GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Programming edge and mobile devices, PG_00053376		
Field of study	Biomedical Engineering, Biomedical Engineering, Biomedical Engineering		
Date of commencement of studies	February 2027	Academic year of realisation of subject	2027/2028
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	1	Language of instruction	Polish
Semester of study	2	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Geoinformatics -> Faculty of Electronics Telecommunications and Informatics -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Przemysław Falkowski-Gilski	
	Teachers	dr inż. Przemysław Falkowski-Gilski	

Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	0.0	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	2.0	18.0	50

Subject objectives	The aim of this course is to acquaint students with principle technologies of edge and mobile programming. The course covers techniques for collecting and processing data using embedded sensors, external modules and wireless communication modules, as well as the practical utilization of deep learning models.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_W04] knows and understands, to an increased extent, the principles, methods and techniques of programming and the principles of computer software development or programming devices or controllers using microprocessors or other elements or programmable devices specific to the field of study, and organization of work of systems using computers or such devices	Student is able to identify key elements of architecture of computer systems, particularly edge and mobile devices.	[SW1] Assessment of factual knowledge
[K7_U04] can apply knowledge of programming methods and techniques as well as select and apply appropriate programming methods and tools in computer software development or programming devices or controllers using microprocessors or programmable elements or systems specific to the field of study, making assessment and critical analysis of the prepared software as well as a synthesis and creative interpretation of information presented with it	Student is able to properly design and implement the software layer of an application for edge and mobile devices.	[SU4] Assessment of ability to use methods and tools
[K7_K02] is ready to provide critical evaluation of received content and to acknowledge the importance of knowledge in solving cognitive and practical problems	The student is able to select appropriate methods, tools, as well as hardware and software layer, depending on the specificity of the analyzed topic.	[SK5] Assessment of ability to solve problems that arise in practice
[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	Student is able to utilize appropriate tools and programming languages in order to analyze a selected topic.	[SU2] Assessment of ability to analyse information

Subject contents

Course content – lecture

1. Introduction to programming on edge and mobile platforms.

2. Configuration of the development environment, internal and external libraries.

3. Design and implementation of graphical user interfaces.

4. Data collection and processing using built-in sensors, external modules, wireless communication modules.

5. Analysis and practical use of deep learning models and edge environments.

Prerequisites and co-requisites

Basic knowledge of Java, C / C ++ programming languages and issues in the field of object-oriented programming techniques.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Laboratory	50.0%	50.0%
Lecture	50.0%	50.0%

Recommended reading

Basic literature	Murphy M., The Busy Coders Guide to Advanced Android Development, CommonsWare, 2011. Darwin I. F., Android Cookbook: Problems and Solutions for Android Development, ORiley Media, 2012. Płonkowski M., Android Studio. Tworzenie aplikacji mobilnych, Helion, 2017.

	Supplementary literature	Jeena Jacob I., Kolandapalayam Shanmugam S., Piramuthu S., Falkowski-Gilski P., Data Intelligence and Cognitive Informatics, Springer, 2021. Suresh A., Paiva S., Deep Learning and Edge Computing Solutions for High Performance Computing, Springer, 2021. Katangur A., Lin S. C., Wei J., Yang S., Zhang L. J., Edge Computing EDGE 2020, Springer, 2020.
	eResources addresses	
Example issues/ example questions/ tasks being completed	1. Preparation of the laboratory stand, including configuration of the emulator and physical device. 2. Collection, processing and presentation of data, access to resources as well as internal and external memory. 3. Design and implementation of the graphical user interface. 4. Support for machine learning libraries. 5. Testing and optimization of selected deep learning models.	
Practical activites within the subject	Not applicable	

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