



Study programme

Major: Electronics and Telecommunications

Table of contents

3
4
5
6
10
11
17
22
30
31

General characteristics of the major

Basic information

Faculty name:	Faculty of Computer Science, Electronics and Telecommunications
Major name:	Electronics and Telecommunications
Level:	First-cycle (engineer) programme
Profile:	General academic
Form:	Full-time studies
ISCED classification:	
Number of ECTS credits necessary to complete studies at a given level:	210
Professional title awarded to graduates:	inżynier
Cycle start date:	2023/2024, winter semester
Duration of studies (number of semesters):	7

Field of science to which the major is assigned:

Field engineering and technical sciences

Discipline of science to which the major is assigned:

Discipline	Percentage	ECTS
Automation, electronic, electrical engineering and space technologies	71%	149
Technical computing and telecommunications	29%	61

Relationship between the major and the AGH UST development strategy and the AGH UST mission

Information on taking into account the socio-economic demand while creating the study programme and indication of the assumed learning outcomes matching the identified demand

Learning paths - scope in Polish and in English

Diploma paths - scope in Polish and in English

The names of the specialties in Polish and in English

Name [pl]	Name [en]
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General information about the study programme

Major: Electronics and Telecommunications

General information related to the study program (general learning objectives and employment opportunities, typical jobs and opportunities for graduate continuing education)

Information on the study programme including the conclusions from the students and graduates careers monitoring

Information on the study programme taking into account the requirements and recommendations of the accreditation committees, in particular the Polish Accreditation Committee and industry accreditation committees

Information on including examples of good practice in the study program

Information on cooperation in the preparation of the study programme with external stakeholders, in particular associations, professional and social organizations

Duration, rules and form of the apprenticeship

Admission criteria, rules and policies

Major: Electronics and Telecommunications

Description of competences expected from the candidate applying for admission to studies

Recruitment conditions, including the winners and finalists of the central level high school scientific Olympics, as well as winners of international and national contests

The expected limit of admissions to studies along with an indication of the minimum number of admitted candidates required to successfully launch a study cycle

Learning outcomes

Major : Electronics and Telecommunications

Knowledge

KEU symbol	Directional learning outcomes	CEU symbol
ETE1A_W01	has knowledge of mathematics, including algebra, analysis, probabilistykę and elements of discrete mathematics and numerical methods, necessary to: description and analysis of the operation of electrical circuits, electronic circuits, signal processing, and analysis and modeling of telecommunications networks. Has an ordered knowledge of mathematical analysis, in particular: -Calculus and calculus of functions of one variable and its uses -calculus and calculus of functions of many variables and its uses -equations ordinary differential Has structured knowledge of: - the elements of algebra and linear algebra -logic elements -analytic geometry in R2 and R3 -elements of discrete mathematics Has structured knowledge of probability, in particular: - probability -statistics	P6S_WG_A
ETE1A_W02	has knowledge in the field of physics, including mechanics, thermodynamics, optics, electricity and magnetism, nuclear physics, photonics and physics of solids, including the knowledge necessary to understand the basic physical phenomena occurring devices electronic and transmission systems. Has knowledge of the principles of conduct and develop a physical measuring uncertainty of measurement results and their determination.	P6S_WG_A
ETE1A_W03	has an ordered knowledge of theory of electrical circuits, signal theory (methods of the processing)	P6S_WG_A
ETE1A_W04	Has knowledge of the electromagnetic waves and their propagation, antenna techniques, wired and wireless transmission of information;	P6S_WG_A
ETE1A_W05	has an ordered knowledge about the materials used in the electronics industry; rules of operation of the electronic components (including optoelectronic elements, the elements and sensors), analogue and digital electronic circuits and simple electronic systems;	P6S_WG_A
ETE1A_W06	has knowledge of architecture and digital systems software and microprocessor, knows the method of their programming in high and low level; know the hardware description languages;	P6S_WG_A
ETE1A_W07	has basic knowledge in metrology, knows and understands the methods of measurement and the extraction of basic size characterizing elements and various types of electronic systems, knows the calculation methods and software tools necessary to analyze the results the experiment;	P6S_WG_A
ETE1A_W08	knows and understands the design methodology of analog and digital electronic circuits (combined version), and electronic systems, knows the computer design and simulation tools and systems;	P6S_WG_A
ETE1A_W09	has an ordered device expertise within the networks, including wireless networks and optical, and startup, configuration, and maintenance of these devices	P6S_WG_A
ETE1A_W10	Is familiar with the basic concepts of data transfer, can specify the characteristics of analog and digital transmission, transmission channel properties, the role of coding, modulation and cryptography, knows the encoding methods of the sounds, images and text in the media	P6S_WG_A
ETE1A_W11	has an ordered knowledge on networks of varying scope (local, wide area and aggregate), principles of their organization and administration, used in their communication protocols, addressing policy, mechanisms for the selection of routes, mechanisms traffic engineering, virtual networking mechanisms;	P6S_WG_A
ETE1A_W12	knows and understands a layered model of telecommunications network equipment, as well as the specific features of each layer for the selected network devices;	P6S_WG_A

KEU symbol	Directional learning outcomes	CEU symbol
ETE1A_W13	on and understand processes, construct and manufacture: integrated circuits and micro-systems, simple electronic devices and the design of computer networks and telecommunications	P6S_WG_A, P6S_WG_A_Inz
ETE1A_W14	has an ordered expertise in methodology and programming techniques; knows the rules for selecting a programming language to solve problems in terms of hardware and software services; understand methods of specifying the basic software requirements	P6S_WG_A
ETE1A_W15	has an ordered knowledge of computer architectures, systems, and computer networks, databases, and operating systems, necessary for the installation, operation and maintenance of it tools for information processing	P6S_WG_A
ETE1A_W16	has an elementary knowledge of the life cycle of equipment and electronic systems and ICT; versed in the current state, and the latest trends and development of electronics and telecommunications;	P6S_WG_A, P6S_WG_A_Inz
ETE1A_W17	has the basic knowledge necessary to understand the <i>pozatechnicznych</i> circumstances of engineering activity; familiar with the basic principles of health and safety at work applicable to the electronics industry and telecommunications; has an elementary knowledge of the protection of intellectual property and patent law;	P6S_WK_A
ETE1A_W18	has an elementary knowledge of management, including quality management, and business, as well as the General principles for the creation and development of individual forms of entrepreneurship	P6S_WK_A_Inz, P6S_WK_A

Skills

KEU symbol	Directional learning outcomes	CEU symbol
ETE1A_U01	Know how to use the rules of the strict, logical thinking in the analysis of the physical and technical processes Can use known mathematical engine to the description and analysis of the basic physical and technical issues, in particular: -know how to use calculus to compute the approximate-knows how to apply calculus and calculus to physics and technical sciences -knows how to use a matrix account -knows how to use the vector account -knows how to solve basic types of equations the differential describing physical phenomena -use description of analytical curves and surfaces in R3 -is able to apply knowledge of probability to analyze experimental data, in particular:-knows how to set the parameters of the random variables and understand their meaning, knows the common distributions of random variables -know how to use the basic methods of statistical inference. Can use the known principles and methods of physics and related mathematical tools to solve common tasks of mechanics, thermodynamics, statistical physics, electricity, magnetism, optics. Can perform a basic physical measurements and develop and present their results, in particular:-can build a simple measurement system using standard measuring devices, in accordance with the given schema and specification,-can appoint results and measurement uncertainty of direct and indirect, can assess the reliability of the measurement results and their interpretation in the context of the knowledge.	P6S_UW_A
ETE1A_U02	It can retrieve information from the literature, databases, and other sources; can integrate information, their interpretation, and also draw conclusions and formulate and justify reviews; has the ability of self-education, m.in. to improve the professional competence;	P6S_UU_A
ETE1A_U03	able to work individually and in a team; know how to estimate the time required for the implementation of commissioned tasks; able to develop and implement work schedule to ensure compliance with the terms;	P6S_UO_A
ETE1A_U04	can develop documentation on the implementation of the engineering tasks and prepare the text that contains an overview of the results of the implementation of this task; able to prepare and present a short presentation on the results of the implementation of the tasks of engineering;	P6S_UK_A

