

1.	Field of study Medical Physics					
2.	Faculty	Faculty of Science and Technology				
3.	Academic year of entry	2025/2026 (winter term)				
4.	Level of qualifications/degree	first-cycle studies (in engineering)				
5. Degree profile general academic						
6. Mode of study full-time						
7.	General information about the module					
Module name		Biomedical Signal Processing				
Module code		N4-FM-S1-6-23-30				
Number of the ECTS credits						
Language of instruction		Polish				
Purpose and description of the content of education		The aim of the course is to familiarize the student with methods of biomedical signal analysis. The lecture and practical sessions cover the following topics: Signal recording and sampling, digital representation of signals, two-dimensional signals Frequency representation of analog and digital signals Z-transform Signal filtering, digital filter design Event detection, basic pattern recognition methods Pattern recognition with a training set Projection methods, principal component analysis, cluster analysis.				
List of modules that must be completed before starting this module (if necessary)		not applicable				

8.	Learning outcomes of the module				
	Code	Description	Learning outcomes of the programme	Level of competenc (scale 1-5)	
E1		Understands methods of representing biomedical signals.	IW01	3	
			W04	3	
E2)	Has knowledge of vector and matrix calculus.	W07	3	
E3	}	Has knowledge in the field of digital processing and analysis of biomedical signals.	IW02	4	
			W09	4	
E4	ļ	Can perform analysis of selected signals.	U05	4	
			U06	4	
E5	;	Can present the results of signal analysis in a concise manner, both orally and in writing.	IU01	4	
			U01	4	



E6	Can design a digital filter with specified characteristics.	IU03	5
		IU04	5
		U05	5
		U06	5
		U07	5
E7	Understands and can describe methods of representing biomedical signals along with their analysis techniques.	IW02	5
		W07	5

9. Methods of	Methods of conducting classes			
Code	Category	Name (description)		
b01	Problem-solving methods	Problem-based lecture an analysis of a selected scientific or practical problem accompanied by its assessment and an attempt to provide a solution to the issues presented in the lecture as well as the indication of the consequences of the proposed solution		
b02	Problem-solving methods	Lecture-discussion transmission of content involving interaction with the lecture audience; discussion of lecture-related issues is one of its elements or constitutes its follow-up		
b04	Problem-solving methods	Activating method – discussion / debate an exchange of views supported by substantive arguments leading to a clash of different views, a compromise or the identification of common positions; it proceeds according to previously agreed-upon rules regarding the time, manner and turn-taking as well as the principles of civil discourse; a discussion is not a competition but aims at finding the best solutions or presenting different points of view; its varieties include brainstorming, Oxford-style debate, panel discussion, decision tree, conference discussion; a debate is an orderly dispute between supporters and opponents of a viewpoint, usually specialists in the field or pre-selected representatives of a group dealing with a common problem		
b05	Problem-solving methods	Activating method – seminar / proseminar a seminar method; usually an oral presentation of a previously studied/diagnosed problem delivered on a forum; it aims at provoking a discussion concerning the results of research work; a type of conference, course or training session modelled on seminar classes		
d01	Programmed learning methods	Working with a computer e.g., Webquest; implementation of educational tasks using electronic and digital devices, computer programs and Internet applications; the academic teacher acts as a consultant; students' work is carried out step by step according to the plan laid own by the person teaching the course and following his instructions, and proceeds towards producing the indicated results within the set deadline		
e01	Practical methods	Laboratory exercise / experiment [also conducted as fieldwork] a method of practical application of knowledge; implemented in three stages: the recognition of a problem induced by the task content, the formulation of the problem and the attempt to solve it accompanied by the assessment of the effects; the goal is to acquire skills, abilities and habits, and to consolidate the acquired knowledge so that it becomes operational; the laboratory method assumes greater independence of learners than carrying out an experiment		



10.	Forms of teach	ning						
Code		Name	Numbe hou	er of Irs	Assessment of the learning outcomes of the module	Learning outcomes of the module	Methods of conducting classes	
FZ1	Z1 lecture		30		exam	E1, E2, E3	b01, b02, b04, b05	
FZ2	Z2 laboratory classes 15		15		course work	E4, E5, E6, E7	d01, e01	
11.	11. The student's work, apart from participation in classes, includes in particular:							
Code Catego		Category		Name (description)		Is it part of the BUNA?		
a02	2 Preparation for classes		 	Literature reading / analysis of source materials reading the literature indicated in the syllabus; reviewing, organizing, analyzing and selecting source materials to be used in class				No
a03		Preparation for classes		Developing practical skills activities involving the repetition, refinement and consolidation of practical skills, including those developed during previous classes or new skills necessary for the implementation of subsequent elements of the curriculum (as preparation for class participation)				Yes
b01	Consulting the curriculum and the organization of classes		ization (Getting acquainted with the syllabus content reading through the syllabus and getting acquainted with its content				Yes
c03		Preparation for verification of learning ou	Itcomes I	Implem examin a set of phase/e	nentation of an individual or group a nation completion activities aimed at performing an assig element of the verification of the learning	assignment necessary for course/ ned task, to be executed out of class g outcomes assigned to the course	bhase/ as an obligatory	Yes

Information on the details of the module implementation in a given academic year can be found in the syllabus available in the USOS system: <u>https://usosweb.us.edu.pl</u>.