechanics and Applied Computer Science
Specialty	
Year/semester	- 2.
Lecturer/Coordinator	Dariusz Mikołajewski PhD Eng
Numer of hours	(L+E+S) 30 (45)
ECTS	3 including: - Lectures: 1 (15) - Lab: 1 (15) - Own work (independent learning): 1 (15)
Language	English
Course enrollment requirements	None.
Expected course learning outcomes	Explain of basic concepts of biocybernetics and biomedical enginnering. Distingush and define biosignals. Explain thair gathering, processing and interpretation. Explain imaging systems and image processing. Comparing of laboratory and analytic techniques in medicine. Explain healthcare informatics, eHealth and telemedicine, inluding mobile technologies. Explain modelling and simulation, especially concerning nervous system (from basic to cognitive function) and motor control. Explain biomechanics, rehabilitation enginnering, biomaterials and tissue enginnering. Explain novel technologies such as brain-computer interfaces, neuroprostheses, robots and applications of 3D-priners and reverse engineering in medicine.

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Course content		
Introduction and basic concepts of biocybernetics and biomedical engineering. Physiological measurements. Biosignals: gathering, processing and interpretation. Medical imaging systems and image processing. La- boratory and analytic techniques in medicine. Healthcare informatics. eHealth. Modelling and simulation. Biomechanics. Rehabilitation engineering. Brain-computer interfaces and neuroprostheses. Biomaterials and biocompatibility. Cellular and tissue engineering. 3D-priners and reverse engineering in medicine. Medical		

robotics including exoskeletons.	
Taching methods	Lectures, seminars and workshops, exercises, project
Assessment and evalua- tion of student's work	Attendance, class participation, independent learning
Final exam	Written exam
Assigned reading	 Saltzman W. M. Biomedical Engineering: Bridging Medicine and Technology (Cambridge Texts in Biomedical Engineering). Cam- bridge University Press, 2009. Enderle J., Bronzino J. Introduction to Biomedical Engineering, Third Edition. Academic Press, 2011.
Optional/additional read- ing	 Semmlow J. L., Griffel B. <i>Biosignal and Medical Image Processing</i>, Third Edition. CRC Press, 2014. King P. H., Fries R. C., Johnson A. T. <i>Design of Biomedical Devices</i> <i>and Systems, Third Edition</i>. CRC Press, 2014.