

PROGRAMME OF EDUCATION

FACULTY: ELECTRONICS (W4).

MAIN FIELD OF STUDY: Electronic and Computer Engineering (EAC).

AREA: technical sciences

FIELD: technical science

DISCIPLINE: Automation and Robotics, Electronics, Computer Science,
Telecommunications

LEADING DISCIPLINE: Electronics

EDUCATION LEVEL: 1st level, engineering studies

FORM OF STUDIES: full-time

PROFILE: general academic

SPECIALIZATION: -----

LANGUAGE OF STUDY: English.

Content:

1. Assumed educational effects – attached below.....
2. Program of studies – attachment no. ...2...
3. Plan of studies – attachment no. ...3...

Faculty Council Resolution of 30.09.2015
In effect since 01.10.2016

MAIN FIELD OF STUDY EDUCATIONAL EFFECTS

Faculty: **ELECTRONICS**

Main Field of Study: **Electronic and Computer Engineering**

Level: **1st level**

Teaching results for the 1st cycle program for main field of study: ECE	DESCRIPTION OF TEACHING RESULTS FOR MAJOR On completion of the second cycle program in EAC the graduate:	Teaching results in the field of technical science (T): reference
KNOWLEDGE		
K1ECE_W01 Algebra ECEA003	has basic knowledge in the field of mathematical logic and set theory, analytic geometry on the plane and in space, complex numbers, polynomials, rational functions, using matrix algebra to solve systems of linear equations	T1A_W01
K1ECE_W02 Math Analysis 1 ECEA001	has basic knowledge of differential and integral calculus of functions of one variable	T1A_W01
K1ECE_W03 Math Analysis 2 ECEA002	has basic knowledge of differential and difference equations and differential and integral calculus of several variables (multiple integrals, operational calculus)	T1A_W01
K1ECE_W04 Math for Electronics ECEA004	has basic knowledge of the concepts and methods of probability and mathematical statistics in practical problems in various fields of engineering applications	T1A_W01
K1ECE_W05 Physics ECEA005	has a basic knowledge of classical mechanics, wave motion, quantum mechanics, quantum optics and condensed matter physics	T1A_W01
K1ECE_W06 Metrology ECEA011	knows the basics of metrology, theory and techniques of measurement of electrical and non-electrical quantities	T1A_W07 T1A_W02 InżW02
K1ECE_W07 Introduction To Programing ECEA007	knows the basics of information technology (including Web services) associated with the acquisition, processing and presentation of information, and is familiar with the term algorithm and methods of its representation, the basic structure of algebraic languages, the concept of recursion, principles of structured programming, basic algorithms for sorting and searching data, as well as dynamic and complex data structures.	T1A_W07 T1A_W03 T1A_W05 InżW02 InżW05
K1ECE_W08 Electronic Technology ECEA014	knows the basic principles of designing electronic devices and principles for the development and reading the documentation for construction and technology of electronic devices	T1A_W07 T1A_W03 T1A_W05 T1A_W06 InżW01 InżW02 InżW05
K1ECE_W09	has knowledge on terminology, basic tasks, techniques and	T1A_W07

