



Curriculum

Field of study: Electrical Engineering
Specialty: Smart Grids Technology Platform

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General characteristics of the field of study

Basic information

Faculty name:	Faculty of Electrical Engineering, Automatics, Computer Science and Biomedical Engineering
Field of study:	Electrical Engineering
Specialty name:	Smart Grids Technology Platform
Level:	Second-cycle (engineer) programme
Profile:	General academic
Form:	Full-time studies
ISCED classification:	0713
Number of ECTS credits necessary to complete studies at a given level:	90
Professional title awarded to graduates:	magister inżynier
Cycle start date:	2026/2027, summer semester
Duration of studies (number of semesters):	3

Field of science to which the field of study is assigned:

Field engineering and technical sciences

Discipline of science to which the field of study is assigned:

Discipline	Percentage	ECTS
Automation, electronic, electrical engineering and space technologies	100%	90

Relationship between the field of study and the development strategy and mission of the university

The aim of education for second-cycle electrical direction is to prepare a specialist's degree in engineering to work in industry and research institutes, laboratories and education. In the same field of education in the electrical fulfills the mission of AGH, which serves the science, economy and society through teaching and educating students. The priority of the development strategy of AGH in the field of education is the care of the educational process maintenance at the highest level and to prepare graduates for the process of lifelong learning. In this regard, the authorities of the department of EAliIB and leadership departments responsible for education in the electrical care to incorporate in the plans and programs of study the latest achievements of science and technology, continuous upgrading of laboratories and teaching methods, expanding continuing education in foreign languages, increasing international student exchanges and expanding cooperation industry.

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

Changes in study plans and study programmes are made adequately to declared needs and expectations of the labor market and technological development. In the course of study, students participate in internship allowing them to gain competencies in line with economic needs.

For the needs of collaboration with the industry and the economy sectors, a Career Center was established at AGH UST, which among others conducts:

- career monitoring of AGH UST's graduates,
- exchange of information about employment prospects for graduates between the education and the industry sectors,

- collaboration with separate faculties and units of the University,
- regular presentation of reports to the University Authorities and representatives of separate faculties.

Education paths - scope in Polish and in English

Graduation paths - scope in Polish and in English

The names of the majors in Polish and in English

Name [pl]	Name [en]
Smart Grids Technology Platform	Smart Grids Technology Platform

General information about the curriculum

Field of study: Electrical Engineering

Specialty: Smart Grids Technology Platform

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

The aim of education for Smart Grids technology and engineering is to increase knowledge and skills required in his further employment. It prepares students for solving current problems associated with electrical engineering.

The graduate of Electrical engineering programme, has suitable level of competence for effective use of the newest technologies in the field of energy conversion, production, utilisation and measurements. Practical skills has significant theoretical background.

Information on including the conclusions from the students and graduates careers monitoring in the curriculum

AGH UST has a Career Center, which among others conducts:

- career monitoring of AGH UST's graduates,
- exchange of information about employment prospects for graduates between the education and industrial sectors,
- collaboration with separate faculties and units of the University,
- regular presentation of reports to the University Authorities and representatives of separate faculties.

The AGH UST Career Center provides results of analysis of professional careers of students and graduates and the University Authorities may consider these results when making changes in study programmes and the content of modules.

Information on including the requirements and recommendations of the accreditation committees, in particular the Polish Accreditation Committee and industry accreditation committees in the curriculum

The results and recommendations of accreditation committees for the Electrical Engineering field of study are analyzed and implemented in study programmes and the content of modules.

Information on including examples of good practice in the curriculum

An Education Quality Assurance System functions at the Faculty of Electrical Engineering, Automatics, Computer Science and Biomedical Engineering, which guarantees that examples of good practice are included in the study programme. The Faculty Education Quality Assurance System includes both the decision-making aspect (Faculty Board, Dean, Deputy Dean) and monitoring of the didactic system by the Deputy Dean for Education (among others: teaching supervision, surveying and class visits) as well as the Education Quality Team and the Didactic Audit Team. The decision-making structure is compliant with the AGH UST Statute and the Study Regulations as well as the education quality policy at AGH UST.

The body applying to the Ministry of Science and Higher Education for consent for establishing and conducting a field of study as well as approving the teaching results in this field of study is the Senate, having consulted the Senat Committee for Education and Student Affairs and the Rector's Representative for the Quality of Education. These actions are undertaken at the request of the Faculty Board, after consulting the Faculty Committee for the Quality of Education appointed for a term of office from among the members of the Faculty Board (since February 2013 - the Faculty Team for the Quality of Education (WZJK)), which is the consultation and advisory body at the Faculty for matters related to didactics and the quality of teaching, and the Faculty Board of Student Self-Government (WRSS). Study plans are developed and possibly modified by a committee appointed for this purpose for a given field of study and under the leadership of the Deputy Dean for Education, evaluated by WZJK and WRSS and approved by resolution of the Faculty Board. The teaching process at the Faculty is the responsibility of the Dean (e.g., ordering the conductance of classes to respective Departments) and on the level of Departments - of their Heads (they appoint persons responsible for specific modules). The Dean assigns the obligatory part of certain tasks connected with coordination to Deputy Deans, Representatives for Internship or the Representative for the Quality of Education, etc. Decisions on limits and the terms of admission to respective fields of studies, cycles and forms of studies are taken by the Senate at the request of the Faculty, which passes a respective resolution on this matter, after consultation with WZJK and the Dean's Committee. For the needs of the diploma procedure, Diploma Commissions for the first cycle studies were appointed at the Faculty. Their purpose is to evaluate topics of diploma theses that are subsequently approved by the Deputy Dean in charge of a given field of study. These Commissions also carry out diploma examinations. The diploma process for the second cycle studies is the

responsibility of the Deputy Dean. The topics of the Master's theses are evaluated by WZJK and approved by the Deputy Dean, who also chairs the Commission carrying out the diploma examination.

