1.	**Field of study**	**Applied Computer Science**
2.	Faculty	Faculty of Science and Technology
3.	Academic year of entry	2019/2020 (winter term), 2020/2021 (winter term), 2021/2022 (winter term), 2022/2023 (winter term)
4.	Level of qualifications/degree	first-cycle studies (in engineering)
5.	Degree profile	general academic
6.	Mode of study	full-time

Code of the learning outcome of the programme	**Learning outcomes** The graduate:	Codes of the second-order PRK characteristics to which the learning outcome of the programme is related
	KNOWLEDGE	
K_W01	has basic knowledge of the mathematical basics of algorithmics, understands the mathematical basics of algorithm analysis and the influence of selection of data structures and algorithms on the operation time of computer programmes	2018_P6S_WG
K_W02	has knowledge of the theoretical basis of control and the basic elements and systems of automation and robotics	2018_P6S_WG, 2018_P6S_WK
K_W03	has basic knowledge of artificial intelligence methods	2018_P6S_WG, 2018_P6S_WK, 2018_inż_P6S_WG
K_W04	has general, forward-looking knowledge of various branches of IT and related scientific and technological fields	2018_P6S_WK
K_W05	knows and understands basic concepts, mathematical description, algorithms and operations performed on raster and vector graphics; knows color spaces and principles of object lighting and rendering	2018_P6S_WG
K_W06	has general knowledge of the thematic methods of the city center and issues specific to a discipline unrelated to the field of study	2018_P6S_KK, 2018_P6S_KO, 2018_P6S_WK
	SKILLS	
K_U01	is able to acquire knowledge independently in order to improve their professional qualifications and competences	2018_P6S_UU
K_U02	knows at least one foreign language at the intermediate (B2) level and can make use of English-language IT literature	2018_P6S_UK
K_U03	is able to identify further learning opportunities and self-learn using library resources, electronic sources and databases	2018_P6S_UU, 2018_P6S_UW
K_U04	has the ability to pose and analyze problems on the basis of the acquired content in the field of science unrelated to the field of study	2018_P6S_KK, 2018_P6S_UU
K_U05	has the ability to understand and create various types of written and oral texts that require systemic knowledge of the language in terms of its grammatical structures, lexis and phonetics; communicates in a foreign language within the scope appropriate for a given area of knowledge using various communication channels and techniques	2018_P6S_UK
	SOCIAL COMPETENCES	
K_K01	knows the limitations of their own knowledge and understands the need to continue to learn and improve their professional, personal and social competences	2018_P6S_KK, 2018_P6S_UU
K_K02	can work in a group while assuming different roles; understands the division of tasks and the individual's need to fulfil a given task; can listen to different opinions and discuss a particular issue; can identify appropriate priorities for carrying out a task set by themselves or by someone else; can formulate precise questions with a view to improving understanding of a given topic or finding missing points in reasoning	2018_P6S_KK, 2018_P6S_UO

K_K03	is aware of the social role of a graduate of a technical programme of studies, recognizes and understands the need to promote information on the development of computer science and other aspects of the work of an engineering-information technology specialist	2018_P6S_KR
K_K04	understands the need for an interdisciplinary approach to solving problems, integrating knowledge from various disciplines and practicing self-education aimed at deepening the acquired knowledge	2018_P6S_KK, 2018_P6S_KO