KEU symbol	Directional learning outcomes	CEU symbol
ETE1A_U05	speaks foreign language sufficiently to communicate, as well as reading comprehension of catalogue cards, application notes, manuals of electronic devices, telecommunications, networking and tools it and similar documents;	P6S_UK_A
ETE1A_U06	able to use known methods and mathematical models and computer simulations to analyze and evaluate the performance of analog and digital electronic circuits, as well as computer networks and telecommunications	P6S_UW_A, P6S_UW_A_Inz_0 1
ETE1A_U07	can analyze the signals and signal processing systems in the field of time and frequency, using analogue and digital techniques and the appropriate hardware and software tools	P6S_UW_A
ETE1A_U08	can compare the design of electronic circuits and electronic systems due to the commercial and economic criteria (power, speed, cost, reliability, topology, bandwidth, etc.);	P6S_UW_A, P6S_UW_A_Inz_0 1
ETE1A_U09	able to plan and execute the simulation and measurements of electronic systems, network protocols, databases and simple electronic systems and telecommunications networks, and presents the results in numerical form, and graphics, can make their interpretation and draw appropriate conclusions;	P6S_UW_A, P6S_UW_A_Inz_0 1
ETE1A_U10	can use the well-chosen methods and devices for measuring basic sizes with elements and electronics, as well as optical networks, cable and wireless; can assess their suitability to solve simple engineering tasks,	P6S_UW_A, P6S_UW_A_Inz_0 1
ETE1A_U11	can design a process of testing simple electronic systems and telecommunications and, in the case of detection of errors - to perform their diagnosis;	P6S_UW_A, P6S_UW_A_Inz_0 1
ETE1A_U12	able to formulate a specification of simple electronic and telecommunications systems at the level of the implemented functions; can plan the process of their construction and estimate the cost of their manufacture; can build, run, and test so defined or system;	P6S_UW_A, P6S_UW_A_Inz_0 2
ETE1A_U13	able to design simple circuits and electronic systems, as well as data transmission systems: cable, optical and wireless, taking into account the specified performance criteria and economical, using appropriate methods, tools and techniques, using the catalogue cards and application notes in order to determine the appropriate components, can design printed circuits, analog and digital (also in the combined version) using specialized software;	P6S_UW_A, P6S_UW_A_Inz_0 2
ETE1A_U14	can configure devices and communication protocols in the local (wired and radio) and (in particular optical) communication networks; can administer networks and data communication systems and solve emerging problems in them;	P6S_UW_A
ETE1A_U15	can formulate the algorithm uses both a high and low-level programming languages and relevant it tools to develop computer programs, electronic system control programs or device network;	P6S_UW_A, P6S_UW_A_Inz_0 1
ETE1A_U16	can-by formulating and solving tasks that involve design elements, systems and electronic systems and telecommunications - detect their non-technical aspects, including: environmental, economic and legal, health and safety of work;	P6S_UW_A, P6S_UW_A_Inz_0 1

Social competence

KEU symbol	Directional learning outcomes	CEU symbol
ETE1A_K01	understand the need for and possibility of continuous training (second degree and third degree, postgraduate courses)-raising professional competence, personal and social;	P6S_KK_A
ETE1A_K02	understand the validity of and understand non-technical aspects and effects of the engineer's activities, including its impact on the environment, and the responsibility for the decisions;	P6S_KO_A

KEU symbol	Directional learning outcomes	CEU symbol
ETE1A_K03	understand the validity of behavior in a professional manner, compliance with the rules of professional ethics and respect for the diversity of views and cultures;	P6S_KO_A
ETE1A_K04	is aware of the responsibility for the work and willingness to comply with the principles of team work and responsibility for jointly carried out the task; He can think and act in a way that is entrepreneurial;	P6S_KO_A
ETE1A_K05	is aware of the social role of the graduate of the Technical University, and, in particular, understand the need for the formulation and the transmission to the public - m.in. through the mass media - information and reviews about the achievements of the electronics, telecommunications, and other aspects of the activities of the engineer; shall endeavour to provide such information and opinions in a commonly understandable;	P6S_KR_A

Compliance table of engineering competence (Inz) with directional learning outcomes (KEU)

Major : Electronics and Telecommunications

Knowledge

CEU symbol	Learning outcomes for qualifications including engineering competence	KEU references
P6S_WG_A_Inz	knowledge of basic processes taking place in the life cycle of technical devices, facilities and systems	ETE1A_W13, ETE1A_W16
P6S_WK_A_Inz	knowledge of basic principles of creating and developing various forms of individual entrepreneurship	ETE1A_W18

Skills

CEU symbol	Learning outcomes for qualifications including engineering competence	KEU references
P6S_UW_A_Inz_01	ability to plan and carry out experiments, including measurements and computer simulations as well as to interpret the obtained results and draw conclusions out of them. When identifying and formulating the specification of engineering problems and solving them, being able to: - use analytical, simulation and experimental methods; - recognize their systemic and non-technical aspects, including ethical connotations; - conduct a preliminary economic assessment of the proposed solutions and planned engineering activities; - perform a critical analysis of the functioning of existing technical solutions to further evaluate them;	ETE1A_U06, ETE1A_U08, ETE1A_U09, ETE1A_U10, ETE1A_U11, ETE1A_U15, ETE1A_U16
P6S_UW_A_Inz_02	ability to design solutions in compliance with the given specification as well as being able to: create simple devices, facilities and systems typical for the study major or implement processes using skillfully chosen methods, techniques, tools and materials	ETE1A_U12, ETE1A_U13

Directional outcomes coverage matrix

Major: Electronics and Telecommunications

2023/2024/S/II/IEiT/ETE/all

Subject	Code	Semestr	ETE1A_W01	ETE1A_W02	ETE1A_W03	ETE1A_W04	ETE1A_W05	ETE1A_W06	ETE1A_W07	ETE1A_W08	ETE1A_W09	ETE1A_W10	ETE1A_W11	ETE1A_W12	ETE1A_W13	ETE1A_W14	ETE1A_W15	ETE1A_W16	ETE1A_W17	ETE1A_W18	ETE1A_U01	ETE1A_U02	ETE1A_U03	ETE1A_U04	ETE1A_U05	ETE1A_U06	ETE1A_U07	ETE1A_U08	ETE1A_U09	ETE1A_U10	ETE1A_U11	ETE1A_U12	ETE1A_U13	ETE1A_U14	ETE1A_U15	ETE1A_U16	ETE1A_K01	ETE1A_K02	ETE1A_K03	ETE1A_K04	ETE1A_K05
Algebra	IETES.li10.5c7fd2ae7c5cff56692ac76a3173da65.23	1	x																																						x
Information Technology	IETES.li10.09ded102d61b53897f95b6fff27850c9.23	1										x	x						x			x	x	x	x										x		x		x		
Mathematical Analysis 1	IETES.li10.4ec9252d59607bcc5bc5b8422e1b5182.23	1	x																																						x
Methodology and Programming Techniques 1	IETES.li10.0c7703279c131a275e7636e25d353e0e.23	1														x																			x		x				
Circuits Theory 1	IETES.li10.2d2051f7f0fb9cb11481d10c141a7b99.23	1	x						x																x						x					x		x			
Physics 1	IETES.li10.6a57bdba13a275784da9318b77db98f1.23	1	x	x																	x	x																		x	
Russian B2 course - compulsory course of 135 hours for students of FIRST-CYCLE studies - semester 1/3	IETES.li20.9207a194b6d4f62b09f23e6556e6b2ed.23	2																																							
English B2 course - compulsory course of 135 hours for students of FIRST-CYCLE studies - semester 1/3	IETES.li20.df2639cc44c5e396cf0074ea122cab71.23	2																																							
Circuits Theory 2	IETES.li20.a1dd92588dca394f0d223b537b517138.23	2	x						x													x	x	x		x	x			x						x		x			
German B2 course - compulsory course of 135 hours for students of FIRST-CYCLE studies - semester 1/3	IETES.li20.375d0ed08478ee775e900113312791c3.23	2																																							
Spanish B2 course - compulsory course of 135 hours for students of FIRST-CYCLE studies - semester 1/3	IETES.li20.e2e9f855d3be1c6e44f1609c9b3733bf.23	2																																							