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

The needs and expectations of employers are monitored on an ongoing basis (e.g., research conducted by the AGH UST Career Centre) and interviews with employers and students concerning the curriculum for different forms of education are carried out. Interviews with employers focusing on employment prospects and forecasts as well as knowledge and skills expected from candidates are also carried out (to increase the possibilities of employing the graduate by the company).

Duration, rules and form of the practical placement

Admission criteria, rules and policies

Field of study: Electrical Engineering

Specialty: Smart Grids Technology Platform

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

The condition for recruitment to second cycle studies is to have a first degree qualifications and competencies necessary for the continuation of education at the second-cycle 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

Zasady i warunki rekrutacji określa Uchwała nr 97/2019 Senatu AGH z dnia 26 czerwca 2019 r. w sprawie warunków, trybu oraz terminu rozpoczęcia i zakończenia rekrutacji na pierwszy rok studiów pierwszego i drugiego stopnia w roku akademickim 2020/2021.

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

Minimalna liczba studentów: 30

Maksymalna liczba studentów: 120

Learning outcomes

Field of study: Electrical Engineering
Specialty: Smart Grids Technology Platform

Knowledge

KEU symbol	Learning outcomes prescribed to a field of study	CEU symbol
ELT2A_W01	ma rozszerzoną i pogłębioną wiedzę z zakresu matematyki niezbędną do opisu i analizy obiektów i procesów technicznych, a w szczególności: - obwodów elektrycznych oraz napędów, - urządzeń, sieci i systemów elektroenergetycznych, - układów automatyki i regulacji automatycznej, - układów pomiarowych oraz metod przetwarzania sygnałów a także w zakresie fizyki niezbędną do zrozumienia zjawisk fizycznych w technice, a w szczególności w elektrotechnice, elektronice i mechanice, oraz w zakresie mechaniki ogólnej w zastosowaniu do układów elektromechanicznych	P7S_WG_A
ELT2A_W02	ma podbudowaną teoretycznie i opanowaną praktycznie szczegółową wiedzę z zakresu metrologii wielkości elektrycznych i nieelektrycznych, oraz przetwarzania sygnałów, a także ma pogłębioną wiedzę teoretyczną o zjawiskach w materiałach stosowanych w nowoczesnych konstrukcjach elektrotechnicznych i właściwościach materiałów	P7S_WG_A_Inz, P7S_WG_A
ELT2A_W03	zna aktualne trendy rozwojowe oraz najistotniejsze nowe osiągnięcia z zakresu elektrotechniki i kierunków pokrewnych, oraz możliwości ich wykorzystania w procesie wdrażania nowych rozwiązań i modernizacji produkcji	P7S_WK_A_Inz, P7S_WK_A
ELT2A_W04	ma poszerzoną i pogłębioną wiedzę w zakresie metodyki i technik programowania oraz stosowania technik komputerowych w działalności naukowo-badawczej i inżynierskiej	P7S_WG_A_Inz, P7S_WG_A
ELT2A_W05	zna numeryczne metody rozwiązywania problemów z zakresu elektrotechniki i kierunków pokrewnych, ma uporządkowaną i podbudowaną teoretycznie wiedzę na temat nieliniowych obwodów elektrycznych oraz wiedzę w zakresie pól elektromagnetycznych, w szczególności niskiej częstotliwości	P7S_WG_A_Inz, P7S_WG_A
ELT2A_W06	ma szczegółową wiedzę w zakresie możliwości wykorzystywania techniki mikroprocesorowej w tym w urządzeniach elektrotechniki i elektroenergetyki, a także ma podbudowaną teoretycznie szczegółową wiedzę w zakresie automatyki i sterowania w wybranym przez siebie dziale elektrotechniki i elektroenergetyki	P7S_WG_A_Inz, P7S_WG_A
ELT2A_W07	zna przyczyny i skutki stanów przejściowych w układach elektroenergetycznych oraz zasady ochrony i koordynacji układów elektroenergetycznych w warunkach zakłóceń, zna rozbudowane modele matematyczne maszyn elektrycznych i układów napędowych oraz metody identyfikacji ich parametrów dla symulacji stanów dynamicznych w tych układach oraz oddziaływania na sieć energetyczną	P7S_WG_A_Inz, P7S_WG_A
ELT2A_W08	ma podbudowaną teoretycznie szczegółową wiedzę z zakresu specjalistycznych zagadnień wybranego przez siebie działu elektrotechniki, a w szczególności: elektroenergetyki, energoelektroniki i napędu elektrycznego, automatyki oraz metrologii,	P7S_WG_A_Inz, P7S_WG_A

