COMPUTER SCIENCE LEARNING OUTCOMES

Name of the field of study: **COMPUTER SCIENCE**

Degree obtained by the graduate: Master

Level of education**: second-cycle studies**

Number of semesters: **4**

Educational profile: **practical**

Number of ECTS: **120**

Mode of study: **full-time studies**

Domain: Engineering and technical sciences

Leading discipline: Information technology and telecommunications

Symbols of field-related outcomes	Field-related learning outcomes	Reference to universal PQF characteristics[1]	Reference to the characteristics of the second degree of the PQF for the appropriate level[2]	Characteristics for qualifications at PQF level 7, enabling the achievement of engineering competences
KNOWLEDGE: THE GRADUATE				
INF2_W01	has in-depth knowledge of the concepts of mathematics, physics, necessary to formulate and solve complex tasks in the field of computer science	P7U_W	P7S_WG	P7S_WG_INZ

[1] PQF level 6-8 according to the annex to the Act of 22 December 2015 on the Integrated Qualification System, *Polish Qualifications Framework*, Institute for Educational Research, Warsaw 2016.

[2]Reference to the characteristics of the second degree of learning outcomes for qualifications at levels 6-8 of the Polish Qualifications Framework typical of qualifications obtained within the system of higher education and science after obtaining a full qualification at level 4, *Polish Qualifications Framework*, Institute for Educational Research, Warsaw 2016.

INF2_W02	has in-depth knowledge of principles of operation and methods of construction of modern telecommunications systems and principles of data transmission in IT systems	P7U_W	P7S_WG	P7S_WG_INZ
INF2_W03	has in-depth knowledge of concepts related to the design and modelling of information systems, computer programming, tool software and network technologies and the application of computer networks	P7U_W	P7S_WG	P7S_WG_INZ
INF2_W04	knows and understands issues related to integrated management systems and optimization of IT tools and know the application of this knowledge in practical professional activities.	P7U_W	P7S_WG	P7S_WG_INZ
INF2_W05	knows and understands issues related to the use of databases and data warehouses and digital security	P7U_W	P7S_WG P7S_WK	P7S_WG_INZ
INF2_W06	has in-depth knowledge of lifecycle of software, equipment and computer systems	P7U_W	P7S_WG	P7S_WG_INZ
INF2_W07	has in-depth knowledge of methods, techniques, tools and materials used to solve complex engineering tasks in the field of computer science	P7U_W	P7S_WG	P7S_WG_INZ
INF2_W08	has in-depth knowledge of technical standards related to engineering activities	P7U_W	P7S_WG	P7S_WG_INZ
INF2_W09	knows and understands social, economic, legal issues including the principles of protection of industrial property and copyright and other non-technical conditions for the development of IT and engineering	P7U_W	P7S_WK	—

	activities related to the IT sector, including basic principles for the creation and development of various forms of entrepreneurship			
	SKILLS: THE GRADUATE CAN			
INF2_U01	in order to formulate and solve complex and unusual practical IT problems, obtain information from literature, databases and other sources, also in a foreign language; integrate the information obtained, make the critical analysis and assessment and creative interpretation, by using appropriate methods and tools, including advanced information and communication technologies, as well as draw conclusions and formulate and justify opinions exhaustively	P7U_U	P7S_UW	—
INF2_U02	plan and carry out computer experiments and simulations, and use analytical methods on IT issues, interpret the results obtained and draw conclusions	P7U_U	P7S_UW	P7S_UW_INZ
INF2_U03	work individually and in a team; can estimate the time needed to perform the task; can develop and implement a work schedule (also in English) to ensure that deadlines are met	P7U_U	P7S_UW	—
INF2_U04	prepare and present oral presentation in Polish and foreign languages on specific issues in the field of computer science	P7U_U	P7S_UW	—
INF2_U05	use information-communication techniques, in particular UML modeling language and block diagrams	P7U_U	P7S_UW	P7S_UW_INZ
INF2_U06	use properly selected development environments, simulators and computer-assisted design tools for simulation, design and verification of computer systems and applications, interpret the	P7U_U	P7S_UW	P7S_UW_INZ

	results obtained in order to draw conclusions			
INF2_U07	conduct an initial economic analysis of the engineering activities undertaken related to the implementation of practical tasks in the field of IT design, implementation and administration of the computer system	P7U_U	P7S_UW	P7S_UW_INZ
INF2_U08	conduct critical analysis and evaluation of the functioning of IT systems, applications and services, the structure and organization of these systems	P7U_U	P7S_UW	P7S_UW_INZ
INF2_U09	modify or improve existing technical solutions, formulate and test hypotheses related to simple implementation problems in computer science	P7U_U	P7S_UW	P7S_UW_INZ
INF2_U10	in accordance with the specification which takes into account non-technical aspect, design a complex device, application, system or IT process, and implement the project, at least in part, using appropriate methods, techniques and tools, also by adapting existing or developing new tools for this purpose	P7U_U	P7S_UW	P7S_UW_INZ
INF2_U11	assess the suitability and identify limitations of methods and tools for the implementation or administration of information systems, databases, computer networks and other tasks; can select and use the right method and tools to carry out these tasks, using his or her own concepts if necessary	P7U_U	P7S_UW	P7S_UW_INZ
INF2_U12	identify and formulate the specification of complex IT tasks, using innovative and creative thinking	P7U_U	P7S_UW	P7S_UW_INZ

INF2 _U13	manage the team's work, take a leadership role in it and also interact with those who carry out team tasks	P7U_U	P7S_UO	—
INF2 _U14	prepare, in Polish and foreign language, documentation on the implementation of the engineering task in accordance with applicable standards	P7U_U	P7S_UW	—
INF2 _U15	communicate with both specialists and other recipients on issues related to information technology while conducting a debate on IT issues.	P7U_U	P7S_UK	—
INF2 _U16	use a foreign language in accordance with the requirements set out for B2+ plus level according to the Common European Framework of Reference for Languages with particular emphasis on information technology issues	P7U_U	P7S_UK	—
INF2 _U17	independently plan self-education with an emphasis on improving professional competences and certification of skills, as well as show opportunities for development to others	P7U_U	P7S_UU	P7S_UU_INZ
SOCIAL COMPETENCES: THE GRADUATE IS READY TO				
INF_K01	critically assess knowledge and content on the development of computer science, recognize the role of knowledge in solving IT problems and cooperate with experts	P7U_K	P7S_KK	—
INF_K02	prioritize professional actions in the area of IT, taking into account changing social needs, including compliance with and adhering to professional ethics principles	P7U_K	P7S_KR	—

INF_K03	resolve the dilemmas associated with the pursuit of the profession, taking care of its development and prestige	P7U_K	P7S_KR	—
INF_K04	think in an entrepreneurial way, be open to setting up and running their own business, is ready to take professional challenges	P7U_K	P7S_KO	—
INF_K05	fulfill social obligations, inspire and organize social activities. He or she is ready to provide information and opinions to the public on the achievements of computer science and other aspects of engineering activities	P7U_K	P7S_KO	—
INF_K06	initiate public interest measures for the digitization of economic and social activities	P7U_K	P7S_KO	—