1.	**Field of study**	**Computer Science**
2.	Faculty	Faculty of Science and Technology
3.	Academic year of entry	2021/2022 (summer term)
4.	Level of qualifications/degree	second-cycle studies
5.	Degree profile	general academic
6.	Mode of study	full-time

Module: Machine learning in biometrics and bioinformatics

Module code: W4-INA-S2-20-F-UMwBB

1. Number of the ECTS credits: 4

2. Learning outcomes of the module

code	description	learning outcomes of the programme	level of competence (scale 1-5)
M_001	The student can solve problems individually or in a team, using the gained knowledge and practical skills.	K_K01 K_K03 K_K04 K_U01 K_U02	1 1 1 1 1
M_002	The student can analyse any biometric system to use the machine learning algorithm.	K_U01 K_U08 K_U09 K_W01 K_W02 K_W04 K_W05 K_W09	1 1 1 1 1 1 1 1
M_003	The student has in-depth knowledge of contemporary methods of artificial intelligence.	K_U01 K_W01 K_W02 K_W05 K_W09	1 1 1 1 1

M_004	The student knows selected neural network architectures.	K_W01 K_W04 K_W09	1 1 1
M_005	The student can implement machine learning models for data classification and regression problems in biometrics and bioinformatics using the software libraries.	K_W01 K_W02 K_W04 K_W05 K_W09	1 1 1 1 1
M_006	The student can test the advancement of his work or teamwork and refer to it.	K_U03 K_U04 K_U05	1 1 1
M_007	The student is familiar with the current state and the latest developments and trends in computer science, including artificial intelligence and machine learning methods and their biometrics and bioinformatics applications.	K_W01 K_W02 K_W09	1 1 1

3. Module description	
Description	The course aims at acquainting the students with machine learning algorithms, with particular emphasis on their applications in biometrics and bioinformatics. It includes the discussion on different learning methods with and without supervision. The primary element of the course are methods based on neural networks.
Prerequisites	

4. Assessment of the learning outcomes of the module

code	type	description	learning outcomes of the module
W_001	Test	The students solve a theoretical test related to the topics discussed in the lectures.	M_003, M_004, M_007
W_002	Project documentation	The students presentat a full documentation of the project, including all stages of its implementation.	M_001, M_002, M_003, M_004, M_005, M_006, M_007

5. Forms of teaching

code	form of teaching			required hours of student's own work		assessment of the learning outcomes of the module
	type	description (including teaching methods)	number of hours	description	number of hours	
Z_001	lecture	The lectures are conducted verbally with the use of content visualisation, emphasising the material particularly difficult to understand. The students are encouraged by asking	15	The students prepare for the test.	10	W_001

		questions about the content. The classes have both traditional and e-learning form.				
Z_002	laboratory classes	During the laboratory classes, the students learn about mathematical models of machine learning and solve tasks in this field. The classes have both a traditional and e-learning form.	30	The students complete tasks from individual topics with analysis of existing solutions.	65	W_002