Skills

KEU symbol	Learning outcomes prescribed to a field of study	CEU symbol
ELT2A_U01	potrafi pozyskiwać informacje z literatury, baz danych i innych źródeł; potrafi integrować pozyskane informacje, dokonywać ich interpretacji i krytycznej oceny, a także wyciągać wnioski oraz formułować i wyczerpująco uzasadniać opinie	P7S_UW_A, P7S_UU_A
ELT2A_U02	potrafi pracować indywidualnie i w zespole, potrafi porozumiewać się przy użyciu różnych technik w środowisku zawodowym, także w języku angielskim; umie oszacować czas potrzebny na realizację zleconego zadania	P7S_UW_A_Inz_01 , P7S_UO_A, P7S_UK_A
ELT2A_U03	potrafi opracować szczegółową dokumentację wyników realizacji eksperymentu, zadania projektowego lub badawczego; potrafi przygotować opracowanie zawierające omówienie tych wyników, oraz potrafi przygotować i przedstawić prezentację poświęconą wynikom realizacji zadania badawczego	P7S_UW_A, P7S_UW_A_Inz_01

KEU symbol	Learning outcomes prescribed to a field of study	CEU symbol
ELT2A_U04	posługuje się językiem angielskim lub innym używanym w komunikacji międzynarodowej w stopniu wystarczającym do porozumiewania się w sprawach zawodowych, a także czytania ze zrozumieniem informacji technicznych i potrzebnych dokumentów oraz wygłoszenia prezentacji	P7S_UW_A_Inz_01 , P7S_UU_A, P7S_UK_A
ELT2A_U05	potrafi stosować poznane zasady fizyki oraz metody i modele matematyczne, a także techniki komputerowe do rozwiązywania zadań technicznych i problemów badawczych z zakresu elektrotechniki, a także potrafi dokonać analizy i syntezy obwodów nieliniowych oraz analizy obwodów liniowych z uwzględnieniem różnych kryteriów	P7S_UW_A_Inz_02 , P7S_UW_A
ELT2A_U06	potrafi dobrze posługiwać się graficzną dokumentacją techniczną oraz innymi technikami informacyjno-komunikacyjnymi, właściwymi do realizacji zadań inżynierskich	P7S_UW_A_Inz_01 , P7S_UK_A
ELT2A_U07	potrafi zastosować metody numeryczne do rozwiązania konkretnych zagadnień technicznych w tym metody wyznaczania rozkładu pól w konkretnych urządzeniach elektrycznych	P7S_UW_A_Inz_02 , P7S_UW_A, P7S_UW_A_Inz_01
ELT2A_U08	posiada umiejętność całościowego rozwiązywania problemów z zakresu pomiaru wielkości elektrycznych i nieelektrycznych	P7S_UW_A, P7S_UW_A_Inz_01
ELT2A_U09	potrafi formułować równania opisujące systemy złożone (takie jak systemy elektromechaniczne, napędowe, energetyczne czy systemy sterowania) pod kątem rozwiązania konkretnego problemu technicznego oraz wybrać właściwą metodę identyfikacji parametrów tych równań	P7S_UW_A, P7S_UW_A_Inz_01
ELT2A_U10	potrafi ocenić przydatność metod i narzędzi służących do rozwiązania złożonego zadania inżynierskiego o charakterze badawczym z zakresu wybranej przez siebie specjalności, potrafi ocenić przydatność nowych osiągnięć konstrukcyjnych i technologicznych w urządzeniach elektrotechnicznych, potrafi stosować ochronę przeciwprzepięciową i odgromową oraz przeciwzakłóceńową, a także postępowanie zgodne z zasadami ochrony i koordynacji układów elektroenergetycznych w warunkach zakłóceń	P7S_UW_A_Inz_02 , P7S_UW_A, P7S_UW_A_Inz_01
ELT2A_U11	potrafi dokonać krytycznej analizy funkcjonowania, ocenić i zaproponować ulepszenia istniejących rozwiązań technicznych z zakresu wybranej przez siebie specjalności, a także, potrafi zaprojektować złożone urządzenie lub system, związane z zakresem wybranej przez siebie specjalności, oraz zrealizować ten projekt lub jego fragment, używając właściwych metod i środków, w tym przystosowując do tego celu już istniejące, a także potrafi oszacować koszty w procesie projektowania	P7S_UW_A_Inz_02 , P7S_UW_A, P7S_UW_A_Inz_01

Social competence

KEU symbol	Learning outcomes prescribed to a field of study	CEU symbol
ELT2A_K01	potrafi myśleć i działać w sposób kreatywny i przedsiębiorczy	P7S_KK_A
ELT2A_K02	ma świadomość roli społecznej absolwenta uczelni technicznej, a zwłaszcza rozumie potrzebę formułowania i przekazywania społeczeństwu – m.in. poprzez środki masowego przekazu – informacji i opinii dotyczących osiągnięć elektrotechniki i innych aspektów działalności inżyniera elektryka; podejmuje starania, aby przekazać takie informacje i opinie w sposób powszechnie zrozumiały	P7S_KO_A, P7S_KR_A

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

Major: Electrical Engineering

Major: Smart Grids Technology Platform

Knowledge

CEU symbol	Learning outcomes for qualifications including engineering competence	KEU references
P7S_WG_A_Inz	knowledge of basic processes taking place in the life cycle of technical devices, facilities and systems	ELT2A_W02, ELT2A_W04, ELT2A_W05, ELT2A_W06, ELT2A_W07, ELT2A_W08
P7S_WK_A_Inz	knowledge of basic principles of creating and developing various forms of individual entrepreneurship	ELT2A_W03

Skills

CEU symbol	Learning outcomes for qualifications including engineering competence	KEU references
P7S_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;	ELT2A_U02, ELT2A_U03, ELT2A_U04, ELT2A_U06, ELT2A_U07, ELT2A_U08, ELT2A_U09, ELT2A_U10, ELT2A_U11
P7S_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	ELT2A_U05, ELT2A_U07, ELT2A_U10, ELT2A_U11