12 / 31

Subject	Code	Semestr	ETE1A_W01	ETE1A_W02	ETE1A_W03	ETE1A_W04	ETE1A_W05	ETE1A_W06	ETE1A_W07	ETE1A_W08	ETE1A_W09	ETE1A_W10	ETE1A_W11	ETE1A_W12	ETE1A_W13	ETE1A_W14	ETE1A_W15	ETE1A_W16	ETE1A_W17	ETE1A_W18	ETE1A_U01	ETE1A_U02	ETE1A_U03	ETE1A_U04	ETE1A_U05	ETE1A_U06	ETE1A_U07	ETE1A_U08	ETE1A_U09	ETE1A_U10	ETE1A_U11	ETE1A_U12	ETE1A_U13	ETE1A_U14	ETE1A_U15	ETE1A_U16	ETE1A_K01	ETE1A_K02	ETE1A_K03	ETE1A_K04	ETE1A_K05	
English B2 course - compulsory course of 135 hours for students of FIRST-CYCLE studies - semester 2/3	IETES.ii40.53db5d5bb3888bb0d3df2be2aca157b1.23	3																																								
Spanish B2 course - compulsory course of 135 hours for students of FIRST-CYCLE studies - semester 2/3	IETES.ii40.a7a0e38e103236aa9b214adde0985c59.23	3																																								
Digital Electronics and Programmable Devices	IETES.ii40.9db28b6bc79b035b51c97744d7de83e9.23	3	x				x			x														x		x			x	x				x	x						x	
Signals and Systems	IETES.ii40.f134db78cbd615f03e02af7de7c11227.23	3	x												x							x				x												x				
Simulation Techniques	IETES.ii40.20a6b6ad25a83b5500b6c171f4ebbac7.23	3	x		x		x			x								x				x		x				x	x								x	x		x	x	
Analogue Electronic Circuits 1	IETES.ii40.ccc7b0a639d768d6d4f5377af3a67524.23	3					x			x					x			x											x				x	x				x	x			
Introduction to Telecommunications	IETES.ii40.05f78b6d871fe8ea9080fdf842ac01c3.23	3										x																	x			x										
German B2 course - compulsory course of 135 hours for students of FIRST-CYCLE studies - semester 3/3	IETES.ii80.e9248a9a134c74395721cf546e69ecdf.23	4																																								
Patent Law	IETES.ii80.52766dd35dace89fcd11124686d4334c.23	4																	x																		x		x		x	
Protection of intellectual property	IETES.ii80.0e0dcbeffcd00d69645f69cd6d1f00e.23	4																	x		x																	x			x	
English B2 course - compulsory course of 135 hours for students of FIRST-CYCLE studies - semester 3/3	IETES.ii80.5e50e9a2d67b5162c856cf859a9b227f.23	4																																								
Digital Signal Processing	IETES.ii80.37b6536d9971294e0ceeb6ae2707781c.23	4			x							x										x					x											x				x

Subject	Code	Semestr	ETE1A_W01	ETE1A_W02	ETE1A_W03	ETE1A_W04	ETE1A_W05	ETE1A_W06	ETE1A_W07	ETE1A_W08	ETE1A_W09	ETE1A_W10	ETE1A_W11	ETE1A_W12	ETE1A_W13	ETE1A_W14	ETE1A_W15	ETE1A_W16	ETE1A_W17	ETE1A_W18	ETE1A_U01	ETE1A_U02	ETE1A_U03	ETE1A_U04	ETE1A_U05	ETE1A_U06	ETE1A_U07	ETE1A_U08	ETE1A_U09	ETE1A_U10	ETE1A_U11	ETE1A_U12	ETE1A_U13	ETE1A_U14	ETE1A_U15	ETE1A_U16	ETE1A_K01	ETE1A_K02	ETE1A_K03	ETE1A_K04	ETE1A_K05	
French B2 course - compulsory course of 135 hours for students of FIRST-CYCLE studies - semester 3/3	IETES.li8O.6807c4d8cf5331d62a78d10b502b9ccb.23	4																																								
Russian B2 course - compulsory course of 135 hours for students of FIRST-CYCLE studies - semester 3/3	IETES.li8O.49d62cc9cd39f7fb09b10f8cfbeb7b06.23	4																																								
Spanish B2 course - compulsory course of 135 hours for students of FIRST-CYCLE studies - semester 3/3	IETES.li8O.001aefb3b9af1096e2664b81b183c217.23	4																																								
Optoelectronics	IETES.li8O.9ca91b4f4305e4cb16ed5fd7bdc80fa3.23	4		x			x																x																		x	
Analogue Electronic Circuits 2	IETES.li8O.3e6344df3813316d9a76cb18f05ba26e.23	4					x			x					x			x										x					x	x								
Microprocessor Technology 1	IETES.li8O.43cb65be4b04f29516b44ec575b208d1.23	4	x	x												x	x					x			x	x		x				x	x									
Computer Networks	IETES.li8O.ddf71bd4a5b4ae28ab58253386e78e12.23	4											x	x				x	x			x									x			x		x				x		
Operating Systems	IETES.li8O.76cff58f85a90981008842c821b82002.23	4											x				x														x			x							x	
Introduction to Mechanics	IETES.li100.0627946e14b1cfd841f615ac2ab00e48.23	5								x													x		x												x					
Microprocessor Technology 2	IETES.li100.900d4e61198eb78f386a0033e765b392.23	5	x	x																											x											
CAD and 3D modeling	IETES.li100.d6a80b17d9113cfe37bc31f6380243a1.23	5								x															x														x			
Telecommunication Networks and Systems	IETES.li100.8bbf4c2803191fd4d61b195927d89c00.23	5		x							x		x	x				x	x			x		x					x					x		x				x		
Computer Measurement Systems	IETES.li100.5451224768aa76cfa740664bdc352514.23	5	x				x	x	x	x		x				x	x					x	x			x	x	x	x							x						
Design Laboratory	IETES.li10K.2ca0551ad98ec07b8f18d7c61383c435.23	5																					x	x	x	x					x	x	x	x	x		x		x	x	x	
Object-Oriented Programming Language	IETES.li100.849664df557e5d66e2e5f57c1abfc7e9.23	5														x		x														x			x		x				x	

Subject	Code	Semestr	ETE1A_W01	ETE1A_W02	ETE1A_W03	ETE1A_W04	ETE1A_W05	ETE1A_W06	ETE1A_W07	ETE1A_W08	ETE1A_W09	ETE1A_W10	ETE1A_W11	ETE1A_W12	ETE1A_W13	ETE1A_W14	ETE1A_W15	ETE1A_W16	ETE1A_W17	ETE1A_W18	ETE1A_U01	ETE1A_U02	ETE1A_U03	ETE1A_U04	ETE1A_U05	ETE1A_U06	ETE1A_U07	ETE1A_U08	ETE1A_U09	ETE1A_U10	ETE1A_U11	ETE1A_U12	ETE1A_U13	ETE1A_U14	ETE1A_U15	ETE1A_U16	ETE1A_K01	ETE1A_K02	ETE1A_K03	ETE1A_K04	ETE1A_K05
Integrated Circuits and Systems	IETES.ii100.f1edb2fe4efdf9d93f59edc4ded4bbe4.23	5	x	x			x																					x												x	
RF Electronics	IETES.ii100.292ce824cfca2b641a8dd4d8f7b72989.23	5			x	x																				x							x	x							
Sensor Technology	IETES.ii200.7260b5ceec9c4e56320ad83826cbf80f.23	6	x	x			x		x	x					x				x				x	x	x	x		x		x		x	x	x		x	x	x		x	
Multimedia Information Processing and Communications	IETES.ii200.2b16500ab48a7cc8c5b5492ff81ee7c7.23	6											x														x				x						x				
Design Digital Systems in Hardware Description Languages	IETES.ii200.570c62f69001c3717bff4158bda7325.23	6	x					x		x														x						x		x	x				x		x		
Diploma Laboratory 1	IETES.ii20K.63876e67559a2.23	6													x	x							x			x	x				x	x	x	x			x	x		x	x
Students Research Group	IETES.ii200.96d4f43164be711bda1eaa4ae26fef74.23	6	x	x		x						x	x	x	x		x	x		x			x	x	x	x									x	x	x	x	x	x	
Databases	IETES.ii200.76042964bce5f9f1e617f36c5a1b596a.23	6																x					x							x	x		x								
Introduction to Java Programming	IETES.ii200.78995a5fccc663d26d1ff7eaaf11a007.23	6						x															x		x											x		x			
Securing Data Transmission: Cryptology, Watermarking and Steganography	IETES.ii200.6b17871fc723023408f0db79a64f5dde.23	6	x										x										x	x	x	x	x						x		x		x		x	x	x
Switching nodes for telecommunication and computer networks	IETES.ii200.9fecdf5d1da3d31924100f0d6b7a9db1.23	6	x	x																																					x
Wireless Techniques and Systems	IETES.ii200.03ae94790910500e2588f31db159e27a.23	6	x			x							x	x												x	x		x												x
Professional practice	IETES.ii200.557aa2c67bc9c194cb3ea1eac55ffe27.23	6																	x	x	x		x	x	x	x				x					x			x	x	x	
Speech Processing	IETES.ii400.1352be83264f6f8bd7fdfe69079bcfbf.23	7	x										x							x								x													
MPLS Networks	IETES.ii400.510e148d4939ea1db972b95903635136.23	7												x									x											x			x			x	
Programming for Android	IETES.ii400.152553bc6e2d5d33b5bee04b0679d257.23	7																																		x		x			
Programming in Python Language	IETES.ii400.60a75d81b0a84.23	7															x						x	x											x					x	
Diploma Seminar	IETES.ii400.c31fbe5bec3172c3f6a1fdb22ab38ce.23	7																					x	x	x														x		x

