Lodz University of Technology

Study programme

Faculty:	Faculty of Electrical, Electronic, Computer and Control Engineering
Major:	Electrical Engineering
Level of study:	second-cycle programme (magister inżynier)
Form of study:	part-time studies
Academic year:	2026/27

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Basic information

Name of the field of study:	Electrical Engineering
Level of study:	second-cycle programme (magister inżynier)
Study profile:	general academic
Form of studies:	part-time studies
Duration of studies (number of semesters):	4
The number of ECTS points required to complete studies:	90
Total number of hours of classes:	640
The number of ECTS points a student obtains as part of classes conducted with the direct participation of academic teachers or other persons conducting classes:	26
Professional title awarded to graduates:	magister inżynier
ISCED code:	0713
Language of study:	polish

Assigning the course to the disciplines to which the learning outcomes relate

Discipline	Percentage share
Automation, electronics and electrical engineering	100%

Learning outcomes (in relation to the PQF)

No.	Learning outcome code	Learning Outcome Content	Reference to the universal characteristics of the first level of PRK	Reference to the second-level characteristics of the PRK, taking into account the second-level characteristics enabling the acquisition of engineering competences
1	**2ELT1**	Explains in depth specialized issues in modern electrical, electronic, and electrical power systems, as well as automation, necessary for the testing, analysis, and modeling of circuits, electrical machines and devices, and the phenomena occurring in them.	P7U_W	P7S_WG, P7S_WG_inż
2	**2ELT2**	Describes the main development trends in the field of electrical engineering and outlines the principles of creating and developing various forms of entrepreneurship, economic and ethical conditions of professional activity, including the principles of industrial property protection and copyright law.	P7U_W, P7U_U	P7S_WG, P7S_WK, P7S_WK_inż, P7S_UW_inż
3	**2ELT3**	Is able to apply possessed knowledge and identify, analyze and solve problems in the field of electrical engineering using appropriate methods and tools, including advanced information and communication techniques, formulate simple research hypotheses in the field of electrical engineering and solve complex and unusual problems using an interdisciplinary and integrated approach.	P7U_W, P7U_U	P7S_WG, P7S_WK, P7S_WK_inż, P7S_UW_inż
4	**2ELT4**	Is able to perform tasks in an innovative way in unpredictable conditions through the right selection of methods, synthesize, creatively interpret and present the acquired knowledge, communicate on specialist topics with diverse groups of recipients, conduct a debate, use specialist terminology and a foreign language at the B2+ level.	P7U_U	P7S_UW, P7S_UK, P7S_UW_inż
5	**2ELT5**	Is able to plan and implement his own lifelong learning independently and guide others in this field, interact with others in team work, manage team work and act as a leader in technology, industry and academia environment.	P7U_U	P7S_UO, P7S_UU
6	**2ELT6**	Is ready to fulfilling social obligations, inspiring and organizing activities for the benefit of the community, and perform the professional roles responsibly with consideration of evolving social needs, including a critical assessment of his knowledge and consulting experts in the event of difficulties in solving a problem individually, developing the achievements, maintaining the ethos and observing the rules of professional ethics.	P7U_K	P7S_KK, P7S_KO, P7S_KR