Field of study-prescribed outcomes coverage matrix

Field of study: Electrical Engineering

Specialty: Smart Grids Technology Platform

2026/2027/S/III/EAIIIB/ELT/SG

Course	Code	Semestr	ELT2A_W01	ELT2A_W02	ELT2A_W03	ELT2A_W04	ELT2A_W05	ELT2A_W06	ELT2A_W07	ELT2A_W08	ELT2A_U01	ELT2A_U02	ELT2A_U03	ELT2A_U04	ELT2A_U05	ELT2A_U06	ELT2A_U07	ELT2A_U08	ELT2A_U09	ELT2A_U10	ELT2A_U11	ELT2A_K01	ELT2A_K02
Advanced methods for signal analysis and processing in power-line systems	EELTSGS.IIi1.03012.26	1s	x			x									x							x	x
Advanced power electronic systems	EELTSGS.IIi1.03011.26	1s	x		x			x		x		x	x	x	x					x	x		x
Electric machines and equipment in electric power system	EELTSGS.IIi1.03062.26	1s	x				x		x			x			x	x	x					x	
Advanced circuit theory	EELTSGS.IIi1.02986.26	1s	x			x	x				x	x	x	x			x					x	x
Numerical methods in electrical engineering	EELTSGS.IIi1.03013.26	1s					x							x	x							x	
Computer Communication In Industrial Applications	EELTSGS.IIi1.06621.26	1s				x		x			x	x	x	x		x						x	x
Distributed Control Systems	EELTSGS.IIi1.03010.26	1s						x		x													
Sociology. Selected issues	UBPOHSIS.A300000.05611.26	21 lub 22																					
Modern microcontrollers in industrial applications	EELTSGS.IIi6.03913.26	2s lub 3s			x	x		x			x									x	x	x	x
English B2+ - Compulsory Specialist Language Course at Second-Cycle Studies for Students of Electrical Engineering	EELTSGS.IIi2.02209.26	2s												x									
Russian B2+ course - compulsory course for students of SECOND-CYCLE STUDIES	EELTSGS.IIi2.02214.26	2s												x									
Real time operating systems	EELTSGS.IIi2.03911.26	2s			x	x		x		x			x		x	x						x	x

Course	Code	Semestr	ELT2A_W01	ELT2A_W02	ELT2A_W03	ELT2A_W04	ELT2A_W05	ELT2A_W06	ELT2A_W07	ELT2A_W08	ELT2A_U01	ELT2A_U02	ELT2A_U03	ELT2A_U04	ELT2A_U05	ELT2A_U06	ELT2A_U07	ELT2A_U08	ELT2A_U09	ELT2A_U10	ELT2A_U11	ELT2A_K01	ELT2A_K02
Supervisory systems (SCADA HMI) and industrial databases	EELTSGS.IIi2.03918.26	2s			x	x		x		x	x		x		x						x	x	x
Spanish B2+ course - compulsory course for students of SECOND-CYCLE STUDIES	EELTSGS.IIi2.04742.26	2s												x									
Globalization. New Challenges in the Contemporary World	EELTSGS.IIi2.12901.26	2s																					
Język francuski B2+ - obowiązkowy kurs języka specjalistycznego na studiach II stopnia dla studentów WEAlIiB-EL-SG	EELTSGS.IIi2.17757.26	2s												x									
General Concepts of Power Grids	EELTSGS.IIi2.05027.26	2s	x		x	x	x			x		x	x	x	x		x				x	x	x
Religions of the World: Humans and the Sacred	UBPOHSIS.A200000.03423.26	22																					
German B2+ course - compulsory course for students of SECOND-CYCLE STUDIES at the Faculty of Electrical Engineering, Automatics, Computer Science and Biomedical Engineering AND the Faculty of Computer Science, Electronics and Telecommunications	EELTSGS.IIi2.02226.26	2s												x									
Project Management in Industry	EELTSGS.IIi2.05213.26	2s				x							x	x								x	
The availability of electronic information	EELTSGS.IIi2.12900.26	2s																					
Smart Grids - Measurements, control and analysis Big Data using the SCADA system	EELTS.IIi2.12295.26	2s		x		x		x		x	x	x		x	x					x	x	x	x
Basics of Psychology	UBPOHSIS.A100000.01083.26	21																					
Sociology of Travel and Tourism	UBPOHSIS.A200000.03896.26	22																					
Intelligent Control Systems	EELTSGS.IIi2.03016.26	2s	x		x	x						x	x						x			x	x
Low frequency conducted disturbances and electromagnetic compatibility	EELTSGS.IIi2.03017.26	2s	x	x	x	x				x	x	x		x	x		x			x	x	x	x
Specialised Sources of Information	EELTSGS.IIi2.09009.26	2s								x	x												x