Subject	Code	Semestr	ETE1A_W01	ETE1A_W02	ETE1A_W03	ETE1A_W04	ETE1A_W05	ETE1A_W06	ETE1A_W07	ETE1A_W08	ETE1A_W09	ETE1A_W10	ETE1A_W11	ETE1A_W12	ETE1A_W13	ETE1A_W14	ETE1A_W15	ETE1A_W16	ETE1A_W17	ETE1A_W18	ETE1A_U01	ETE1A_U02	ETE1A_U03	ETE1A_U04	ETE1A_U05	ETE1A_U06	ETE1A_U07	ETE1A_U08	ETE1A_U09	ETE1A_U10	ETE1A_U11	ETE1A_U12	ETE1A_U13	ETE1A_U14	ETE1A_U15	ETE1A_U16	ETE1A_K01	ETE1A_K02	ETE1A_K03	ETE1A_K04	ETE1A_K05
Applications of Digital Signal Processors	IETES.li400.e552fd94436166b283294b7b6d5b99fa.23	7			x							x									x						x									x				x	
Advanced Java Programming	IETES.li400.ece48d217725e472f306178cd83d6a53.23	7						x													x		x												x	x			x		
Seminar on ICT	IETES.li400.7d2c6d79609f2bcbe9542887671089d1.23	7	x									x									x	x	x	x	x									x	x		x	x	x		
Final Project	IETES.li400.d0b468d65b7dc665a0381d9957a5c950.23	7																			x	x	x	x	x	x						x	x					x	x	x	
Diploma Laboratory 2	IETES.li40K.6387721d77c1b.23	7																			x	x				x											x	x		x	
Sum (obligatory):			17	9	4	2	8	1	7	5	1	5	6	2	3	9	3	7	4	1	3	19	11	11	6	11	7	9	7	8	4	9	7	4	4	5	21	11	10	16	12
Sum (elective):			7	3	1	1	1	3	1	4	2	6	2	1	1	2	2	2	4	2	0	13	5	9	4	2	4	0	3	2	2	4	1	2	6	4	13	4	4	10	4
Sum:			24	12	5	3	9	4	8	9	3	11	8	3	4	11	5	9	8	3	3	32	16	20	10	13	11	9	10	10	6	13	8	6	10	9	34	15	14	26	16

Characteristics matrix of learning outcomes in relation to modules

Major: Electronics and Telecommunications

2023/2024/S/li/IEiT/ETE/all

Subject	Code	Semestr	P6S_WG_A	P6S_WG_A_Inz	P6S_WK_A	P6S_WK_A_Inz	P6S_UW_A	P6S_UU_A	P6S_UO_A	P6S_UK_A	P6S_UW_A_Inz_01	P6S_UW_A_Inz_02	P6S_KK_A	P6S_KO_A	P6S_KR_A
Algebra	IETES.li10.5c7fd2ae7c5cff56692ac76a3173da65.23	1	x												x
Information Technology	IETES.li10.09ded102d61b53897f95b6fff27850c9.23	1	x		x		x	x	x	x	x			x	x
Mathematical Analysis 1	IETES.li10.4ec9252d59607bcc5bc5b8422e1b5182.23	1	x												x
Methodology and Programming Techniques 1	IETES.li10.0c7703279c131a275e7636e25d353e0e.23	1	x				x				x		x		
Circuits Theory 1	IETES.li10.2d2051f7f0fb9cb11481d10c141a7b99.23	1	x				x				x		x	x	
Physics 1	IETES.li10.6a57bdba13a275784da9318b77db98f1.23	1	x				x	x						x	
Russian B2 course - compulsory course of 135 hours for students of FIRST-CYCLE studies - semester 1/3	IETES.li20.9207a194b6d4f62b09f23e6556e6b2ed.23	2													
English B2 course - compulsory course of 135 hours for students of FIRST-CYCLE studies - semester 1/3	IETES.li20.df2639cc44c5e396cf0074ea122cab71.23	2													
Circuits Theory 2	IETES.li20.a1dd92588dca394f0d223b537b517138.23	2	x				x	x	x	x	x		x	x	
German B2 course - compulsory course of 135 hours for students of FIRST-CYCLE studies - semester 1/3	IETES.li20.375d0ed08478ee775e900113312791c3.23	2													
Spanish B2 course - compulsory course of 135 hours for students of FIRST-CYCLE studies - semester 1/3	IETES.li20.e2e9f855d3be1c6e44f1609c9b3733bf.23	2													
French B2 course - compulsory course of 135 hours for students of FIRST-CYCLE studies - semester 1/3	IETES.li20.e553773bdd5bdb73e59798df5bf39847.23	2													

Subject	Code	Semestr	P6S_WG_A	P6S_WG_A_Inz	P6S_WK_A	P6S_WK_A_Inz	P6S_UW_A	P6S_UU_A	P6S_UO_A	P6S_UK_A	P6S_UW_A_Inz_01	P6S_UW_A_Inz_02	P6S_KK_A	P6S_KO_A	P6S_KR_A
Mathematical Analysis 2	IETES.li2O.3d4adc4c0e85ba0afc9317c1bd5592a1.23	2	x										x		x
Electronic Metrology	IETES.li2O.ea91fef80b3ffb147971b1cfef76f275.23	2	x										x	x	
Electronic Devices	IETES.li2O.003ee3e95bf397334b9ece408f32ff9e.23	2	x				x	x			x		x	x	
Methodology and Programming Techniques 2	IETES.li2O.42df48946d74db35e157bab06613764a.23	2	x				x				x		x		
Probability Theory and Statistics	IETES.li2O.60a65b045e1b2.23	2	x				x	x	x		x		x	x	
Physics 2	IETES.li2O.e4f6c7a276d8f7720505264b04b5bc2a.23	2	x				x			x	x		x	x	
German B2 course - compulsory course of 135 hours for students of FIRST-CYCLE studies - semester 2/3	IETES.li4O.194f7fd6b2f8791bf3f31dfd0a5d917d.23	3													
Fundamentals of management	IETES.li4O.6a658fd635153e248d94e96829470083.23	3			x	x	x	x			x				
Fundamentals of Economics, Finance and Business Law	IETES.li4O.0f8968b48c68a4af7e61ec00be2a39fb.23	3			x	x									
French B2 course - compulsory course of 135 hours for students of FIRST-CYCLE studies - semester 2/3	IETES.li4O.022ccfa514f05e50192ce87a0bff56b7.23	3													
Computational Techniques	IETES.li4O.e14d4ec0cb6a788f0d5be71f895692d3.23	3	x				x	x	x	x	x		x	x	
Russian B2 course - compulsory course of 135 hours for students of FIRST-CYCLE studies - semester 2/3	IETES.li4O.1b348d99edf04f5b24411f8925d672c5.23	3													
English B2 course - compulsory course of 135 hours for students of FIRST-CYCLE studies - semester 2/3	IETES.li4O.53db5d5bb3888bb0d3df2be2aca157b1.23	3													
Spanish B2 course - compulsory course of 135 hours for students of FIRST-CYCLE studies - semester 2/3	IETES.li4O.a7a0e38e103236aa9b214adde0985c59.23	3													
Digital Electronics and Programmable Devices	IETES.li4O.9db28b6bc79b035b51c97744d7de83e9.23	3	x				x			x	x	x		x	

