



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 2025		Academic year of realisation of subject		2025/2026		
Education level	second-cycle studies		Subject group		Optional subject group Specialty 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		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_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
	[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_W10] knows and understands, to an increased extent, the basic processes occurring in the life cycle of equipment, objects and technical systems, as well as methods of supporting processes and functions, specific to the field of study	can organize his/her work environment, recognizes possibilities of using external sources and libraries to improve the process of implementing the solution	[SW2] Assessment of knowledge contained in presentation
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	Information Technology		
	Methods and techniques of programming		
	1 The construction program in structured programming		
	1.1. Variables, data types, functions,		
	1.2. control Statements		
	1.3. Compilation and execution of programs		
	1.4. Basic data structures		
	1.5. The ability to move from ideas, by the algorithm of the program		
	2 Construction of the program in object-oriented programming		
	2.1. Designing and writing classes		
	2.2. Creating and using objects		
2.3. Elements of object-oriented paradigm (abstraction, encapsulation, inheritance, polymorphism)			
2.4. Using class libraries			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Test 2	51.0%	20.0%
	Test 1	51.0%	20.0%
	Project development	51.0%	60.0%
Recommended reading	Basic literature	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.htm 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	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).	
Work placement	Not applicable		

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