Learning outcomes of the programme:

1.	Field of study	Computer Science
2.	Academic year of entry	2017/2018 (winter term), 2017/2018 (summer term), 2018/2019 (winter term), 2018/2019 (summer term)
3.	Level of qualifications/degree	second-cycle studies
4.	Degree profile	general academic

Code of the learning outcome of the programme	Learning outcomes The graduate:	Codes of the learning outcomes of the areas of education to which the learning outcome of the programme is related
KNOWLEDGE		
K_2_A_I_W01	Has an in-depth knowledge in the field of some sections of mathematics, including elements of set theory, discrete and applied mathematics, including mathematical methods necessary for modeling and analysis of advanced elements and digital electronic systems, description, analysis and synthesis of electronic signal processing algorithms together with image processing algorithms, also 3D ones;	T2A_W01, T2A_W03, T2A_W04
K_2_A_I_W02	Knows mathematical foundations of information theory, algorithm theory and cryptography and their practical usage;	T2A_W01, T2A_W03
K_2_A_I_W03	Has an ordered knowledge enabling use of specialist descriptions concerning multiple applications of mathematics in IT practice;	T2A_W02
K_2_A_I_W04	Possesses an ordered knowledge in the field of computer architecture, including parallel and multiprocessor computers;	T2A_W03, T2A_W04, T2A_W05, T2A_W06
K_2_A_I_W05	Has a well established knowledge in the field of architecture and operating systems design;	T2A_W04
K_2_A_I_W06	Has a grounded knowledge in the field of modern programming techniques: object programming, concurrent and parallel programming;	T2A_W04, T2A_W05
K_2_A_I_W07	Has a wide knowledge concerning program optimization taking into account various aspects of computer architectures;	T2A_W04
K_2_A_I_W08	Possesses a wide knowledge in the field of modern information analysis and processing used in computational intelligence (mainly in swarm intelligence and evolutionary methods) used, among others, in optimization and bioinformatics;	T2A_W01, T2A_W02, T2A_W03, T2A_W05
K_2_A_I_W09	Has a grounded knowledge in the field of algorithms and data structures, is familiar with optimization techniques;	T2A_W04
K_2_A_I_W10	Has a thorough knowledge in the field of analysis methodologies and techniques, designing, modeling, testing, manufacturing and maintenance of software (programming methodology and techniques) and knows concepts of procedural, functional and object programming and the meaning of code quality in the aspect of software maintenance;	T2A_W04, T2A_W05, T2A_W07
K_2_A_I_W11	Has an ordered and theoretically grounded knowledge of devices comprising computer networks, including wireless networks and architecture and configuration of such devices in local and wide areas networks;	T2A_W04, T2A_W06, T2A_W07
K_2_A_I_W12	Possesses a thorough knowledge of user interfaces, their specifications and design principles;	T2A_W04
K_2_A_I_W13	Has an ordered knowledge in the field of client-server architecture enabling understanding the essence of data transfer in network systems;	T2A_W04
K_2_A_I_W14	Understands the present state and the newest developmental trends of Information Technology and is able to use information-communication techniques, including their use in software engineering;	T2A_W04, T2A_W05, T2A_W07
K_2_A_I_W15	Has knowledge in the field of computer graphics and methods of image processing including 3D and animation;	T2A_W04
K_2_A_I_W16	Knows basics of multimedia interactive applications;	T2A_W03, T2A_W04
K_2_A_I_W17	Possesses a grounded knowledge in the field of information retrieval and gathering and data mining;	T2A_W04
K_2_A_I_W18	Has an ordered knowledge referring to decision support systems and other artificial intelligence systems;	T2A_W03
K_2_A_I_W19	Has an ordered knowledge referring to network information systems and their use, among others, in medicine, and geo-informatics;	T2A_W03, T2A_W04
K_2_A_I_W20	Has a grounded knowledge concerning data security in computer systems, knows principles and methods of assigning access to information systems;	T2A_W04, T2A_W07
K_2_A_I_W21	Possesses a basic knowledge to understand social, economic, legal and other non-technical conditions of engineering activities, is familiar with basic health and safety principles applied in Information Technology;	T2A_W02, T2A_W08
K_2_A_I_W22	Has a basic knowledge referring to protection of intellectual property;	T2A_W02, T2A_W10