Course	Code	Semestr	ELT2A_W01	ELT2A_W02	ELT2A_W03	ELT2A_W04	ELT2A_W05	ELT2A_W06	ELT2A_W07	ELT2A_W08	ELT2A_U01	ELT2A_U02	ELT2A_U03	ELT2A_U04	ELT2A_U05	ELT2A_U06	ELT2A_U07	ELT2A_U08	ELT2A_U09	ELT2A_U10	ELT2A_U11	ELT2A_K01	ELT2A_K02
Measurements in electric power grid	EELTSGS.IIi2.02987.26	2s		x	x								x			x		x		x	x	x	x
Disturbances in electrical power systems	EELTSGS.IIi2.03014.26	2s							x	x	x	x					x			x	x		
Selected issues of smart power grids	EELTSGS.IIi4.05211.26	3s	x				x		x			x			x	x	x					x	
Diploma Seminar	EELTSGS.IIi4.01432.26	3s	x		x			x		x	x	x	x							x		x	x
Scientific circle Smart Grids	EELTSGS.IIi4.08482.26	3s	x	x	x	x		x		x	x	x	x									x	x
Supervisory systems (SCADA HMI) and industrial databases	EELTSGS.IIi4.03918.26	3s			x	x		x		x	x		x		x						x	x	x
Distributed generation and renewable energy sources	EELTSGS.IIi4.05212.26	3s	x							x	x	x				x				x			x
Real time operating systems	EELTSGS.IIi4.03911.26	3s			x	x		x		x			x		x	x						x	x
Diploma Thesis	EELTSGS.IIi4.01412.26	3s			x															x	x		x
Sum (obligatory):			7	2	6	5	3	4	2	6	6	8	6	5	5	3	4	1	1	6	5	9	10
Sum (elective):			4	2	7	9	2	7	1	8	6	5	7	8	7	4	2	0	0	3	5	10	9
Sum:			11	4	13	14	5	11	3	14	12	13	13	13	12	7	6	1	1	9	10	19	19

Characteristics matrix of learning outcomes in relation to modules

Major: Electrical Engineering

Major: Smart Grids Technology Platform

2026/2027/S/III/EAIIIB/ELT/SG

Course	Code	Semestr	P7S_WG_A	P7S_WG_A_Inz	P7S_WK_A_Inz	P7S_WK_A	P7S_UW_A	P7S_UU_A	P7S_UW_A_Inz_01	P7S_UO_A	P7S_UK_A	P7S_UW_A_Inz_02	P7S_KK_A	P7S_KO_A	P7S_KR_A
Advanced methods for signal analysis and processing in power-line systems	EELTSGS.IIi1.03012.26	1s	x	x			x					x	x	x	x
Advanced power electronic systems	EELTSGS.IIi1.03011.26	1s	x	x	x	x	x	x	x	x	x	x		x	x
Electric machines and equipment in electric power system	EELTSGS.IIi1.03062.26	1s	x	x			x		x	x	x	x	x		
Advanced circuit theory	EELTSGS.IIi1.02986.26	1s	x	x			x	x	x	x	x	x	x	x	x
Numerical methods in electrical engineering	EELTSGS.IIi1.03013.26	1s	x	x			x	x	x		x	x	x		
Computer Communication In Industrial Applications	EELTSGS.IIi1.06621.26	1s	x	x			x	x	x	x	x		x	x	x
Distributed Control Systems	EELTSGS.IIi1.03010.26	1s	x	x											
Sociology. Selected issues	UBPOHSIS.A300000.05611.26	21 lub 22													
Modern microcontrollers in industrial applications	EELTSGS.IIi6.03913.26	2s lub 3s	x	x	x	x	x	x	x			x	x	x	x
English B2+ - Compulsory Specialist Language Course at Second-Cycle Studies for Students of Electrical Engineering	EELTSGS.IIi2.02209.26	2s						x	x		x				
Russian B2+ course - compulsory course for students of SECOND-CYCLE STUDIES	EELTSGS.IIi2.02214.26	2s						x	x		x				
Real time operating systems	EELTSGS.IIi2.03911.26	2s	x	x	x	x	x		x		x	x	x	x	x
Supervisory systems (SCADA HMI) and industrial databases	EELTSGS.IIi2.03918.26	2s	x	x	x	x	x	x	x			x	x	x	x
Spanish B2+ course - compulsory course for students of SECOND-CYCLE STUDIES	EELTSGS.IIi2.04742.26	2s						x	x		x				

Course	Code	Semestr	P7S_WG_A	P7S_WG_A_Inz	P7S_WK_A_Inz	P7S_WK_A	P7S_UW_A	P7S_UU_A	P7S_UW_A_Inz_01	P7S_UO_A	P7S_UK_A	P7S_UW_A_Inz_02	P7S_KK_A	P7S_KO_A	P7S_KR_A
Globalization. New Challenges in the Contemporary World	EELTSGS.IIi2.12901.26	2s													
Język francuski B2+ - obowiązkowy kurs języka specjalistycznego na studiach II stopnia dla studentów WEAlIB-EL-SG	EELTSGS.IIi2.17757.26	2s						x	x		x				
General Concepts of Power Grids	EELTSGS.IIi2.05027.26	2s	x	x	x	x	x	x	x	x	x	x	x	x	x
Religions of the World: Humans and the Sacred	UBPOHSIS.A200000.03423.26	22													
German B2+ course - compulsory course for students of SECOND-CYCLE STUDIES at the Faculty of Electrical Engineering, Automatics, Computer Science and Biomedical Engineering AND the Faculty of Computer Science, Electronics and Telecommunications	EELTSGS.IIi2.02226.26	2s						x	x		x				
Project Management in Industry	EELTSGS.IIi2.05213.26	2s	x	x			x	x	x		x		x		
The availability of electronic information	EELTSGS.IIi2.12900.26	2s													
Smart Grids - Measurements, control and analysis Big Data using the SCADA system	EELTS.IIi2.12295.26	2s	x	x			x	x	x	x	x	x	x	x	x
Basics of Psychology	UBPOHSIS.A100000.01083.26	21													
Sociology of Travel and Tourism	UBPOHSIS.A200000.03896.26	22													
Intelligent Control Systems	EELTSGS.IIi2.03016.26	2s	x	x	x	x	x		x	x	x		x	x	x
Low frequency conducted disturbances and electromagnetic compatibility	EELTSGS.IIi2.03017.26	2s	x	x	x	x	x	x	x	x	x	x	x	x	x
Specialised Sources of Information	EELTSGS.IIi2.09009.26	2s	x	x			x	x						x	x
Measurements in electric power grid	EELTSGS.IIi2.02987.26	2s	x	x	x	x	x		x		x	x	x	x	x
Disturbances in electrical power systems	EELTSGS.IIi2.03014.26	2s	x	x			x	x	x	x	x	x			
Selected issues of smart power grids	EELTSGS.IIi4.05211.26	3s	x	x			x		x	x	x	x	x		
Diploma Seminar	EELTSGS.IIi4.01432.26	3s	x	x	x	x	x	x	x	x	x	x	x	x	x

