

Course code	TCS_CC4							
Type and description	TCS core curriculum							
ECTS credit	2							
Course name	Computational Intelligence							
Course name in Polish	Inteligencja obliczeniowa							
Language of instruction	English							
Course level	8 PRK							
Course coordinator	Artur Klepaczko							
Course instructors	Artur Klepaczko, Piotr Szczypiński							
Delivery methods and course duration		Lecture	Tutorials	Laboratory	Project	Seminar	Other	Total of teaching hours during semester
	Contact hours				15			15
	E-learning	No	No	No	No	No	No	
	Assessment criteria (weightage)				100%			
Course objective	The objective of the course is to learn how to apply the machine learning toolbox to a given real-life task and solve a computational problem identified therein.							
Learning outcomes	<p>Deep study of methods and tools in computational intelligence, both with respect to the needs of the realized Ph.D. research project. (W1)</p> <p>The student knows the methodology of conducting, implementing, and evaluating research with the use of machine learning algorithms appropriately applied to the area of the prepared doctoral dissertation. (W4)</p> <p>Ability to independently acquire knowledge and expand own competences in the field of machine learning and deep neural networks, as well as to inspire researchers from other disciplines in the use of these methods in scientific research. (U3)</p> <p>The student is prepared to critically evaluate and analyze scientific achievements, as well as to carry out tasks for the development of a knowledge-based economy with the use of artificial intelligence methods. (K1)</p>							

	Competences to comply with the rules and obligations of the researcher in the field of validation of the obtained machine learning results and due diligence in conducting research in this area. (K2)
Assessment methods	Projects will promote a teamwork. Upon completion of the assigned tasks, students will deliver a written report in the form of a conference paper. The paper will be assessed based on completeness of the solution (30%), correctness of the adopted solution procedure (40%), quality and structure of the paper (15%) and clarity of communication (15%).
Prerequisites	Knowledge of machine learning theory and tools. Fundamentals of statistics and statistical methods for evaluation of measurement results.
Course content with delivery methods	The course consists in solving a real-life task that contains a computational problem solvable with the use of a machine learning-based approach. The solution toolbox may include, but is not limited to, such algorithms and methods as linear and non-linear regression, support vector machines, deep neural networks. The project tasks will concern image and signal classification and data modeling problems, proposed either by the teacher or students.
Basic reference materials	Computer science journals devoted to artificial intelligence and machine learning, e.g.: <i>Artificial Intelligence, Data & Knowledge Engineering, Expert Systems with Applications, Neural Networks, Neurocomputing, IEEE Trans. Pattern Analysis and Machine Intelligence, IEEE Trans. Systems, Man, and Cybernetics, IEEE Trans. Neural Networks.</i>
Other reference materials	Documentation of the Scikit-learn, Prophet, PyTorch and Keras libraries
Average student workload outside classroom	35 h
Comments	
Last update	2023.04.27