GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Basics of Biometrics, PG_00049298		
Field of study	Biomedical Engineering		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2027/2028
Education level	first-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	4	Language of instruction	Polish
Semester of study	7	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	2.0	18.0	50

Subject objectives

The aim of the course is to acquaint students with the basics of biometrics and methods for its use. An important objective is to present detailed practical use biopomiarów and analysis to apply for identification of persons or verify his identity. It is assumed that the reported content of education in this subject should encourage self-awareness utilizing available within the subject elements of distance education and other electronic resources.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W02] knows and understands, to an advanced extent, selected laws of physics and physical phenomena as well as methods and theories explaining the complex relationships between them, constituting the basic general knowledge in the field of technical sciences related to the field of study	He can assess the suitability of measurement method for biometrics.	[SU2] Assessment of ability to analyse information
[K6_U08] while identifying and formulating specifications of engineering tasks related to the field of study and solving these tasks, can:n- apply analytical, simulation and experimental methods,n- notice their systemic and non-technical aspects,n- make a preliminary economic assessment of suggested solutions and engineering work n	It can optimize resources and measurement methods for a specific solution.	[SW1] Assessment of factual knowledge [SU2] Assessment of ability to analyse information
[K6_W51] Knows and understands, to an advanced extent, selected aspects of human anatomy and physiology, constituting general knowledge related to the field of study	He is able to choose the measurement method for the recorded life signal. Is able to assess the usefulness of the measurement method for the needs of biometrics.	[SW1] Assessment of factual knowledge

Subject contents	1. Introduction. Basic concepts. Identification and verification of identity, 2. Biometric systems. 3. Concurrency in distributed processing. 4. Physical descriptors - the collection and analysis of fingerprint 5. Physical descriptors - the collection and analysis of facial features 6. Physical descriptors - the collection and analysis of facial features - features topology 7. Physical descriptors - collection and analysis of facial features using thermography 8. Physical descriptors - collection and analysis of the characteristics of the hand (geometry, thermography) 9. Physical descriptors - the collection and analysis of DNA 10. Descriptors behavioral traits - the collection and analysis of posture and movement (walking, running) 11. Descriptors behavioral traits - the collection and analysis of voice features 12. Classification of data in biometrics 13. Measures of the quality of the identification / verification. Evaluation of usability methods. 14. Multimodal biometrics. 15. Typical applications of biometrics (healthcare, military, border guards, and others).
Prerequisites and co-requisites	**Information Technology:** 1. Launch an application 1.1. Running applications from the command line (terminal) 1.2. Launching the application from the operating system GUI 2. Computer Configuration 2.1. Installing the software 2.2. Setting the environment variables **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 to the program by the algorithm 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 **Fundamentals of image processing:** Acquisition and representation of the model Operations pixels Techniques for improving the quality of geometry processing **Biomeasurements:** Measurement and representation of the data in the study of thermal infrared ECG Basics

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Project	51.0%	60.0%
Test 2	0.0%	20.0%
Test 1	0.0%	20.0%

Recommended reading

Basic literature	1. Script of material to the subject "Fundamentals of biometrics" 2. Course materials developed in the form of distance education, access: http://uno.biomed.gda.pl 3. RM Bolle, JH Connell, S. Pankanti, NK Ratha, Senior, Biometria, WNT, 2008
Supplementary literature	1. Slot K. Wybrane zagadnienia biometrii (Selected topics of biometrics), WKŁ, 2008 2. Literature available in the library, in particular a series of IEEE Transactions on ...
eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	
Work placement	Not applicable