Course	Code	Semestr	P7S_WG_A	P7S_WG_A_Inz	P7S_WK_A_Inz	P7S_WK_A	P7S_UW_A	P7S_UU_A	P7S_UW_A_Inz_01	P7S_UO_A	P7S_UK_A	P7S_UW_A_Inz_02	P7S_KK_A	P7S_KO_A	P7S_KR_A
Scientific circle Smart Grids	EELTSGS.IIi4.08482.26	3s	x	x	x	x	x	x	x	x	x		x	x	x
Supervisory systems (SCADA HMI) and industrial databases	EELTSGS.IIi4.03918.26	3s	x	x	x	x	x	x	x			x	x	x	x
Distributed generation and renewable energy sources	EELTSGS.IIi4.05212.26	3s	x	x			x	x	x	x	x	x		x	x
Real time operating systems	EELTSGS.IIi4.03911.26	3s	x	x	x	x	x		x		x	x	x	x	x
Diploma Thesis	EELTSGS.IIi4.01412.26	3s			x	x	x		x			x		x	x
Sum (obligatory):			13	13	6	6	13	8	11	8	10	10	9	10	10
Sum (elective):			11	11	7	7	11	13	16	5	13	9	10	9	9
Sum:			24	24	13	13	24	21	27	13	23	19	19	19	19

Matrix of learning outcomes prescribed to a field of study with related forms of classes and the method of testing

Major: Electrical Engineering

Major: Smart Grids Technology Platform

2026/2027/S/III/EAIIIB/ELT/SG

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
Advanced methods for signal analysis and processing in power-line systems	Lectures, Laboratory classes	Test results, Activity during classes, Test	ELT2A_W01, ELT2A_W04, ELT2A_U05, ELT2A_K01, ELT2A_K02
Advanced power electronic systems	Lectures, Laboratory classes	Execution of laboratory classes, Examination, Completion of laboratory classes, Examination, Completion of laboratory classes	ELT2A_W03, ELT2A_W08, ELT2A_U10, ELT2A_U11, ELT2A_K02, ELT2A_U02, ELT2A_U04, ELT2A_U05, ELT2A_W06, ELT2A_W01, ELT2A_U03
Electric machines and equipment in electric power system	Lectures, Laboratory classes	Examination, Test results, Report	ELT2A_W01, ELT2A_U02, ELT2A_U07, ELT2A_K01, ELT2A_W07, ELT2A_W05, ELT2A_U05, ELT2A_U06
Advanced circuit theory	Lectures, Auditorium classes	Activity during classes, Examination, Oral answer, Activity during classes, Test, Essays written during classes, Oral answer	ELT2A_W01, ELT2A_W04, ELT2A_W05, ELT2A_U01, ELT2A_U02, ELT2A_U03, ELT2A_U04, ELT2A_U07, ELT2A_K01, ELT2A_K02
Numerical methods in electrical engineering	Lectures, Laboratory classes	Activity during classes, Examination, Report, Completion of laboratory classes, Activity during classes, Examination, Report, Completion of laboratory classes	ELT2A_W05, ELT2A_U04, ELT2A_U05, ELT2A_K01
Computer Communication In Industrial Applications	Lectures, Laboratory classes	Examination, Execution of laboratory classes, Report	ELT2A_W06, ELT2A_W04, ELT2A_U01, ELT2A_U02, ELT2A_U03, ELT2A_U04, ELT2A_U06, ELT2A_K01, ELT2A_K02
Distributed Control Systems	Lectures, Laboratory classes	Execution of laboratory classes, Execution of laboratory classes	ELT2A_W06, ELT2A_W08
Sociology. Selected issues	Lectures	Activity during classes, Test	
Modern microcontrollers in industrial applications	Lectures, Laboratory classes	Test, Execution of laboratory classes, Report	ELT2A_W03, ELT2A_W04, ELT2A_W06, ELT2A_U01, ELT2A_U11, ELT2A_U10, ELT2A_K01, ELT2A_K02

