



Subject card

Subject name and code	Medical Telematics, PG_00053406						
Field of study	Biomedical Engineering, Biomedical Engineering, Biomedical Engineering						
Date of commencement of studies	October 2022	Academic year of realisation of subject				2023/2024	
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	4	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		dr hab. inż. Mariusz Kaczmarek				
Lesson types and methods 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						
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_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		
	[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			[SW3] Assessment of knowledge contained in written work and projects [SU3] Assessment of ability to use knowledge gained from the subject [SK5] Assessment of ability to solve problems that arise in practice		
	[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_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.			[SU5] Assessment of ability to present the results of task [SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment		

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="456 1476 794 1503">Subject passing criteria</th> <th data-bbox="799 1476 1137 1503">Passing threshold</th> <th data-bbox="1142 1476 1481 1503">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="456 1509 794 1536">Project development</td> <td data-bbox="799 1509 1137 1536">51.0%</td> <td data-bbox="1142 1509 1481 1536">60.0%</td> </tr> <tr> <td data-bbox="456 1543 794 1570">Test 2</td> <td data-bbox="799 1543 1137 1570">51.0%</td> <td data-bbox="1142 1543 1481 1570">20.0%</td> </tr> <tr> <td data-bbox="456 1576 794 1603">Test 1</td> <td data-bbox="799 1576 1137 1603">51.0%</td> <td data-bbox="1142 1576 1481 1603">20.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Project development	51.0%	60.0%	Test 2	51.0%	20.0%	Test 1	51.0%	20.0%
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Project development	51.0%	60.0%													
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Recommended reading	Basic literature	<ol style="list-style-type: none"> 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. Zhai Y. A call for addressing barriers to telemedicine: health disparities during the COVID-19 pandemic. Psychother Psychosom. 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 external icon. https://www.cdc.gov/coronavirus/2019-ncov/hcp/telehealth.html . https://www.federalregister.gov/d/2020-17364/improving-rural-health-and-telehealth-access external icon.
	eResources addresses	Adresy na platformie eNauczanie:
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	