Subject	Code	Semestr	P6S_WG_A	P6S_WG_A_Inz	P6S_WK_A	P6S_WK_A_Inz	P6S_UW_A	P6S_UU_A	P6S_UO_A	P6S_UK_A	P6S_UW_A_Inz_01	P6S_UW_A_Inz_02	P6S_KK_A	P6S_KO_A	P6S_KR_A
Signals and Systems	IETES.li40.f134db78cbd615f03e02af7de7c11227.23	3	x				x	x			x		x		
Simulation Techniques	IETES.li40.20a6b6ad25a83b5500b6c171f4ebbac7.23	3	x	x			x	x		x	x		x	x	x
Analogue Electronic Circuits 1	IETES.li40.ccc7b0a639d768d6d4f5377af3a67524.23	3	x	x			x				x	x	x	x	
Introduction to Telecommunications	IETES.li40.05f78b6d871fe8ea9080fdf842ac01c3.23	3	x				x				x				
German B2 course - compulsory course of 135 hours for students of FIRST-CYCLE studies - semester 3/3	IETES.li80.e9248a9a134c74395721cf546e69ecdf.23	4													
Patent Law	IETES.li80.52766dd35dace89fcd11124686d4334c.23	4			x		x				x			x	
Protection of intellectual property	IETES.li80.0e0dcbeffcfd00d69645f69cd6d1f00e.23	4			x			x					x	x	
English B2 course - compulsory course of 135 hours for students of FIRST-CYCLE studies - semester 3/3	IETES.li80.5e50e9a2d67b5162c856cf859a9b227f.23	4													
Digital Signal Processing	IETES.li80.37b6536d9971294e0ceeb6ae2707781c.23	4	x				x	x					x		x
French B2 course - compulsory course of 135 hours for students of FIRST-CYCLE studies - semester 3/3	IETES.li80.6807c4d8cf5331d62a78d10b502b9ccb.23	4													
Russian B2 course - compulsory course of 135 hours for students of FIRST-CYCLE studies - semester 3/3	IETES.li80.49d62cc9cd39f7fb09b10f8cfbeb7b06.23	4													
Spanish B2 course - compulsory course of 135 hours for students of FIRST-CYCLE studies - semester 3/3	IETES.li80.001aefb3b9af1096e2664b81b183c217.23	4													
Optoelectronics	IETES.li80.9ca91b4f4305e4cb16ed5fd7bdc80fa3.23	4	x						x					x	
Analogue Electronic Circuits 2	IETES.li80.3e6344df3813316d9a76cb18f05ba26e.23	4	x	x			x				x	x	x	x	
Microprocessor Technology 1	IETES.li80.43cb65be4b04f29516b44ec575b208d1.23	4	x				x	x		x	x	x	x	x	

Subject	Code	Semestr	P6S_WG_A	P6S_WG_A_Inz	P6S_WK_A	P6S_WK_A_Inz	P6S_UW_A	P6S_UU_A	P6S_UO_A	P6S_UK_A	P6S_UW_A_Inz_01	P6S_UW_A_Inz_02	P6S_KK_A	P6S_KO_A	P6S_KR_A
Computer Networks	IETES.li80.ddf71bd4a5b4ae28ab58253386e78e12.23	4	x	x	x		x	x			x		x	x	
Operating Systems	IETES.li80.76cff58f85a90981008842c821b82002.23	4	x				x				x			x	
Introduction to Mechanics	IETES.li100.0627946e14b1cfd841f615ac2ab00e48.23	5	x					x		x			x		
Microprocessor Technology 2	IETES.li100.900d4e61198eb78f386a0033e765b392.23	5	x				x				x				
CAD and 3D modeling	IETES.li100.d6a80b17d9113cfe37bc31f6380243a1.23	5	x							x				x	
Telecommunication Networks and Systems	IETES.li100.8bbf4c2803191fd4d61b195927d89c00.23	5	x	x	x		x	x		x	x		x	x	
Computer Measurement Systems	IETES.li100.5451224768aa76cfa740664bdc352514.23	5	x				x	x	x		x		x		
Design Laboratory	IETES.li10K.2ca0551ad98ec07b8f18d7c61383c435.23	5					x	x	x	x	x	x		x	x
Object-Oriented Programming Language	IETES.li100.849664df557e5d66e2e5f57c1abfc7e9.23	5	x	x			x				x	x	x	x	
Integrated Circuits and Systems	IETES.li100.f1edb2fe4efdf9d93f59edc4ded4bbe4.23	5	x				x				x			x	
RF Electronics	IETES.li100.292ce824cfca2b641a8dd4d8f7b72989.23	5	x				x				x	x			
Sensor Technology	IETES.li200.7260b5ceec9c4e56320ad83826cbf80f.23	6	x	x			x	x	x	x	x	x	x	x	
Multimedia Information Processing and Communications	IETES.li200.2b16500ab48a7cc8c5b5492ff81ee7c7.23	6	x				x				x		x		
Design Digital Systems in Hardware Description Languages	IETES.li200.570c62f69001c3717bffc4158bda7325.23	6	x				x			x	x	x	x	x	
Diploma Laboratory 1	IETES.li20K.63876e67559a2.23	6	x	x			x	x			x	x	x	x	x
Students Research Group	IETES.li200.96d4f43164be711bda1eaa4ae26fef74.23	6	x		x		x	x	x	x	x		x	x	x
Databases	IETES.li200.76042964bce5f9f1e617f36c5a1b596a.23	6	x				x	x			x	x			
Introduction to Java Programming	IETES.li200.78995a5fccc663d26d1ff7eaa11a007.23	6	x				x	x		x	x		x		

Subject	Code	Semestr	P6S_WG_A	P6S_WG_A_Inz	P6S_WK_A	P6S_WK_A_Inz	P6S_UW_A	P6S_UU_A	P6S_UO_A	P6S_UK_A	P6S_UW_A_Inz_01	P6S_UW_A_Inz_02	P6S_KK_A	P6S_KO_A	P6S_KR_A
Securing Data Transmission: Cryptology, Watermarking and Steganography	IETES.li200.6b17871fc723023408f0db79a64f5dde.23	6	x				x	x	x	x	x	x	x	x	x
Switching nodes for telecommunication and computer networks	IETES.li200.9fecdf5d1da3d31924100f0d6b7a9db1.23	6	x											x	
Wireless Techniques and Systems	IETES.li200.03ae94790910500e2588f31db159e27a.23	6	x				x				x			x	
Professional practice	IETES.li200.557aa2c67bc9c194cb3ea1eac55ffe27.23	6	x	x	x	x	x	x	x	x	x			x	x
Speech Processing	IETES.li400.1352be83264f6f8bd7fdfe69079bcfbf.23	7	x	x			x								
MPLS Networks	IETES.li400.510e148d4939ea1db972b95903635136.23	7	x				x	x					x	x	
Programming for Android	IETES.li400.152553bc6e2d5d33b5bee04b0679d257.23	7	x				x				x		x		
Programming in Python Language	IETES.li400.60a75d81b0a84.23	7	x				x	x	x		x			x	
Diploma Seminar	IETES.li400.c31fbe5bec3172c3f6a1fdb22ab38ce.23	7						x	x	x				x	x
Applications of Digital Signal Processors	IETES.li400.e552fd94436166b283294b7b6d5b99fa.23	7	x				x	x					x		x
Advanced Java Programming	IETES.li400.ece48d217725e472f306178cd83d6a53.23	7	x				x	x		x	x		x	x	
Seminar on ICT	IETES.li400.7d2c6d79609f2bcbe9542887671089d1.23	7	x				x	x	x	x	x		x	x	x
Final Project	IETES.li400.d0b468d65b7dc665a0381d9957a5c950.23	7					x	x	x	x	x	x		x	x
Diploma Laboratory 2	IETES.li40K.6387721d77c1b.23	7					x	x	x		x			x	x
Sum (obligatory):			34	8	4	1	32	19	11	12	30	9	21	27	12
Sum (elective):			17	2	5	2	16	13	5	9	13	4	13	12	4
Sum:			51	10	9	3	48	32	16	21	43	13	34	39	16