Introduction To Automation And Robotics ECEA019	components of automation and robotics.	T1A_W03 T1A_W05 InżW02
K1ECE_W10 Systems Theory ECEA018	knows the basics of systems theory, the properties of the basic structures of systems, and methods for solving simple problems of identification, recognition and control	T1A_W02
K1ECE_W11 Object Oriented Programming ECEA008	knows basics of object-oriented engineering and programming methodology	T1A_W07 T1A_W03 T1A_W05 InżW02 InżW05
K1ECE_W12 Fundamentals Of Telecommunication ECEA021	knows the basics of telecommunications and defines the basic concepts of telecommunications	T1A_W02
K1ECE_W13 Digital Signal Processing ECEA020	knows the basic issues of digital signal processing theory of deterministic and random signals, in particular tasks sampling, quantization, detection and filtration	T1A_W03
K1ECE_W14 Introduction To Microcontrollers ECEA016	knows the internal structure and programming methods of microprocessors and microcontrollers	T1A_W07 T1A_W03 T1A_W05 InżW02 InżW05
K1ECE_W15 Physics For Electronics ECEA006	knows the basic laws of physics for the electric and magnetic fields in vacuum and in material and is familiar with elements of operational calculus and the Maxwell equations	T1A_W01
K1ECE_W16 Electronics ECEA012	has basic knowledge of methods of analysis of electronic DC and AC circuits	T1A_W07 T1A_W03 T1A_W05 InżW05
K1ECE_W17 Electronic Components And Sensors ECEA013	knows the basics of operation, parameters and application of electronic components and sensors and is able to characterize measurement interfaces	T1A_W07 T1A_W03 T1A_W05 InżW05
K1ECE_W18 Electronic Circuits ECEA015	knows the basic methods and computational techniques (including computer software) necessary for the design and analysis of electronic circuits; realizes the trends of development of electronic systems	T1A_W07 T1A_W03 T1A_W05 InżW02 InżW05
K1ECE_W19 Scientific & Engineering	knows the basic programming tools and environments essential for dynamical systems simulation and understands the role of the proper tools selection.	T1A_W07 T1A_W03 T1A_W05

Programming ECEA009		InżW05
K1ECE_W20 Programming Systems & Environments ECEA010	knows the basic environment of operating systems and API, understands their importance in the programming process	T1A_W07 T1A_W03 T1A_W05 InżW02 InżW05
K1ECE_W21 Computer Networks ECEA017	explains and describes basic information related to computer networks technologies, computer networks protocols, design and configuration of computer networks	T1A_W03
K1ECE_W22 Electroacoustic s ECEA022	knows the basic concepts of mechanical vibrations as well as acoustic waves and systems and he/she characterizes the features of electroacoustic transducers, devices and systems	T1A_W02
K1ECE_W23 Optional Module 1	has specialized knowledge of selected issues of the three effects of the knowledge contained in “ Optional Module 1 ”	T1A_W04 T1A_W05
K1ECE_W24 Optional Module 2	has specialized knowledge of selected issues of the three effects of the knowledge contained in “ Optional Module 2 ”	T1A_W04 T1A_W05
K1ECE_W25 Optional Module 3	has specialized knowledge of selected issues of the two effects of the knowledge contained in “ Optional Module 3 ”	T1A_W04 T1A_W05
K1ECE_W40 Philosophy	has the knowledge allowing understand the determinants of non-technical engineering activities	T1A_W08 InżW03
K1ECE_W41 Author Low	knows the basic principles of intellectual property protection	T1A_W09 T1A_W10 InżW04
K1ECE_W42 Business	knows the rules of creating entrepreneurship in the right direction for the studied specialty	T1A_W11 T1A_W09 InżW04
	SKILLS	
K1ECE_U01 Algebra ECEA003	is able to correctly and efficiently apply the knowledge in the field of mathematical logic and set theory, analytic geometry on the plane and space, complex numbers, polynomials, rational functions, using matrix algebra to solve systems of linear equations	T1A_U09 InżU02
K1ECE_U02 Math Analysis 1 ECEA001	is able to correctly and efficiently apply knowledge of differential and integral calculus of functions of one variable	T1A_U09 InżU02
K1ECE_U03 Math Analysis 2 ECEA002	is able to correctly and efficiently apply the knowledge in the field of differential equations and differential and integral calculus of several variables (multiple integrals, the operational calculus)	T1A_U09 InżU02
K1ECE_U04 Math For Electronic ECEA004	is able to correctly and efficiently apply knowledge of concepts and methods of probability and mathematical statistics in practical problems in various fields of application engineering.	T1A_U09 InżU02
K1ECE_U05	is able to correctly and efficiently apply the learned principles and	T1A_U09