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
English B2+ - Compulsory Specialist Language Course at Second-Cycle Studies for Students of Electrical Engineering	Foreign language classes	Activity during classes, Participation in a discussion, Execution of exercises, Test, Examination, Report, Scientific paper, Test results, Essays written during classes, Presentation	ELT2A_U04
Russian B2+ course - compulsory course for students of SECOND-CYCLE STUDIES	Foreign language classes	Activity during classes, Participation in a discussion, Execution of exercises, Test, Examination, Report, Scientific paper, Test results, Essays written during classes, Presentation	ELT2A_U04
Real time operating systems	Lectures, Laboratory classes	Test, Execution of laboratory classes, Report	ELT2A_W03, ELT2A_W06, ELT2A_W08, ELT2A_W04, ELT2A_U03, ELT2A_U05, ELT2A_U06, ELT2A_K02, ELT2A_K01
Supervisory systems (SCADA HMI) and industrial databases	Lectures, Laboratory classes	Activity during classes, Execution of a project, Execution of laboratory classes, Completion of laboratory classes, Activity during classes, Execution of a project, Execution of laboratory classes, Report, Completion of laboratory classes	ELT2A_W06, ELT2A_W08, ELT2A_W03, ELT2A_W04, ELT2A_U01, ELT2A_U05, ELT2A_U11, ELT2A_U03, ELT2A_K01, ELT2A_K02
Spanish B2+ course - compulsory course for students of SECOND-CYCLE STUDIES	Foreign language classes	Activity during classes, Participation in a discussion, Execution of exercises, Test, Examination, Report, Scientific paper, Test results, Essays written during classes, Presentation	ELT2A_U04
Globalization. New Challenges in the Contemporary World	Lectures	Activity during classes, Report, Essay	
Język francuski B2+ - obowiązkowy kurs języka specjalistycznego na studiach II stopnia dla studentów WEAIIB-EL-SG	Foreign language classes	Activity during classes, Participation in a discussion, Execution of exercises, Test, Examination, Report, Scientific paper, Test results, Essays written during classes, Presentation	ELT2A_U04
General Concepts of Power Grids	Lectures, Laboratory classes	Activity during classes, Participation in a discussion, Test results, Participation in a discussion, Completion of laboratory classes	ELT2A_W01, ELT2A_W08, ELT2A_W03, ELT2A_W04, ELT2A_W05, ELT2A_U04, ELT2A_U05, ELT2A_U07, ELT2A_U02, ELT2A_U03, ELT2A_U11, ELT2A_K01, ELT2A_K02
Religions of the World: Humans and the Sacred	Lectures	Activity during classes, Test	
German B2+ course - compulsory course for students of SECOND-CYCLE STUDIES at the Faculty of Electrical Engineering, Automatics, Computer Science and Biomedical Engineering AND the Faculty of Computer Science, Electronics and Telecommunications	Foreign language classes	Activity during classes, Participation in a discussion, Execution of exercises, Test, Examination, Report, Scientific paper, Test results, Essays written during classes, Presentation	ELT2A_U04

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
Project Management in Industry	Lectures, Laboratory classes	Activity during classes, Participation in a discussion, Project, Case study, Involvement in teamwork, Presentation, Activity during classes, Participation in a discussion, Project, Case study, Involvement in teamwork, Presentation	ELT2A_W04, ELT2A_U04, ELT2A_U03, ELT2A_K01
The availability of electronic information	Project classes	Activity during classes, Execution of a project, Project	
Smart Grids - Measurements, control and analysis Big Data using the SCADA system	Lectures, Laboratory classes, Project classes	Project, Activity during classes, Execution of laboratory classes, Participation in a discussion, Execution of a project, Involvement in teamwork	ELT2A_W06, ELT2A_W08, ELT2A_W02, ELT2A_W04, ELT2A_U02, ELT2A_U04, ELT2A_U11, ELT2A_U01, ELT2A_U10, ELT2A_U05, ELT2A_K01, ELT2A_K02
Basics of Psychology	Lectures	Activity during classes, Test	
Sociology of Travel and Tourism	Lectures	Test results	
Intelligent Control Systems	Lectures, Laboratory classes	Activity during classes, Project, Examination, Oral answer, Activity during classes, Project, Examination, Oral answer	ELT2A_W04, ELT2A_W01, ELT2A_W03, ELT2A_U02, ELT2A_U03, ELT2A_U09, ELT2A_K01, ELT2A_K02
Low frequency conducted disturbances and electromagnetic compatibility	Lectures, Laboratory classes	Activity during classes, Test results, Activity during classes, Report, Completion of laboratory classes	ELT2A_W01, ELT2A_W02, ELT2A_W03, ELT2A_W08, ELT2A_W04, ELT2A_U02, ELT2A_U04, ELT2A_U05, ELT2A_U07, ELT2A_U11, ELT2A_U01, ELT2A_U10, ELT2A_K01, ELT2A_K02
Specialised Sources of Information	Discussion seminars	Activity during classes, Execution of exercises	ELT2A_W08, ELT2A_U01, ELT2A_K02
Measurements in electric power grid	Lectures, Project classes	Execution of laboratory classes, Involvement in teamwork, Test results, Execution of laboratory classes, Test results	ELT2A_W02, ELT2A_W03, ELT2A_U03, ELT2A_U06, ELT2A_U08, ELT2A_U10, ELT2A_U11, ELT2A_K01, ELT2A_K02
Disturbances in electrical power systems	Lectures, Laboratory classes	Examination, Activity during classes, Test, Report, Involvement in teamwork	ELT2A_W07, ELT2A_W08, ELT2A_U10, ELT2A_U11, ELT2A_U07, ELT2A_U01, ELT2A_U02
Selected issues of smart power grids	Lectures, Seminars	Activity during classes, Participation in a discussion, Participation in a discussion, Completion of laboratory classes	ELT2A_W07, ELT2A_W05, ELT2A_W01, ELT2A_U02, ELT2A_U07, ELT2A_K01, ELT2A_U05, ELT2A_U06
Diploma Seminar	Auditorium classes	Participation in a discussion, Presentation	ELT2A_W01, ELT2A_W03, ELT2A_W08, ELT2A_W06, ELT2A_U01, ELT2A_U02, ELT2A_U03, ELT2A_U10, ELT2A_K01, ELT2A_K02