Matrix of course modules in relation to learning outcomes and curriculum content

No.	Course name	Program content	2ELT1	2ELT2	2ELT3	2ELT4	2ELT5	2ELT6
1	Design of Electrical Systems	Design of the power supply and control system for a production industrial machine using electrical devices, PLC controllers, communication networks, and visualization systems.						
2	Finite Element Method	Theory and application of the finite element method in modeling electromagnetic fields, including the transition from differential equations and boundary conditions to discrete form and one-, two- and three-dimensional analyses.	x		x			
3	Safety of Electrical Devices in Industry	Design of a safety system for an industrial machine, focusing on risk and hazard analysis. The laboratory analysis will be carried out using specialized software for evaluating machine safety levels.						
4	Short Circuits and Overvoltages in Power Systems	Short circuits in power systems and methods for calculating short circuit magnitudes. The generation and propagation of overvoltages in power systems and methods for limiting their impact on the devices comprising the system.	x		x			
5	Field-circuit Methods	Modeling of electromechanical transducers using field-circuit methods. Simulation of dynamic states of electrical machines and calculation of their characteristic parameters such as inductances, currents, power losses, and electromagnetic torques.	x			x		
6	Optimization Methods	Dynamic and static optimization. Linear programming problems. Nonlinear programming problems with equality constraints. The steepest descent method and its applications in electrical engineering.	x		x	x		
7	Legal Conditions in the Business Activity	Legal aspects of establishing and running a business, taking into account the Act on Freedom of Economic Activity. Selected aspects of business processes with an element of management. Issues related to intellectual property protection, technology transfer, and commercialization of research results.		x		x		
8	Modeling Physical Phenomena in Electrical Machines and Transformers	Modeling of electromagnetic, thermal and mechanical phenomena in transformers and electrical machines using numerical and circuit methods.	x		x			
9	Design of Electrical Apparatus	Design of one of the main components of an electrical device using computer software to perform the analysis.	x			x	x	
10	Instrument Transformers in Electrical Power Engineering	Design of inductive and unconventional instrument transformers. Analysis of transformer operation and insulation systems using numerical field methods, considering standard requirements and internal electromagnetic compatibility.	x	x	x			
11	Prototyping of Electromechanical Systems	Prototyping electrical machinery systems using digital models and tools for electromagnetic, thermal, and mechanical analysis. Creating and testing virtual prototypes of electrical machines.	x		x			
12	Computer-Aided Systems of Experimental Data Analysis	Modeling of electromechanical transducers using field-circuit methods. Simulation of dynamic states of electrical machines and calculation of their characteristic parameters such as inductances, currents, power losses, and electromagnetic torques.			x	x		x
13	Foreign Language for Specialist Purposes	Using linguistic tools and resources for effective communication in the university environment and the workplace of a Master of Science in Engineering.				x		x

No.	Course name	Program content	2ELT1	2ELT2	2ELT3	2ELT4	2ELT5	2ELT6
14	Thermal Impact of Electromagnetic Field	Thermal effect of electromagnetic interaction, mathematical description of fields, boundary conditions, and solution methods. Technical aspects of the thermal interaction of the electromagnetic field, mitigation of harmful effects, and methods for the effective utilization of the phenomenon.	x		x			
15	Temperature Control and Power Electronic Heating Devices	Automatic temperature control systems, methods of temperature measurement, identification of the dynamic properties of objects and methods of control, parameter tuning, and evaluation of control quality. Power electronic heating devices, structure, operating principle and effective utilization.	x		x	x		
16	3D Design in Electrical Engineering	Designing three-dimensional models of electrical components and systems using CAD tools and visualizing their operation in a virtual environment.	x			x	x	
17	Design of Control Modules	Design a power semiconductor control module used in DC and AC connectors.	x		x			
18	Devices for Prosumer Generation	Technologies and solutions in prosumer energy, legal regulations, support systems, and settlement rules. Types of energy sources and storage installations, application in on-grid and off-grid systems, and economics of installations. Laboratory testing of prosumer devices.						
19	Automation of Power Plants and Distributed Generation	Power and combined heat-and-power plants as control objects, control and actuating elements, and typical automatic control systems. Structure of networks with renewable energy sources and objectives of regulators controlling power system devices.	x		x			
20	Construction Process - Legal and Practical Issues	Construction process: project stages, participants, legal basis, administrative procedures, design and documentation, project execution, supervision, and safety regulations. Electrical works costing: requirements, quantity catalogs, software, and preparation of cost estimates for selected projects.			x		x	
21	Workshop on Measurements, Design, and Nonlinear Circuit Analysis	Selected methods for describing and analyzing DC and dynamic nonlinear systems. Selection and application of systems and methods for measuring basic technological quantities in industrial processes and assessing the effectiveness of shock protection. Project in the discipline assigned to the Electrical Engineering field of study.	x		x	x	x	
22	Fast Digital Photography and Digital Imaging	Application of high-speed digital photography and digital imaging to observe and analyze switching and physical phenomena during the operation of DC and AC switches.	x		x	x		
23	Automatic Train Control	Automation in rail transport: train traffic control systems, modern automation and teleinformatics systems, automatic train operation, European Rail Traffic Management System, traction and drive automation, and diagnostics and maintenance of systems.						
24	Renewable Energy Installation Project	Integration of renewable energy sources in power networks: impact on the system, legal and technical requirements, control of converter systems, photovoltaic installation design, and capacity selection. Independent electrical projects, economic analysis of investments, and grid connection possibilities.	x		x			
25	Artificial Intelligence in Technical Data Analysis	The use of modern artificial intelligence tools and methods, including machine learning and language models, to analyze technical data from measurements, signals and engineering documentation.	x		x			