Physics ECEA005	laws of physics to qualitative and quantitative analysis of the physical problems of engineering.	InżU02
K1ECE_U06 Metrology ECEA011	is able to: plan and safely perform measurements, develop measurements, to estimate the uncertainty of measured values measured values, can construct a measurement system and perform measurements of analog and digital instruments of electrical and non-electrical	T1A_U08 InżU01
K1ECE_U07 Introduction To Programming ECEA007	is able to use information techniques; can save the algorithm in block diagram form to solve it simple programming tasks in the form of algorithms and how they have been testing use development environment and programming using simple types, strings, loops, procedures and functions	T1A_U07
K1ECE_U08 Electronic Technology ECEA014	is able to apply the basic forms of saving construction techniques of projection and describe the object model using different types of cross-sections	T1A_U08 T1A_U09 T1A_U13 T1A_U14 T1A_U15 InżU01 InżU02
K1ECE_U09 Introduction To Automation And Robotics ECEA019	is able to simulate and analyze basic objects of automation and robotics using appropriate tools.	T1A_U08 T1A_U09 InżU01 InżU02
K1ECE_U10 System Theory ECEA018	has the ability to represent the expert knowledge and experimental knowledge in the form of block diagrams, graphs, and sets of logical expressions, in particular is able to create an input-output system and is able to construct a mathematical model of the system	T1A_U10 InżU03
K1ECE_U11 Object Oriented Programing ECEA008	can create object-oriented programs	T1A_U07
K1ECE_U12 Fundamentals Of Telecommunic ation ECEA021	can perform measurements of basic parameters of modulated signals as well as analog or digital transmission parameters using specialized instrumentation systems	T1A_U08
K1ECE_U13 Digital Signal Processing ECEA020	is able to analyze the features of the signals in the time domain and frequency and digital filter synthesis using dedicated software	T1A_U08 InżU01
K1ECE_U14 Introduction To Microcontrolle rs ECEA016	is able to prepare and run the software using the internal structure of microcontrollers	T1A_U16 InżU08
K1ECE_U15	knows how to calculate the distributions of the electromagnetic field	T1A_U09

Physics For Electronics ECEA006	and the capacity, resistance and inductance of physical systems	InžU02
K1ECE_U16 Electronics ECEA012	can analyze simple electrical DC and AC circuits including the symbolic method and operators	T1A_U09 InžU02
K1ECE_U17 Electronic Components And Sensors ECEA013	knows how to evaluate the performance and characteristics of selected electronic components; can design algorithm for data acquisition and processing, and deploy it for use	T1A_U09 InžU02
K1ECE_U18 Electronic Circuits ECEA015	can, in accordance with a preset specification and using appropriate methods, techniques and tools (including computer simulations) to design and implement a simple electronic circuit.	T1A_U13 T1A_U14 T1A_U15 T1A_U16 InžU05 InžU07 InžU08
K1ECE_U19 Scientific & Engineering Programming ECEA009	knows the basic programming tools and environments essential for dynamical systems simulation and understands the role of the proper tools selection.	T1A_U13 T1A_U14 T1A_U15 T1A_U16 InžU05 InžU06 InžU07 InžU08
K1ECE_U20 Programming Systems & Environments ECEA010	can use in programs, system functions and development environment, knows how to create a simple multithreaded, graphical or mobile applications	T1A_U13 T1A_U14 T1A_U15 T1A_U16 InžU05 InžU06 InžU07 InžU08
K1ECE_U21 Computer Networks ECEA017	distinguish devices and services of computer network, design IP addressing scheme, design and construct a simple computer network	T1A_U15
K1ECE_U22 Electroacoustic ECEA022	can perform basic measurements in the field of acoustic surveying and analyze and interpret measurement results.	T1A_U08 T1A_U15 InžU01 InžU07
K1ECE_U23 Optional Module 1	can formulate and solve engineering tasks and / or analyze and assess the functioning of the systems or processes in the field of three effects skills included in the " Optional Module 1 "	T1A_U09 T1A_U13 InžU05
K1ECE_U24 Optional Module 2	can formulate and solve engineering tasks and / or analyze and assess the functioning of the systems or processes in the field of three effects skills included in the " Optional Module 2 "	T1A_U09 T1A_U13 InžU05