Code of the learning outcome of the programme	**Learning outcomes leading to the acquisition of engineering competences** The graduate:	Codes of the second-order PRK characteristics to which the learning outcome of the programme is related
	KNOWLEDGE	
KIN_W01	knows basic concepts and theorems from selected areas of further mathematics, including logic, mathematical analysis, algebra, analytical geometry, discrete mathematics, probabilistics; knows basic computational techniques useful in computer science; understands the importance of mathematical formalism in formulating and solving IT and engineering problems	2018_P6S_WG, 2018_inż_P6S_WG
KIN_W02	has knowledge of physics including: elements of mechanics, electricity and magnetism, optics and quantum mechanics and the physical basis of operation of selected semiconductor and optronic devices	2018_P6S_WG, 2018_P6S_WK, 2018_inż_P6S_WG
KIN_W03	has knowledge of the basics of electrical engineering, electronics and digital technology	2018_P6S_WG, 2018_inż_P6S_WG
KIN_W04	has structured knowledge of contemporary paradigms, languages and methods of programming and software engineering	2018_P6S_WG, 2018_P6S_WK, 2018_inż_P6S_WG
KIN_W05	has structured knowledge of software design and development and of typical software development environments and tools	2018_P6S_WG, 2018_inż_P6S_WG
KIN_W06	has basic knowledge of how to use typical applications and information systems for commercial and engineering purposes	2018_P6S_WG, 2018_P6S_WK, 2018_inż_P6S_WG
KIN_W07	knows the structure and organisation of typical computer systems; knows and understands the concept of “conventional machine” in computer system architecture; knows the methods of performing sequential and parallel processing in computer systems	2018_P6S_WG, 2018_inż_P6S_WG
KIN_W08	has knowledge in the field of measurement data acquisition and processing necessary to implement simple automated measurement systems	2018_P6S_WG, 2018_inż_P6S_WG
KIN_W09	has the knowledge necessary to design and program a simple embedded system, knows the specifics, structure and organisation of typical microprocessors and microcontrollers	2018_P6S_WG, 2018_inż_P6S_WG
KIN_W10	has basic knowledge of modern design methods using CAD/CAM/CAE systems	2018_P6S_WG, 2018_inż_P6S_WG
KIN_W11	knows and understands the concept and typical functionalities of an operating system, multitasking/multi-threaded work, multi-access; knows the basic mechanisms of intra-system communication; has basic knowledge of virtualisation and its importance for modern information technologies	2018_P6S_WG, 2018_inż_P6S_WG
KIN_W12	has the necessary knowledge of modern network and Internet technologies, knows the reference models of network systems, including the ISO/OSI model; knows the basic protocols, network services and applications, and typical methods of data transmission taking into account the specifics of the media used	2018_P6S_WG, 2018_inż_P6S_WG
KIN_W13	has basic knowledge of security hazards in typical network/system environments and knows how to secure against and counteract them	2018_P6S_WG, 2018_inż_P6S_WG

KIN_W14	knows the algebra of relational databases and the relational database model, knows the basics of algebra, commands classified into functional groups and the composition of the structured query language (SQL), has basic knowledge of data modeling and database design, knows selected computer-aided design (CASE) tools for relational databases and the rules of their use; has the necessary knowledge of database security and administration	2018_P6S_WG, 2018_inż_P6S_WG
KIN_W15	has basic knowledge of economic, legal and ethical conditions related to the activity of an IT engineer, knows the basic principles of occupational health and safety	2018_P6S_WG, 2018_P6S_WK, 2018_inż_P6S_WK
KIN_W16	knows and understands basic concepts and principles of industrial property protection, copyright and patent law; can use patent information resources	2018_P6S_WK, 2018_inż_P6S_WK
KIN_W17	has basic knowledge of management and operating a business, knows the general principles of creating and developing forms of individual entrepreneurship	2018_P6S_WK, 2018_inż_P6S_WK
KIN_W18	has extended knowledge of the issues discussed during the specialist module	2018_P6S_WG, 2018_P6S_WK, 2018_inż_P6S_WG
SKILLS		
KIN_U01	is able to formulate theorems and definitions in a correct and comprehensible manner, both orally and in writing; has the ability to use mathematical methods to solve simple IT problems; can use mathematical formalism to precisely describe practical IT tasks	2018_P6S_UW, 2018_inż_P6S_UW
KIN_U02	can use numerical methods to solve mathematical problems; can use software packages to support such calculations	2018_P6S_UW, 2018_inż_P6S_UW
KIN_U03	can construct algorithms using classic data structures and basic algorithmic techniques; can write classic algorithms in the form of a block diagram, a list of steps, in a pseudo-code and in a selected programming language; can use mathematical methods to evaluate the effectiveness of simple algorithms	2018_P6S_UW, 2018_inż_P6S_UW
KIN_U04	has the ability to create and process graphics using available applications	2018_P6S_UW, 2018_inż_P6S_UW
KIN_U05	can describe and analyse basic physical phenomena using an appropriate mathematical apparatus; can verify real-world models as well as predict events and states based on known models	2018_P6S_UW, 2018_inż_P6S_UW
KIN_U06	is able to analyse an electrical circuit using an appropriate method, to carry out measurements and interpret the results obtained for different electrical quantities	2018_P6S_UW, 2018_inż_P6S_UW
KIN_U07	is able to design and implement typical applications in the selected programming language, including those using graphical and communication interfaces	2018_P6S_UW, 2018_inż_P6S_UW
KIN_U08	has basic skills in low-level and system programming, including programming of microprocessors and microcontrollers for embedded systems	2018_P6S_UW, 2018_inż_P6S_UW
KIN_U09	is able to design and build simple measuring systems and simple devices incorporating automatic control systems	2018_P6S_UW, 2018_inż_P6S_UW
KIN_U10	is able to create applications implementing algorithms of measurement data acquisition, processing and presentation	2018_P6S_UW, 2018_inż_P6S_UW
KIN_U11	is able to prepare simple mechanical models and electronic systems using appropriate CAD packages	2018_P6S_UW, 2018_inż_P6S_UW
KIN_U12	is able to identify and estimate factors affecting the performance of a computer system, microprocessor or microcontroller and to experimentally determine appropriate parameters	2018_P6S_UW, 2018_inż_P6S_UW
KIN_U13	is able to take advantage of the functionality of typical operating systems, in particular Unix systems, system shells and shell scripts; is able to use the capabilities of an operating system to manage data sets	2018_P6S_UW, 2018_inż_P6S_UW
KIN_U14	is able to design and implement simple configuration of a local network with access to the Internet, based on typical active devices and transmission media; can perform basic diagnostic tests of status and functionality for a typical computer network and typical network services	2018_P6S_UW, 2018_inż_P6S_UW

