EDUCATIONAL EFFECTS FOR THE MAJOR: INFORMATICS
FACULTY OF AUTOMATIC CONTROL, ELCTRONICS AND COMPUTER SCIENCE

the name of the major: Informatics	
educational level: 1st cycle studies	
educational profile: general academic	
Symbol	Major educational effects
Knowledge: a graduate knows and understands	
K1A_W01	elements of digital arithmetic, numerical methods, linear algebra, mathematical analysis and analytical geometry, differential and integral calculus as well as their applications
K1A_W02	fundamentals of: – discrete mathematics, – differential equations, – calculus of probability, – mathematical statistics
K1A_W03	notions of classical, relativistic and quantum physics, in particular: – general laws of physics, physical quantities and fundamental interactions – elements of: a) classical and relativistic mechanics, b) oscillatory and wave motion, c) thermodynamics, d) electromagnetics, e) physical foundations of solid-state electronics, f) fundamentals of nuclear physics
K1A_W04	rules of conducting and compiling results of physical measurements, types of measurement uncertainties, methods of their determination and expression
K1A_W05	elements of physics, electrical engineering and electronics necessary to understand digital technology and rules of functioning of contemporary computers
K1A_W06	fundamentals of electrical engineering necessary to understand functioning of electronic units in a computer system
K1A_W07	fundamentals of electronics, including: basic electronic analogue systems, elements of transmission lines, A/C and C/A converters, foundations of digital and microprocessor technologies necessary to solve basic engineering problems
K1A_W08	elements of digital information transmission necessary to understand the principles of functioning, designing and configurating contemporary computer networks of various types
K1A_W09	elements of algorithms and their analysis, programming languages and paradigms, computer graphics, user interfaces, artificial intelligence, data bases, software engineering
K1A_W10	construction and architecture of computer systems, computer networks, embedded systems, foundations of operating systems, elements of network technologies, mobile technologies and principles of designing and implementing basic information systems

K1A_W11	detailed elements of algorithmics, programming, designing and modelling information systems
K1A_W12	basic data structures and operations conducted on them as well as strategies of selecting data structures adequate for a realized assignment
K1A_W13	latest development trends in informatics
K1A_W14	lifecycle of hardware or software information systems
K1A_W15	basic methods, technologies and tools used for solving basic engineering information problems in analysis of computational complexity of algorithms, computer graphics, user interfaces, artificial intelligence, data bases, software engineering
K1A_W16	basic methods, technologies and tools used for solving basic engineering information problems in building computer systems, operating systems, computer networks, embedded systems
K1A_W17	levels of constructing a model of real world expressed by means of data structures
K1A_W18	social, economic, legal and other extra-technical conditions of engineering activities
K1A_W19	fundamentals of management, including quality management and running business operations
K1A_W20	fundamentals of patent filing process, major aspects of copyrights law and related laws, as well as the act on industrial property
K1A_W21	general principles of creating and developing forms of individual enterprise using the knowledge of informatics
K1A_W22	typical technologies used in solving engineering problems in the field of informatics
K1A_W23	fundamental dilemmas of the contemporary civilization
Skills: a graduate is able to:	
K1A_U01	use the acquired knowledge – formulate and solve complex and untypical problems as well as execute assignments in unpredictable conditions by: – a proper selection of sources and information acquired from them, evaluation, critical analysis and synthesis of the information, – selection and application of proper methods and tools, including advanced information and communication technologies (ICT)
K1A_U02	communicate by means of various technologies using specialised terminology in the professional and other environments as well as information tools
K1A_U03	prepare both in Polish and English a well-documented study on realizing an engineering assignment, including problems in informatics
K1A_U04	prepare both in Polish and English an oral presentation on detailed problems in the field of informatics and realization of an engineering assignment
K1A_U05	plan and realize individually life-long learning, also in order to develop professional competences
K1A_U06	master English language to a degree which would allow to understand and read with comprehension technical documents and literature, in accordance with the requirements of the B2 level of the Common European Framework of Reference for Languages
K1A_U07	use the versions control system