K1ECE_U25 Optional Module 3	can formulate and solve engineering tasks and / or analyze and assess the functioning of the systems or processes in the field of two effects skills included in the "Optional Module 3"	T1A_U09 T1A_U13 InzU05
K1ECE_U31 Internship ECEA026	is prepared to work in an industrial environment, and has knowledge of safety rules related to the workplace	T1A_U02 T1A_U11
K1ECE_U32 Diploma Seminar ECEA024	demonstrates knowledge of the chosen topic on the seminar achieved, among others, in the process of self-education; is able to make a presentation containing the results of solutions and present it to the public; can in the discussion objectively justify their original ideas and solutions	T1A_U02 T1A_U03 T1A_U04 T1A_U05 T1A_U10 T1A_K01 T1A_K07
K1ECE_U33 Final Project ECEA025	can solve the engineer task using the acquired knowledge and skills as well as is able to obtain information from other sources in the process of self-education; takes into account non-technical aspects; is able to produce documentation solution and present their solutions in a clear and legible way.	T1A_U02 T1A_U03 T1A_U10 T1A_K01 T1A_K02 T1A_K07
K1ECE_U34 Foreign Language 1	can independently use a variety of foreign sources of information, in particular literature, integrate the information obtained	T1A_U01
K1ECE_U35 Foreign Language 2	skillfully speaks a foreign language in an international working environment with emphasis on intercultural knowledge and formal and informal registry of expression, in accordance with the requirements set for the level b2	T1A_U01 T1A_U06
	COMPETENCES	
K1ECE_K01 Philosophy, Ethics	is aware of the importance and understanding of the humanistic aspects and impacts of engineering. learns the consequences of the impact of technology on the environment, and the related social responsibility of science and technology.	T1A_K01 T1A_K02 T1A_K07 InzK01
K1ECE_K02 Author Low	correctly identifies and resolves dilemmas related to the profession; is aware of the social role of technical college graduate. understands the need for formulating and providing the public with information and opinions on the achievements of technology and other aspects of engineering; can transmit this information and opinions in a meaningful, with the justification of different points of view.	T1A_K05 T1A_K07
K1ECE_K03 Business	understands the legal aspects and consequences engineering activities	T1A_K05 T1A_K06 T1A_U12 InzK02 InzU04
K1ECE_K04 Team & Preengineering Project ECEA023	can work with the team in the implementation of complex engineering tasks performing different roles in the team, is able to perform assigned tasks on schedule.	T1A_K01 T1A_K03 T1A_K04 T1A_K05 T1A_U12 InzK01

		InžU04
K1ECE_K05 Sport	is aware of the necessity of individual and team activities beyond the engineering activity	T1A_K02 T1A_K04 InžK01

MODUŁY WYBIERALNE (OPTIONAL MODULES)

Moduł wybieralny 1 (Optional Module 1)

	KNOWLEDGE	
K1ECE _W23_01 Advanced Topics in Robotics (ECEA101)	<i>knows selected method of robot modelling, motion planning and control and applications of modern robots</i>	T1A_W04
K1ECE _W23_02 Microcontrollers (ECEA102):	<i>knows the operation of advanced microcontroller peripheral blocks as interrupt controllers, memory interfaces and blocks counters</i>	T1A_W04
K1ECE _W23_03 AI & Vision Systems (ECEA103)	<i>knows the basic paradigms and algorithms, artificial intelligence, and basic models and algorithms of machine vision processing</i>	T1A_W04
K1ECE _W23_04 Optoelectronics (ECEA104)	<i>knows the basic principles of optoelectronics in terms of generation, detection and processing of optical radiation</i>	T1A_W04
K1ECE _W23_05 Wireless systems (ECEA105)	<i>has basic knowledge in the field of various types of wireless systems, techniques used for transmission, system procedures and communication protocols.</i>	T1A_W04
	SKILLS	
K1ECE _U23_01 Advanced Topics in Robotics (ECEA101)	<i>is able to analyze, design and implement motion planning and control systems for robots</i>	T1A_U09 T1A_U13 InzU05
K1ECE _U23_02 Microcontrollers (ECEA102)	<i>is able to properly select the development environment and prepare, create, validate and deploy software testing and functional microcontrollers</i>	T1A_U09 T1A_U13 InzU05
K1ECE _U23_03 AI & Vision Vystems (ECEA103)	<i>is able to explain selected patterns knowledge representation in artificial intelligence, and associated algorithms</i>	T1A_U09 T1A_U13 InzU05
K1ECE _U23_04 Optoelectronics (ECEA104)	<i>can search, analyze, synthesize and present scientific information on selected aspects of optoelectronics and use it in solving engineering problems</i>	T1A_U09 T1A_U13 InzU05
K1ECE	<i>is able to determine the radio link budget, communication and</i>	T1A_U09