KIN_U15	is able to assess threats in information systems and apply appropriate methods to eliminate them	2018_P6S_UW, 2018_inż_P6S_UW
KIN_U16	can solve data exploration issues with the use of relational database algebra; can construct correct and optimal SQL queries for databases; can operate and use databases, including as a source of database applications; can design correct and integral relational databases, including using selected computer-aided design (CASE) tools; can develop correct and transparent documentation for a relational database project; can administer databases and take care of data security	2018_P6S_UW, 2018_inż_P6S_UW
KIN_U17	has the ability to describe the problem area; has the ability to match the heuristic search algorithm to the specificity of the problem, and to implement it	2018_P6S_UW, 2018_inż_P6S_UW
KIN_U18	has the ability to prepare and deliver oral presentations on specific IT issues with the support of multimedia; has the ability to prepare typical written work on specific IT issues using a variety of information sources	2018_P6S_UK, 2018_P6S_UW, 2018_inż_P6S_UW
KIN_U19	has the ability to implement basic algorithms of raster and vector graphics, both 2D and 3D; can properly use various programming libraries; can properly select hardware solutions specific to computer graphics	2018_P6S_UW, 2018_inż_P6S_UW
KIN_U20	is able to use and apply, in engineering practice, extended knowledge of selected issues discussed in the specialist module	2018_P6S_UW, 2018_inż_P6S_UW
KIN_U21	is able to identify alternatives and/or compromise solutions for engineering activities, taking into account the results of the preliminary economic analysis	2018_P6S_UW, 2018_inż_P6S_UW
SOCIAL COMPETENCES		
KIN_K01	recognises and appreciates the role and importance of IT for the development of civilisation, science and technology; understands the interdisciplinary character of IT; recognises and appreciates the role and importance of open systems and free software for the development of information technologies, and makes efforts to promote free software	2018_P6S_KK, 2018_P6S_KO, 2018_inż_P6S_WG
KIN_K02	understands non-technical aspects of the application of acquired knowledge and skills and the associated responsibilities; understands and appreciates the importance of intellectual honesty in one's actions and in those of others; acts ethically	2018_P6S_KR, 2018_inż_P6S_WG
KIN_K03	can think and act in terms of entrepreneurship, taking into account costs, economic effects, income statement, profitability, compromise solutions	2018_P6S_KO, 2018_inż_P6S_WK