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
Scientific circle Smart Grids	Participation in a student research club	Execution of a project	ELT2A_W01, ELT2A_W02, ELT2A_W04, ELT2A_W06, ELT2A_W08, ELT2A_U01, ELT2A_U02, ELT2A_U03, ELT2A_W03, ELT2A_K01, ELT2A_K02
Supervisory systems (SCADA HMI) and industrial databases	Lectures, Laboratory classes	Activity during classes, Execution of a project, Execution of laboratory classes, Completion of laboratory classes, Activity during classes, Execution of a project, Execution of laboratory classes, Report, Completion of laboratory classes	ELT2A_W06, ELT2A_W08, ELT2A_W03, ELT2A_W04, ELT2A_U01, ELT2A_U05, ELT2A_U11, ELT2A_U03, ELT2A_K01, ELT2A_K02
Distributed generation and renewable energy sources	Lectures, Project classes	Participation in a discussion, Project, Case study, Involvement in teamwork, Completion of laboratory classes, Participation in a discussion, Project, Case study, Involvement in teamwork, Completion of laboratory classes	ELT2A_W01, ELT2A_W08, ELT2A_U10, ELT2A_U01, ELT2A_U02, ELT2A_U06, ELT2A_K02
Real time operating systems	Lectures, Laboratory classes	Test, Execution of laboratory classes, Report	ELT2A_W03, ELT2A_W06, ELT2A_W08, ELT2A_W04, ELT2A_U03, ELT2A_U05, ELT2A_U06, ELT2A_K02, ELT2A_K01
Diploma Thesis	Diploma Thesis	Diploma thesis preparation	ELT2A_W03, ELT2A_U10, ELT2A_U11, ELT2A_K02

ECTS credits calculations

Field of study: Electrical Engineering

Specialty: Smart Grids Technology Platform

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	68
core science classes relevant to a given major	0
practical classes, developing practical skills, including laboratory, design, practical and workshop classes	57
classes subject to choice by the student (in the amount of not less than 30% of the number of ECTS credits necessary to obtain qualifications corresponding to the level of education)	88
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	2
practical placements	0
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 credits 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)	63
classes shaping practical skills in the amount greater than 50% of the number of ECTS credits required to complete studies at a given level (applies only to studies with a practical profile)	

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

Field of study: Electrical Engineering

Specialty: Smart Grids Technology Platform

Enrollment rules for the next semester

Not exceeding the acceptable deficit of ECTS credits, i.e., 15 credits.

In accordance with the requirements specified in the Regulations of the First and Second Cycle Studies at AGH University of Science and Technology in Krakow: "Granting a pass for the last semester of the first cycle studies is permitted only provided that all previous semesters of studies, modules and classes required by the study plan are completed and if there is no learning backlog."

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

The acceptable deficit of ECTS credits is compliant with the requirements specified in the Regulations of the First and Second Cycle Studies at AGH University of Science and Technology in Krakow.

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)

Possible conductance of modules within the so-called 'block of classes'.

Monitoring semesters

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

A condition necessary to apply for an individual course of studies is the completion of the first cycle studies with an average grade not lower than 4.70 and the completion of the first semester of the second cycle studies without any deficit of ECTS credits and with an average grade exceeding 4.70.

Implementation of practical placements including monitoring system and completion rules

Rules of elective modules taking

The student chooses specialties defining the sequence of their preference. The student is allocated to a given specialty by the Dean, taking into account student preferences, limits and availability for this specialty.

Rules of education paths, graduation paths, major choice/eligibility

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

The second cycle studies are completed with the preparation of the Master's thesis under the supervision of a selected thesis supervisor. The topic of the Master's thesis must be previously evaluated by the Committee for the Quality of Education appointed by the Faculty Board and approved by the Dean. The thesis is subject to review. The reviewer is appointed by the Dean. After submitting the thesis, a one-part (oral) diploma examination takes place before a commission chaired by the Dean and composed also of the thesis

supervisor and the reviewer.

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

The graduation requirements according to the AGH UST Study Regulations is:

- 1) obtaining learning outcomes specified in the curriculum for a degree programme;
- 2) completion of all modules prescribed in the study programme;
- 3) obtaining the minimum ECTS credits required by the study programme;
- 4) submission of the diploma thesis;
- 5) taking the diploma examination;

The graduation result is established as a weighted average of the following ratings:

- 1) the average grade of the studies as determined in accordance with the AGH UST Study Regulations;
- 2) the final grade of the diploma thesis;
- 3) the diploma examination grade.

The weight coefficients are defined by the Faculty Board, provided that the average grade of the whole degree programme is determined with a weight coefficient no lower than 60%.

The grades and the result of completing the studies is determined to two decimal places, without rounding, according to the following rule depending on the numeric value:

- 1) from 3.00 verbal descriptor: 'dostateczny' (satisfactory) (3.0);
- 2) from 3.21 verbal descriptor: 'plus dostateczny' (satisfactory plus) (3.5);
- 3) from 3.71 verbal descriptor: 'dobry' (good) (4.0);
- 4) from 4.21 verbal descriptor: 'plus dobry' (good plus) (4.5);
- 5) from 4.71 verbal descriptor: 'bardzo dobry' (very good) (5.0);

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