_U23_05 Wireless systems (ECEA105):	<i>interference range for mobile networks; is able to use the diagnostic tools and to configure selected devices wireless networks</i>	T1A_U13 InżU05
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Moduł wybieralny 2 (Optional Module 2)

	KNOWLEDGE	
K1ECE_W24_01 Control Systems Engineering (ECEA201)	<i>has extended knowledge of architecture of advanced automation systems</i>	T1A_W04
K1ECE_W24_02 Embedded Systems (ECEA202)	<i>has knowledge of the design of programmable logic and the main blocks implemented in the structures of programmable devices. Has knowledge of parallel processing and the design of multiprocessor systems; has knowledge of operation of Internet of Things (IoT) systems</i>	T1A_W04
K1ECE_W24_03 Real Time Operating Systems (ECEA203)	<i>knows the general structure and functions of real time operating systems</i>	T1A_W04
K1ECE_W24_04 Lasers, Fibers and Applications (ECEA204)	<i>understands quantum mechanics principles of lasers operation. Knows the basic parameters of lasers, their types and applications. Knows principles of optical fiber operation. Knows optical fibers types, their parameters and applications</i>	T1A_W04
K1ECE_W24_05 Communication systems and networks (ECEA205)	<i>He has knowledge of the structure and functioning of the systems and telecommunications networks using different technologies and standards</i>	T1A_W04
	SKILLS	
K1ECE_U24_01 Control Systems Engineering (ECEA201)	<i>can design, configure and run various automation systems.</i>	T1A_U09 T1A_U13 InżU05
K1ECE_U24_02 Embedded Systems (ECEA202)	<i>can create software in HDL languages; can use sub-blocks of FPGA; can use computer tools supporting the design and testing of software for the selected hardware platform</i>	T1A_U09 T1A_U13 InżU05
K1ECE_U24_03 Real Time Operating Systems (ECEA203)	<i>can create real-time applications for selected real-time operating systems</i>	T1A_U09 T1A_U13 InżU05
K1ECE_U24_04 Lasers, Fibers and Applications (ECEA204)	<i>can carry out experiments in the field of laser technology and fiber optics; is able to interpret the results</i>	T1A_U09 T1A_U13 InżU05
K1ECE_U24_05	<i>is able to present the construction of modern</i>	T1A_U09

Communication systems and networks (ECEA205)	<i>telecommunication networks and configure basic functionality of selected systems</i>	T1A_U13 InzU05
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Moduł wybieralny 3 (Optional Module 3)