K1A_U08	use the acquired mathematical knowledge, including elements of the calculation theory, and statistical knowledge to describe processes, create models, record algorithms, analyse the efficiency of basic hardware and software systems, as well as other activities in the field of informatics
K1A_U09	conduct basic physical measurements as well as compile and present their results clearly, in particular: a) compile a basic measurement system using standard measurement devices, in accordance with the assigned scheme and specification, b) determine the results and uncertainties of direct and indirect measurements as well as record them in a proper form, c) evaluate the credibility of the obtained measurement results and interpret them based on the acquired physical knowledge
K1A_U10	plan and conduct experiments, including computer simulations, interpret the obtained results and draw conclusions
K1A_U11	use logic to formulate correct statements and evaluate the truth of complex sentences, perform calculations in vector spaces, use selected elements of linear algebra for technical problems, use methods of differential and integral calculus to describe physical and technical problems
K1A_U12	use mathematical apparatus to formulate, analyse and solve basic engineering problems
K1A_U13	analyse and solve basic physical problems based on the knowledge of laws and methods of physics, in particular: a) explain a course of physical phenomena based on the knowledge of basic laws of physics, b) use the knowledge of laws and methods of physics as well as proper mathematical tools to solve typical problems in classical mechanics, oscillatory and wave motions, thermodynamics, electricity, magnetism, optics and fundamentals of nuclear physics, c) use the knowledge of mathematical methods to analyse basic electronic systems
K1A_U14	during identification and formulation of specifications for engineering assignments and their solving: − use analytical, simulation and experimental methods, − discern their system and extra-technical aspects, − conduct an initial economic assessment of the proposed solutions and undertaken engineering actions
K1A_U15	conduct systematic verification of both hardware and software
K1A_U16	build basic systems of industrial informatics in the field of selecting hardware and software
K1A_U17	use and follow safety regulations connected with working in the industrial environment
K1A_U18	characterize architecture and organization of different types of computers
K1A_U19	conduct a critical analysis of the information system functioning and evaluate current information solutions, at least with reference to their functional characteristics
K1A_U20	formulate technical and utility specifications of basic information systems with reference to hardware, system software and functional characteristics of applications
K1A_U21	assess usefulness of routine methods and information tools as well as select and use a proper method and tools for typical information assignments
K1A_U22	use selected information and programme tools to render computer graphics; implement basic algorithms of computer graphics

K1A_U23	implement algorithms using a familiar programme language and low-level programming
K1A_U24	design and perform basic internet and network applications using communication protocols
K1A_U25	design basic local computer networks with their configuration; perform the function of a computer network administrator
K1A_U26	create basic applications functioning under the control of various hardware and software environments; design a functional, reliable and useful user interface
K1A_U27	build basic, safe database systems, using at least one of the database management systems
K1A_U28	build basic digital and embedded systems with software
K1A_U29	design, in accordance with an assigned specification, and realize a basic information system, including the hardware part and/or software, using proper methods, technologies and tools
K1A_U30	participate in debates – present, evaluate and discuss various opinions and approaches
K1A_U31	plan and organize both individual and team work
Social competences: a graduate is prepared to:	
K1A_K01	evaluate critically the acquired knowledge and accept the meaning of knowledge in solving cognitive and practical problems
K1A_K02	work and cooperate in a team, taking on various roles
K1A_K03	perform responsibly professional roles and individual work, including using the rules of professional ethics and requiring others to do so, as well as caring about trade achievements and traditions
K1A_K04	think and act in a resourceful way, show initiative and autonomy in professional actions
K1A_K05	initiate actions for public interest and show sensitivity to social problems
K1A_K06	fulfill social obligations, co-organize actions for the social environment

a table of coverage of learning outcomes leading to obtain engineering competences through the effects of education for the field of study

the name of the major: Informatics educational level: 1st cycle studies educational profile: general academic	
learning outcomes leading to obtain engineering competences	Relations to the learning outcomes for the studies
Knowledge: a graduate knows and understands	
basic processes going in the lifecycle of hardware devices, objects and technical systems	K1A_W14
general principles of creating and developing forms of individual enterprise	K1A_W21
Skills: a graduate is able to:	
plan and conduct experiments, including computer simulations, interpret the obtained results and draw conclusions	K1A_U10
during identification and formulation of specifications for engineering assignments and their solving: − use analytical, simulation and experimental methods, − discern their system and extra-technical aspects, − conduct an initial economic assessment of the proposed solutions and undertaken engineering actions	K1A_U14
conduct a critical analysis of the information system functioning and evaluate current information solutions	K1A_U19
design, in accordance with an assigned specification, and realize a basic information system, including the hardware part and/or software, using proper methods, technologies, materials and tools	K1A_U29