K_2_A_I_W23	Has an elementary knowledge from the field of management, including quality management and managing economic activity;	T2A_W02, T2A_W09
K_2_A_I_W24	Knows principles of creating and development of individual entrepreneurship forms, taking advantage of science fields and scientific disciplines appropriate for the studied faculty.	T2A_W11
SKILLS		
K_2_A_I_U01	Is able to obtain information from literature, data bases and other properly chosen sources, is able to integrate obtained information, interpret and draw conclusions as well as formulate and justify opinions;	T2A_U01
K_2_A_I_U02	Can work individually and in a team, can manage a small team, can elaborate and realize a work schedule allowing to meet deadlines;	T2A_U02
K_2_A_I_U03	Is able to elaborate a detailed documentation concerning realization of the project goal and prepare elaboration of this task results;	T2A_U01, T2A_U03
K_2_A_I_U04	Is able to prepare and present an oral presentation concerning realization of a project task and to lead a discussion about the presented problem;	T2A_U04
K_2_A_I_U05	Can specify and realize a self-study process, for example for improving professional competences;	T2A_U05
K_2_A_I_U06	Can use English language in a communicative way in speaking and in reading enabling understanding technical documentation and giving short presentation about a project task realization (skills in accordance with requirements specified for B2+ level by the Common European Framework of Reference for Languages);	T2A_U06
K_2_A_I_U07	Is able to create a mathematical model for information technology, use and perform formal description analysis;	T2A_U07
K_2_A_I_U08	Is able to use the learned methods and mathematical models and computer simulations for solving project tasks, among others, for analysis and estimation of electronic, mechanical and other systems operation;	T2A_U07, T2A_U08, T2A_U09
K_2_A_I_U09	Can design, construct, activate and test an electronic system or a structure;	T2A_U14, T2A_U16
K_2_A_I_U10	Is able – while formulating and solving problems involving elements, systems and constructions designing – to recognize also their non-technical aspects,legal and economic;	T2A_U10, T2A_U12, T2A_U13
K_2_A_I_U11	Knows and uses principles of health and safety at work;	T2A_U13
K_2_A_I_U12	Can configure communication devices and construct a local and a wide area network and match an appropriate net service for a specific realization and possessed equipment;	T2A_U12, T2A_U13, T2A_U15, T2A_U16
K_2_A_I_U13	Can design and implement an algorithm for a specific programming task;	T2A_U14, T2A_U15, T2A_U16
K_2_A_I_U14	Knows commands and syntax of high-level and low-level programming languages and sufficient programming environments;	T2A_U14, T2A_U15, T2A_U16
K_2_A_I_U15	Is able to take advantage of routine methods and information technology tools for practical tasks;	T2A_U07, T2A_U14, T2A_U15, T2A_U16
K_2_A_I_U16	Can create an application with assorted usage, including a multimedia one, choosing and taking advantage of an appropriate method and tools;	T2A_U12, T2A_U14, T2A_U15, T2A_U16
K_2_A_I_U17	Is able to create artificial intelligence systems, including decision support and computational intelligence systems;	T2A_U14, T2A_U15, T2A_U16
K_2_A_I_U18	Can design and modify data mining systems: gather, group and retrieve information basing on the chosen data mining methods;	T2A_U14, T2A_U15, T2A_U16
K_2_A_I_U19	Can design and practically use solutions ensuring data security in information technology systems;	T2A_U10, T2A_U12, T2A_U13, T2A_U14, T2A_U15, T2A_U16
K_2_A_I_U20	Can design information technology systems defining basic structural and object models of the designed system and prepare full documentation of the works;	T2A_U07, T2A_U10, T2A_U13, T2A_U16
K_2_A_I_U21	Is able to use various tools supporting designing works in an appropriate way;	T2A_U15
K_2_A_I_U22	Can effectively use various methods of data mining and data manipulating in data base systems.	T2A_U07, T2A_U08, T2A_U09
SOCIAL COMPETENCES		
K_2_A_I_K01	Understands the need and necessity of lifelong learning and improving professional and personal competences;	T2A_K01
K_2_A_I_K02	Is aware of the importance and understands non-technical aspects and consequences of information scientist's professional activities and take necessary responsibility for decisions taken;	T2A_K02
K_2_A_I_K03	Can co-operate and work in a team, accepting different roles, planning and timely realizing various tasks;	T2A_K03, T2A_K04
K_2_A_I_K04	Acts ethically, understands importance of intellectual honesty both in his/her own actions and in actions of other people;	T2A_K04, T2A_K05
K_2_A_I_K05	Can think in an entrepreneurial manner;	T2A_K06

| K_2_A_I_K06 | Can formulate opinions about basic issues, current state and developmental tends in information technology. | T2A_K07 |