Matrix of directional learning outcomes with related forms of classes and the method of testing

Major: Electronics and Telecommunications

2023/2024/S/II/IEiT/ETE/all

Name of the module	Activity	Method of verification and assessment of learning outcomes achieved by the student in individual forms of classes and activities for the entire module	KEU references
Algebra	Lecture, Auditorium classes	Test, Examination, Test, Examination, Oral answer	ETE1A_W01, ETE1A_K05
Information Technology	Lecture, Project classes	Test results, Presentation	ETE1A_W17, ETE1A_U16, ETE1A_K03, ETE1A_K05, ETE1A_W10, ETE1A_W11, ETE1A_U03, ETE1A_U02, ETE1A_U04, ETE1A_U05
Mathematical Analysis 1	Lecture, Auditorium classes	Test, Examination, Test, Examination, Oral answer	ETE1A_W01, ETE1A_K05
Methodology and Programming Techniques 1	Lecture, Laboratory classes	Examination, Completion of laboratory classes, Test, Completion of laboratory classes	ETE1A_W14, ETE1A_U15, ETE1A_K01
Circuits Theory 1	Lecture, Auditorium classes	Activity during classes, Test, Activity during classes, Test	ETE1A_W07, ETE1A_W01, ETE1A_U06, ETE1A_U10, ETE1A_K01, ETE1A_K03
Physics 1	Lecture, Auditorium classes	Activity during classes, Execution of exercises, Activity during classes, Execution of exercises	ETE1A_W02, ETE1A_W01, ETE1A_U01, ETE1A_U02, ETE1A_K04
Russian B2 course - compulsory course of 135 hours for students of FIRST-CYCLE studies - semester 1/3	Foreign language classes	Activity during classes, Participation in a discussion, Execution of exercises, Test, Examination, Test results, Essays written during classes, Presentation	
English B2 course - compulsory course of 135 hours for students of FIRST-CYCLE studies - semester 1/3	Foreign language classes	Activity during classes, Participation in a discussion, Execution of exercises, Test, Examination, Test results, Essays written during classes, Presentation	
Circuits Theory 2	Lecture, Auditorium classes, Laboratory classes	Activity during classes, Test, Project, Examination, Activity during classes, Test, Project, Examination, Activity during classes, Test, Project, Examination	ETE1A_W07, ETE1A_W01, ETE1A_U06, ETE1A_U07, ETE1A_U10, ETE1A_U02, ETE1A_U03, ETE1A_U04, ETE1A_K01, ETE1A_K03

Name of the module	Activity	Method of verification and assessment of learning outcomes achieved by the student in individual forms of classes and activities for the entire module	KEU references
German B2 course - compulsory course of 135 hours for students of FIRST-CYCLE studies - semester 1/3	Foreign language classes	Activity during classes, Participation in a discussion, Execution of exercises, Test, Examination, Test results, Essays written during classes, Presentation	
Spanish B2 course - compulsory course of 135 hours for students of FIRST-CYCLE studies - semester 1/3	Foreign language classes	Activity during classes, Participation in a discussion, Execution of exercises, Test, Examination, Test results, Essays written during classes, Presentation	
French B2 course - compulsory course of 135 hours for students of FIRST-CYCLE studies - semester 1/3	Foreign language classes	Activity during classes, Participation in a discussion, Execution of exercises, Test, Examination, Test results, Essays written during classes, Presentation	
Mathematical Analysis 2	Lecture, Auditorium classes	Test, Examination, Test, Examination, Oral answer	ETE1A_W01, ETE1A_K01, ETE1A_K05
Electronic Metrology	Lecture, Laboratory classes	Activity during classes, Report, Test results, Activity during classes, Report, Test results	ETE1A_W07, ETE1A_K01, ETE1A_K02
Electronic Devices	Lecture, Laboratory classes	Activity during classes, Test, Examination, Activity during classes, Test, Examination	ETE1A_W01, ETE1A_W02, ETE1A_W05, ETE1A_W14, ETE1A_W11, ETE1A_U02, ETE1A_U07, ETE1A_U08, ETE1A_U09, ETE1A_K01, ETE1A_K02, ETE1A_K03
Methodology and Programming Techniques 2	Lecture, Laboratory classes	Completion of laboratory classes, Execution of laboratory classes, Test	ETE1A_W14, ETE1A_W07, ETE1A_U15, ETE1A_K01
Probability Theory and Statistics	Lecture, Auditorium classes	Test, Examination, Test results, Test, Examination, Test results	ETE1A_W01, ETE1A_W07, ETE1A_U02, ETE1A_U03, ETE1A_U06, ETE1A_K01, ETE1A_K02
Physics 2	Lecture, Auditorium classes, Laboratory classes	Activity during classes, Test, Examination, Report, Involvement in teamwork, Oral answer, Activity during classes, Test, Examination, Involvement in teamwork, Oral answer, Activity during classes, Test, Examination, Report, Involvement in teamwork, Oral answer	ETE1A_W02, ETE1A_U01, ETE1A_U04, ETE1A_U09, ETE1A_K01, ETE1A_K04, ETE1A_K02
German B2 course - compulsory course of 135 hours for students of FIRST-CYCLE studies - semester 2/3	Foreign language classes	Activity during classes, Participation in a discussion, Execution of exercises, Test, Examination, Test results, Essays written during classes, Presentation	

Name of the module	Activity	Method of verification and assessment of learning outcomes achieved by the student in individual forms of classes and activities for the entire module	KEU references
Fundamentals of management	Lecture, Auditorium classes	Test, Execution of exercises	ETE1A_W18, ETE1A_U02, ETE1A_U16
Fundamentals of Economics, Finance and Business Law	Lecture, Auditorium classes	Test, Test	ETE1A_W17, ETE1A_W18
French B2 course - compulsory course of 135 hours for students of FIRST-CYCLE studies - semester 2/3	Foreign language classes	Activity during classes, Participation in a discussion, Execution of exercises, Test, Examination, Test results, Essays written during classes, Presentation	
Computational Techniques	Lecture, Laboratory classes, Project classes	Activity during classes, Execution of a project, Execution of laboratory classes, Test, Project, Test results, Completion of laboratory classes, Activity during classes, Participation in a discussion, Execution of laboratory classes, Test, Project, Involvement in teamwork, Test results, Oral answer, Completion of laboratory classes, Activity during classes, Participation in a discussion, Execution of a project, Execution of laboratory classes, Test, Project, Involvement in teamwork, Test results, Oral answer, Completion of laboratory classes	ETE1A_W01, ETE1A_W02, ETE1A_W03, ETE1A_W07, ETE1A_W14, ETE1A_U02, ETE1A_U05, ETE1A_U09, ETE1A_U03, ETE1A_U15, ETE1A_K03, ETE1A_K01, ETE1A_K04
Russian B2 course - compulsory course of 135 hours for students of FIRST-CYCLE studies - semester 2/3	Foreign language classes	Activity during classes, Participation in a discussion, Execution of exercises, Test, Examination, Test results, Essays written during classes, Presentation	
English B2 course - compulsory course of 135 hours for students of FIRST-CYCLE studies - semester 2/3	Foreign language classes	Activity during classes, Participation in a discussion, Execution of exercises, Test, Examination, Test results, Essays written during classes, Presentation	
Spanish B2 course - compulsory course of 135 hours for students of FIRST-CYCLE studies - semester 2/3	Foreign language classes	Activity during classes, Participation in a discussion, Execution of exercises, Test, Examination, Essay, Test results, Essays written during classes, Presentation	
Digital Electronics and Programmable Devices	Lecture, Auditorium classes, Laboratory classes	Execution of laboratory classes, Test, Examination, Execution of laboratory classes, Test, Examination, Execution of laboratory classes, Test, Examination, Involvement in teamwork	ETE1A_W01, ETE1A_W08, ETE1A_W05, ETE1A_U09, ETE1A_U12, ETE1A_U13, ETE1A_U08, ETE1A_U06, ETE1A_U04, ETE1A_K04

