



Subject card

Subject name and code	Medical Telematics, PG_00053406						
Field of study	Biomedical Engineering, Biomedical Engineering, Biomedical Engineering						
Date of commencement of studies	February 2022	Academic year of realisation of subject				2022/2023	
Education level	second-cycle studies	Subject group				Optional subject group Subject group related to scientific research in the field of study	
Mode of study	Full-time studies	Mode of delivery				at the university	
Year of study	2	Language of instruction				Polish	
Semester of study	3	ECTS credits				2.0	
Learning profile	general academic profile	Assessment form				assessment	
Conducting unit	Department of Biomedical Engineering -> Faculty of Electronics, Telecommunications and Informatics						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Mariusz Kaczmarek				
	Teachers		mgr inż. Natalia Kowalczyk dr hab. inż. Mariusz Kaczmarek				
Lesson type and method of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	15.0	0.0	30
	E-learning hours included: 0.0						
Telematyka medyczna - 2022/2023 - Moodle ID: 28869 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=28869							
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours	Self-study	SUM		
	Number of study hours	30	3.0	17.0	50		
Subject objectives	Familiarizing students with selected techniques and standards used in telemedicine as well as developing the knowledge gained so far in the field of programming for the software of portable and wearable devices such as smartphones, fitband.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K7_U03] can design, according to required specifications, and make a complex device, facility, system or carry out a process, specific to the field of study, using suitable methods, techniques, tools and materials, following engineering standards and norms, applying technologies specific to the field of study and experience gained in the professional engineering environment	can choose electronic components in order to build a sensor of selected life signals, and then program the data acquisition and transfer system. can write a program for a mobile device with popular operating systems using existing APIs.			[SU1] Assessment of task fulfillment [SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task		
	[K7_W05] Knows and understands, to an increased extent, methods of process and function support, specific to the field of study.	is able to organize a work environment, recognizes the possibility of using external sources and libraries to improve the implementation process of the solution			[SW2] Assessment of knowledge contained in presentation		
	[K7_U09] can carry out a critical analysis of the functioning of existing technical solutions and assess these solutions, as well as apply experience related to the maintenance of advanced technical systems, devices and facilities typical for the field of studies, gained in the professional engineering environment	writes a program that uses user interaction, designs and implements SI using SOA and Web Services technologies, designs and develops the basics of the functioning of a medical IT system			[SK5] Assessment of ability to solve problems that arise in practice [SU3] Assessment of ability to use knowledge gained from the subject [SW3] Assessment of knowledge contained in written work and projects		
[K7_W53] Knows and understands, to an increased extent, selected aspects of biomedical diagnostics.	He knows the basics of physiology and anatomy. Can identify the sources of signals in a living organism.			[SW1] Assessment of factual knowledge			

Subject contents	<p>Basic concepts of medical telematics. Systems of remote acquisition of medical data, basic concepts, definitions, standards.</p> <p>Principles and quality of telematic systems in medicine, aspects of biometric authentication of remote services, etc.</p> <p>Selected aspects of the ISO 11073 standard.</p> <p>Practical applications of AI - e.g. remote recognition of emotions, diseases, telemedicine, etc.</p> <p>Methods and standards of data exchange in medicine - specification of requirements and limitations. Exchange and remote evaluation of medical signals (ECG, others). Integration of systems and networks in medicine.</p> <p>Wireless communication standards used in biomedical monitoring (WiFi, Bluetooth, GPRS, mWLAN).</p> <p>Principles and good practices of creating software for mobile devices (Android, www) in the Agent-Manager architecture.</p> <p>Preparation of a research project in the field of medical telematics</p> <p>Design</p> <p>Problem definition, knowledge analysis, definition of functional and non-functional requirements and solution design</p> <p>Implementation of the prototype of the solution</p> <p>Tests and verification of the solution</p> <p>Prototype optimization and fixes</p> <p>Preparation of project documentation</p>														
Prerequisites and co-requisites	<p>Information Technology</p> <p>Methods and techniques of programming</p> <p>1 The construction program in structured programming</p> <p>1.1. Variables, data types, functions,</p> <p>1.2. control Statements</p> <p>1.3. Compilation and execution of programs</p> <p>1.4. Basic data structures</p> <p>1.5. The ability to move from ideas, by the algorithm of the program</p> <p>2 Construction of the program in object-oriented programming</p> <p>2.1. Designing and writing classes</p> <p>2.2. Creating and using objects</p> <p>2.3. Elements of object-oriented paradigm (abstraction, encapsulation, inheritance, polymorphism)</p> <p>2.4. Using class libraries</p>														
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="453 1471 794 1503">Subject passing criteria</th> <th data-bbox="794 1471 1142 1503">Passing threshold</th> <th data-bbox="1142 1471 1482 1503">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="453 1509 794 1541">Test 1</td> <td data-bbox="794 1509 1142 1541">51.0%</td> <td data-bbox="1142 1509 1482 1541">20.0%</td> </tr> <tr> <td data-bbox="453 1541 794 1572">Test 2</td> <td data-bbox="794 1541 1142 1572">51.0%</td> <td data-bbox="1142 1541 1482 1572">20.0%</td> </tr> <tr> <td data-bbox="453 1572 794 1603">Project development</td> <td data-bbox="794 1572 1142 1603">51.0%</td> <td data-bbox="1142 1572 1482 1603">60.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Test 1	51.0%	20.0%	Test 2	51.0%	20.0%	Project development	51.0%	60.0%
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Test 1	51.0%	20.0%													
Test 2	51.0%	20.0%													
Project development	51.0%	60.0%													
Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. Almathami HKY, Win KT, Vlahu-Gjorgievska E. Barriers and facilitators that influence telemedicine-based, real-time, online consultation at patients homes: systematic literature review. J Med Internet Res 2020;22:e16407. 2. Zhai Y. A call for addressing barriers to telemedicine: health disparities during the COVID-19 pandemic. Psychother Psychosom. 3. Tom 7. Informatyka w medycynie, pod redakcją A. Nowakowskiego, INŻYNIERIA BIOMEDYCZNA - Podstawy i zastosowania, ISBN 978-83-7837-087-1, 2020 													

	Supplementary literature	https://www.medicaid.gov/medicaid/benefits/telemedicine/index.html https://www.cdc.gov/coronavirus/2019-ncov/hcp/telehealth.html . https://www.federalregister.gov/d/2020-17364/improving-rural-health-and-telehealth-access
	eResources addresses	
Example issues/ example questions/ tasks being completed	<p>During the course, students will carry out the design process of software development from discovering the subject task by analyzing the project and the project until the implementation of the code, its testing and documentation. At the first meeting, the teacher will present the design principles of the project (including the availability of document templates, schedule project meetings, office hours) and distribute themes tasks. Subsequent meetings will be used to present the different stages of the project by the student. During the meetings will be led by students gave guidance on recommended changes in the design phase. Two weeks before the end of classes in a given semester, students will prepare a complete solution along with documentation and forward it to the platform for distance education. During the last two weeks of classes, all students will present the results of their work (in the framework of project meetings).</p>	
Work placement	Not applicable	