	KNOWLEDGE	
K1ECE_W25_01 Electrotechnics (ECEA301)	<i>knows the rules for construction of low-voltage electrical installations and performance criteria for fire protection installations with an operating voltage up to 1kV; knows the rules of the organization safe operation of electrical equipment and first aid in cases of electric shock.</i>	T1A_W04
K1ECE_W25_02 Medical Electronics (ECEA302)	<i>explains the construction and operation of electronic equipment, characterizes basic types of diagnostic, life supporting, and therapeutic equipment</i>	T1A_W04
K1ECE_W25_03 Fiber Optics Technology (ECEA303)	<i>has knowledge concerning basic physical phenomena in optical fibers and fiber parameters.</i>	T1A_W04
K1ECE_W25_04 Electronics for Renewable Energy Sources (ECEA304)	<i>characterizes renewable energy sources, proposes appropriate systems for the collection, chooses systems of obtained energy distribution,</i>	T1A_W04
K1ECE_W25_05 Satellite Communication Networks (ECEA305)	<i>has knowledge concerned with: networks offering multimedia services, the legal aspects and standards of multimedia networks, the features of particular elements of the satellite communication system</i>	T1A_W04
K1ECE_W25_06 Virtualization and Cloud Computing (ECEA306)	<i>knows methods, techniques, protocols and tools required to build classic, virtualized and cloud datacenter environment</i>	T1A_W04
K1ECE_W25_07 Machine learning (ECEA307)	<i>has basic knowledge about. machine learning methods and their applications</i>	T1A_W04
K1ECE_W25_08 Selected topics in Artificial Intelligence (ECEA308)	<i>knows the selected patterns of knowledge representation in artificial intelligence, and associated algorithms</i>	T1A_W04
K1ECE_W25_09 Hybrid Telecommunication Networks (ECEA309)	<i>knows the structure and operation of hybrid communication networks.</i>	T1A_W04
K1ECE_W25_10 Ultrasonic technology (ECEA310)	<i>describes and understands the basic concepts and theoretical issues associated with the ultrasound technique and knows the principles of ultrasound sources.</i>	T1A_W04

K1ECE _W25_11 Speech communication (ECEA311)	<i>Student knows the basic issues from speech acoustics, speech signal coding, vocoders, speech synthesis, speech recognition, speaker recognition and human-computer speech communication, as well as the rules of selection and usage of measurement techniques for the evaluation of quality transmission of speech signal.</i>	T1A_W04
	SKILLS	
K1ECE _U25_01 Electrotechnics (ECEA301)	<i>can perform basic switching the power supply and control systems for operating voltages up to 1kV and perform basic research such installations.</i>	T1A_U09 T1A_U13 InzU05
K1ECE _U25_02 Medical Electronics (ECEA302)	<i>can search, analyze and present scientific information on selected aspects of medical electronics</i>	T1A_U09 T1A_U13 InzU05
K1ECE _U25_03 Fiber Optics Technology (ECEA303)	<i>knows how to explain the importance of basic parameters of optical fibers.</i>	T1A_U09 T1A_U13 InzU05
K1ECE _U25_04 Electronics for Renewable Energy Sources (ECEA304)	<i>can search, analyze and present scientific information on selected aspects of electronics renewable energy sources</i>	T1A_U09 T1A_U13 InzU05
K1ECE _U24_05 Satellite Communication Networks (ECEA305)	<i>can analyze service parameters important for the multimedia networks structure, arrange proper network architecture and multimedia system architecture and evaluate functionality of the multimedia network elements</i>	T1A_U09 T1A_U13 InzU05
K1ECE _U24_06 Virtualization and Cloud Computing (ECEA306)	<i>is able to configure classic, virtualized and cloud datacenter infrastructure</i>	T1A_U09 T1A_U13 InzU05
K1ECE _U24_07 Machine learning (ECEA307)	<i>is able to solve selected tasks and machine learning to program and test selected computational algorithms in Matlab</i>	T1A_U09 T1A_U13 InzU05
K1ECE _U24_08 Selected topics in Artificial Intelligence (ECEA308)	<i>can create applications for selected languages and development environments artificial intelligence</i>	T1A_U09 T1A_U13 InzU05
K1ECE _U24_09 Hybrid Telecommunication Networks (ECEA309)	<i>can design wide and local area networks, can monitor optical networks,</i>	T1A_U09 T1A_U13 InzU05
K1ECE _U24_10 Ultrasonic technology (ECEA310)	<i>performs ultrasonic measurements of fundamental physical parameters and can operate ultrasonic devices designed for nondestructive testing.</i>	T1A_U09 T1A_U13 InzU05
K1ECE _U24_11 Speech communication	<i>is able to process the analog sound signal into digital form, measure the basic parameters of time, frequency and LPC domains, compare and assess the audio and</i>	T1A_U09 T1A_U13 InzU05

(ECEA311)	<i>video coding and compression methods, use the TTS tools and plan and use the functions of speech and speaker recognition systems.</i>	
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