Name of the module	Activity	Method of verification and assessment of learning outcomes achieved by the student in individual forms of classes and activities for the entire module	KEU references
Signals and Systems	Lecture, Auditorium classes	Test, Project, Examination, Test, Project	ETE1A_W01, ETE1A_W14, ETE1A_U02, ETE1A_U06, ETE1A_K01
Simulation Techniques	Lecture, Laboratory classes, Project classes	Test, Test, Report, Test	ETE1A_W01, ETE1A_W03, ETE1A_W05, ETE1A_W08, ETE1A_W16, ETE1A_U02, ETE1A_U07, ETE1A_U08, ETE1A_U04, ETE1A_K01, ETE1A_K02, ETE1A_K04, ETE1A_K05
Analogue Electronic Circuits 1	Lecture, Auditorium classes, Laboratory classes, Project classes	Test, Examination, Test, Examination, Test, Test	ETE1A_W08, ETE1A_W16, ETE1A_W05, ETE1A_W13, ETE1A_U13, ETE1A_U08, ETE1A_U12, ETE1A_K01, ETE1A_K02
Introduction to Telecommunications	Lecture, Laboratory classes	Test, Examination, Test, Examination	ETE1A_W10, ETE1A_U08, ETE1A_U10
German B2 course - compulsory course of 135 hours for students of FIRST-CYCLE studies - semester 3/3	Foreign language classes	Activity during classes, Participation in a discussion, Execution of exercises, Test, Examination, Test results, Essays written during classes, Presentation	
Patent Law	Lecture	Participation in a discussion, Execution of a project, Involvement in teamwork	ETE1A_W17, ETE1A_U16, ETE1A_K04, ETE1A_K02
Protection of intellectual property	Lecture, Project classes	Test	ETE1A_K04, ETE1A_W17, ETE1A_U02, ETE1A_K01
English B2 course - compulsory course of 135 hours for students of FIRST-CYCLE studies - semester 3/3	Foreign language classes	Activity during classes, Participation in a discussion, Execution of exercises, Test, Examination, Test results, Essays written during classes, Presentation	
Digital Signal Processing	Lecture, Laboratory classes	Participation in a discussion, Execution of laboratory classes, Test, Examination, Participation in a discussion, Execution of laboratory classes, Test, Examination	ETE1A_W03, ETE1A_W10, ETE1A_U07, ETE1A_U02, ETE1A_K01, ETE1A_K05
French B2 course - compulsory course of 135 hours for students of FIRST-CYCLE studies - semester 3/3	Foreign language classes	Activity during classes, Participation in a discussion, Execution of exercises, Test, Examination, Test results, Essays written during classes, Presentation	

Name of the module	Activity	Method of verification and assessment of learning outcomes achieved by the student in individual forms of classes and activities for the entire module	KEU references
Russian B2 course - compulsory course of 135 hours for students of FIRST-CYCLE studies - semester 3/3	Foreign language classes	Activity during classes, Participation in a discussion, Execution of exercises, Test, Examination, Test results, Essays written during classes, Presentation	
Spanish B2 course - compulsory course of 135 hours for students of FIRST-CYCLE studies - semester 3/3	Foreign language classes	Activity during classes, Participation in a discussion, Execution of exercises, Test, Examination, Test results, Essays written during classes, Presentation	
Optoelectronics	Lecture, Laboratory classes	Examination, Examination, Report	ETE1A_W02, ETE1A_W05, ETE1A_U03, ETE1A_K04
Analogue Electronic Circuits 2	Lecture, Laboratory classes, Project classes	Test, Examination, Test, Examination, Test	ETE1A_W08, ETE1A_W16, ETE1A_W05, ETE1A_W13, ETE1A_U13, ETE1A_U08, ETE1A_U12, ETE1A_K01, ETE1A_K02
Microprocessor Technology 1	Lecture, Laboratory classes, Project classes	Activity during classes, Execution of laboratory classes, Test, Project, Oral answer, Completion of laboratory classes, Activity during classes, Execution of laboratory classes, Test, Project, Oral answer, Completion of laboratory classes, Execution of laboratory classes, Test, Project, Completion of laboratory classes	ETE1A_W15, ETE1A_W01, ETE1A_W02, ETE1A_W14, ETE1A_U08, ETE1A_U04, ETE1A_U12, ETE1A_U02, ETE1A_U05, ETE1A_U13, ETE1A_K02, ETE1A_K01
Computer Networks	Lecture, Laboratory classes	Test, Examination, Case study, Activity during classes, Execution of laboratory classes, Test, Examination, Case study	ETE1A_W11, ETE1A_W12, ETE1A_W16, ETE1A_W17, ETE1A_U14, ETE1A_U11, ETE1A_U02, ETE1A_U16, ETE1A_K01, ETE1A_K04
Operating Systems	Lecture, Laboratory classes, Project classes	Test, Test, Test	ETE1A_W15, ETE1A_W11, ETE1A_U14, ETE1A_U10, ETE1A_K04
Introduction to Mechanics	Lecture, Laboratory classes	Activity during classes, Completion of laboratory classes, Activity during classes, Completion of laboratory classes	ETE1A_W08, ETE1A_U02, ETE1A_U04, ETE1A_K01
Microprocessor Technology 2	Lecture, Laboratory classes, Project classes	Participation in a discussion, Test, Examination, Oral answer, Execution of laboratory classes, Test, Project, Examination, Oral answer, Completion of laboratory classes, Execution of laboratory classes, Project, Completion of laboratory classes	ETE1A_W01, ETE1A_W02, ETE1A_U10

Name of the module	Activity	Method of verification and assessment of learning outcomes achieved by the student in individual forms of classes and activities for the entire module	KEU references
CAD and 3D modeling	Lecture, Laboratory classes	Activity during classes, Completion of laboratory classes, Activity during classes, Completion of laboratory classes	ETE1A_W08, ETE1A_U04, ETE1A_K02
Telecommunication Networks and Systems	Lecture, Laboratory classes, Project classes	Examination, Completion of laboratory classes, Examination, Involvement in teamwork, Completion of laboratory classes, Involvement in teamwork	ETE1A_W02, ETE1A_W11, ETE1A_W12, ETE1A_W16, ETE1A_W09, ETE1A_W17, ETE1A_U02, ETE1A_U09, ETE1A_U04, ETE1A_U14, ETE1A_U16, ETE1A_K04, ETE1A_K01
Computer Measurement Systems	Lecture, Laboratory classes	Activity during classes, Execution of laboratory classes, Activity during classes, Execution of laboratory classes	ETE1A_W01, ETE1A_W08, ETE1A_W10, ETE1A_W05, ETE1A_W06, ETE1A_W15, ETE1A_W07, ETE1A_W14, ETE1A_U02, ETE1A_U06, ETE1A_U07, ETE1A_U08, ETE1A_U09, ETE1A_U03, ETE1A_K01
Design Laboratory	Project classes	Activity during classes, Execution of a project, Project, Report, Case study, Presentation	ETE1A_U05, ETE1A_U10, ETE1A_U11, ETE1A_U12, ETE1A_U13, ETE1A_U03, ETE1A_U04, ETE1A_U14, ETE1A_U16, ETE1A_U02, ETE1A_K02, ETE1A_K03, ETE1A_K04, ETE1A_K05
Object-Oriented Programming Language	Lecture, Laboratory classes, Project classes	Involvement in teamwork, Test results, Involvement in teamwork, Test results, Test results	ETE1A_W16, ETE1A_W14, ETE1A_U15, ETE1A_U12, ETE1A_K04, ETE1A_K01
Integrated Circuits and Systems	Lecture, Laboratory classes	Activity during classes, Test, Project, Activity during classes, Test, Project	ETE1A_W01, ETE1A_W05, ETE1A_W02, ETE1A_U08, ETE1A_K04
RF Electronics	Lecture, Laboratory classes	Examination, Completion of laboratory classes, Examination, Completion of laboratory classes	ETE1A_W04, ETE1A_W03, ETE1A_U13, ETE1A_U12, ETE1A_U06
Sensor Technology	Lecture, Laboratory classes	Activity during classes, Execution of laboratory classes, Test, Activity during classes, Execution of laboratory classes, Test, Report	ETE1A_W05, ETE1A_W13, ETE1A_W01, ETE1A_W07, ETE1A_W08, ETE1A_W16, ETE1A_W02, ETE1A_U03, ETE1A_U04, ETE1A_U02, ETE1A_U05, ETE1A_U12, ETE1A_U07, ETE1A_U09, ETE1A_U11, ETE1A_U13, ETE1A_U16, ETE1A_K02, ETE1A_K01, ETE1A_K04

Name of the module	Activity	Method of verification and assessment of learning outcomes achieved by the student in individual forms of classes and activities for the entire module	KEU references
Multimedia Information Processing and Communications	Laboratory classes, Project classes	Test, Test	ETE1A_W10, ETE1A_U10, ETE1A_U07, ETE1A_K01
Design Digital Systems in Hardware Description Languages	Lecture, Laboratory classes	Execution of a project, Execution of laboratory classes	ETE1A_W01, ETE1A_W08, ETE1A_W06, ETE1A_U12, ETE1A_U04, ETE1A_U09, ETE1A_U11, ETE1A_K01, ETE1A_K03
Diploma Laboratory 1	Project classes	Activity during classes, Diploma thesis, Presentation	ETE1A_W13, ETE1A_W14, ETE1A_U06, ETE1A_U07, ETE1A_U02, ETE1A_U10, ETE1A_U11, ETE1A_U12, ETE1A_U13, ETE1A_K01, ETE1A_K02, ETE1A_K04, ETE1A_K05
Students Research Group	Project classes	Coordination, conduct of a research project, preparation of a scientific paper, organization, organization of conferences, camps and scientific trips.	ETE1A_W17, ETE1A_W01, ETE1A_W02, ETE1A_W04, ETE1A_W09, ETE1A_W10, ETE1A_W11, ETE1A_W12, ETE1A_W14, ETE1A_W15, ETE1A_U02, ETE1A_U03, ETE1A_U04, ETE1A_U16, ETE1A_U05, ETE1A_K01, ETE1A_K02, ETE1A_K03, ETE1A_K04, ETE1A_K05
Databases	Lecture, Laboratory classes, Project classes	Execution of laboratory classes, Test, Execution of laboratory classes, Project	ETE1A_W15, ETE1A_U02, ETE1A_U09, ETE1A_U10, ETE1A_U12
Introduction to Java Programming	Lecture, Project classes	Activity during classes, Participation in a discussion, Execution of a project, Project, Oral answer, Project, Oral answer	ETE1A_W06, ETE1A_U15, ETE1A_U02, ETE1A_U04, ETE1A_K01
Securing Data Transmission: Cryptology, Watermarking and Steganography	Lecture, Project classes, Seminars	Test results, Activity during classes, Participation in a discussion, Execution of a project, Project, Report, Presentation, Report, Scientific paper, Presentation	ETE1A_W01, ETE1A_W10, ETE1A_U02, ETE1A_U03, ETE1A_U04, ETE1A_U05, ETE1A_U06, ETE1A_U12, ETE1A_U14, ETE1A_U15, ETE1A_K01, ETE1A_K03, ETE1A_K04, ETE1A_K05
Switching nodes for telecommunication and computer networks	Lecture, Auditorium classes	Execution of exercises, Activity during classes, Execution of exercises	ETE1A_W01, ETE1A_W02, ETE1A_K04
Wireless Techniques and Systems	Lecture, Laboratory classes	Examination, Examination, Completion of laboratory classes	ETE1A_W04, ETE1A_W11, ETE1A_W10, ETE1A_W01, ETE1A_U09, ETE1A_U06, ETE1A_U07, ETE1A_K04

Name of the module	Activity	Method of verification and assessment of learning outcomes achieved by the student in individual forms of classes and activities for the entire module	KEU references
Professional practice	Practical placement	Report on completion of a practical placement, Confirmation of completion of practical placement programme	ETE1A_W18, ETE1A_W17, ETE1A_W16, ETE1A_U03, ETE1A_U04, ETE1A_U05, ETE1A_U10, ETE1A_U16, ETE1A_U02, ETE1A_K03, ETE1A_K04, ETE1A_K05
Speech Processing	Lecture, Laboratory classes	Completion of laboratory classes, Completion of laboratory classes	ETE1A_W01, ETE1A_W10, ETE1A_W16, ETE1A_U07
MPLS Networks	Laboratory classes, Project classes	Test, Case study, Test, Case study	ETE1A_W11, ETE1A_U14, ETE1A_U02, ETE1A_K01, ETE1A_K04
Programming for Android	Lecture, Project classes	Project, Project	ETE1A_W09, ETE1A_U15, ETE1A_K01
Programming in Python Language	Lecture, Laboratory classes, Project classes	Project, Project, Project	ETE1A_W14, ETE1A_U03, ETE1A_U15, ETE1A_U02, ETE1A_K04
Diploma Seminar	Seminars	Presentation	ETE1A_U02, ETE1A_U03, ETE1A_U04, ETE1A_K03, ETE1A_K05
Applications of Digital Signal Processors	Lecture, Laboratory classes	Participation in a discussion, Execution of laboratory classes, Test, Test results, Completion of laboratory classes, Execution of laboratory classes, Test, Test results, Completion of laboratory classes	ETE1A_W03, ETE1A_W10, ETE1A_U07, ETE1A_U02, ETE1A_K01, ETE1A_K05
Advanced Java Programming	Lecture, Project classes	Activity during classes, Project, Execution of a project, Project	ETE1A_W06, ETE1A_U15, ETE1A_U02, ETE1A_U04, ETE1A_K04, ETE1A_K01
Seminar on ICT	Lecture, Project classes, Seminars	Test results, Activity during classes, Participation in a discussion, Execution of a project, Project, Report, Presentation, Participation in a discussion, Scientific paper, Presentation	ETE1A_W10, ETE1A_W01, ETE1A_U03, ETE1A_U04, ETE1A_U15, ETE1A_U05, ETE1A_U02, ETE1A_U06, ETE1A_K01, ETE1A_K03, ETE1A_K04, ETE1A_K05
Final Project	Diploma Thesis	Diploma thesis preparation	ETE1A_U01, ETE1A_U06, ETE1A_U02, ETE1A_U04, ETE1A_U05, ETE1A_U11, ETE1A_U12, ETE1A_U03, ETE1A_K04, ETE1A_K05, ETE1A_K03
Diploma Laboratory 2	Project classes	Engineering project, Presentation	ETE1A_U02, ETE1A_U03, ETE1A_U06, ETE1A_K02, ETE1A_K03, ETE1A_K05

ECTS credits calculations

Major: Electronics and Telecommunications

The total number of ECTS credits the student needs to obtain in the form of:

classes conducted with the direct participation of academic teachers or other persons conducting classes	110
core science classes relevant to a given major	51
practical classes, developing practical skills, including laboratory, design, practical and workshop classes	79
classes subject to choice by the student (in the amount of not less than 30% of the number of ECTS points necessary to obtain qualifications corresponding to the level of education)	63
classes in the field of humanities or social sciences - in the case of fields of study assigned to disciplines within fields other than humanities or social sciences, respectively	5
foreign language classes	5
apprenticeships	4
classes related to the academic activity conducted at the University in the discipline or disciplines to which the field of study is assigned, in the amount greater than 50% of the number of ECTS points required to complete studies at a given level, taking into account the participation of students in classes preparing to conduct scientific activity or participate in this activity (applies only to studies with a general academic profile)	118
classes shaping practical skills in the amount greater than 50% of the number of ECTS points required to complete studies at a given level (applies only to studies with a practical profile)	0

Detailed rules of the implementation of the study programme established by the Dean of the Faculty (the so-called Study Rules)

Major: Electronics and Telecommunications

Enrollment rules for the next semester

Enrollment rules for the next semester as a part of the so-called ECTS credits debt ceiling

ECTS credits debt ceiling

15

Organization of classes within the so-called blocks of classes (i.e. such organization of subjects or individual forms of classes that creates exceptions to the cyclical nature of classes in particular weeks of a given semester of studies)

Monitoring semesters

Study rules in case of the individual organization of studies approved for a specific student

Implementation of apprenticeships including monitoring system and completion rules

Rules of elective modules taking

Rules of study paths, diploma paths, specialty choice/eligibility

Rules related to the preparation of diploma projects and theses as well as the implementation of the degree granting

Principles for determining the overall evaluation of graduation (the final grade)

Other requirements related to the implementation of the study programme resulting from the AGH UST Study Regulations or other regulations in force at the University