No.	Course name	Program content	2ELT1	2ELT2	2ELT3	2ELT4	2ELT5	2ELT6
26	Integration of Prosumers Systems and Electromobility	Regulations for prosumer connection and the impact of distributed energy sources on the power system, energy quality, and use of energy storage. Types of EVs and chargers, charging strategies, impact of electromobility on the grid, and related regulations and standards. Operation of microgrids both connected to the grid and autonomously.	x		x	x		
27	Diploma Seminar	Legal basis and principles of the diploma process. Research methodology. Presentation of thesis results. Principles of and preparation for the competence examination. Scope of the competence examination covering selected issues in the area of the design, operation and diagnostics of electrical power systems, high voltage engineering, and power system protection.		x		x	x	x
28	Internship	Deepening and consolidating the theoretical knowledge acquired during studies and developing the ability to use it in practice to perform assigned tasks - both in the case of work performed individually and in a team.				x	x	x
29	Final Project	Preparation of a master's thesis in accordance with the adopted requirements.	x		x	x	x	x
30	Digital Technologies in Electrical Power Engineering	Digital technologies in power engineering: measurement, control, data transmission, and processing, including smart building systems, data transfer via the grid, smart meters, energy management systems, and cybersecurity.	x		x		x	
31	High-voltage Engineering	Modern insulating materials in high-voltage power devices based on the electrical strength of gaseous, liquid, solid dielectrics and their mixtures, and the effect of dielectric constant on the insulation system’s strength characteristics.	x	x	x			
32	Electrical Power Systems	Operation of interconnected power systems in steady-state and transient conditions, methods for power flow calculations, control of system operating parameters, and stability assessment and improvement. Analytical methods and computational tools used to analyze power flows and symmetrical and asymmetrical faults in transmission and distribution networks.	x	x	x			
33	Power Measurements and Diagnostics	Types and scopes of measurements in power engineering, instruments and methods, including pressure, temperature, flow, heat, and fuel calorific value measurements, as well as photometric and high-voltage measurements for device diagnostics. Diagnostics of power system components and systems using measurement signals.	x		x		x	
34	Optimization in Electrical Power Engineering	Static optimization methods.Optimizing capacitor bank selection for reactive power compensation. Solving technical problems in the field of electrical power engineering.			x	x		
35	Economics of Electrical Power Systems	Operation of the energy sector under competition and transition, investment profitability and risk assessment, energy market and tariff principles, and systems supporting transformation. Application of financial engineering and optimization in prosumer and distributed generation projects.		x	x			x
36	Advanced Power System Protection	Power System Protection Automation standards, protections for lines, transformers, generators, and high-voltage motors. Laboratory measurements and testing of protection systems using a real-time digital simulator.						
37	Modeling and Simulation of Power Systems	Analysis of transient states in power networks and systems using simulation methods and models, including creation and operation of computer models of devices and complete systems. Use of dedicated engineering software for simulation, evaluation, and interpretation of results.	x			x		x

No.	Course name	Program content	2ELT1	2ELT2	2ELT3	2ELT4	2ELT5	2ELT6
38	Diploma Seminar	Legal basis and principles of the diploma process. Presentation of thesis results. Principles of and preparation for the competence examination. Research methodology. Competence examination verifying knowledge and aggregated skills, covering selected issues in the area of design and operation of electromechanical systems and electrical apparatus, as well as computational analyses of electrical machines and transformers.		x		x	x	x
39	Integrated Sensory Systems	Course covers the issue of sensory systems as integrated and autonomous, operating based on data fusion or predictive models.		x	x	x		
40	Discrete-Time Control Systems	Digital controller. Sampling and extrapolation. Astatic and static control, dead-beat control. State-space description. Dead-beat control in state space.	x					x
41	Automatics Laboratory	Classification and modelling of control systems, as well as the analysis of their stability and control performance. Design and simulation of controllers. Implementation and commissioning of a real control system.	x		x	x		
42	Industrial Robot Controling	Basic components of a robot and their interaction. Kinematics of industrial robots. Trajectory planning. Control and programming of robots.	x	x	x			
43	Programmable Controllers in Automation Systems	Typical tasks of PLC controllers in practice, including the use of programmable controllers for implementing regulators, logic functions, and timers, as well as programming methods.		x	x		x	
44	Documentation of Industrial Automation Systems	Automatic control system design and preparation of technical documentation, including electrical schematics of machines and control systems, and analysis of technical-operational documentation of selected electrical devices.	x		x			x
45	Transducers and Measurement Systems	Construction and operation of voltage, current, power, and energy measuring transducers. Use of specialized amplifiers in measurement circuits. Determination of measurement errors in measurement systems.	x		x		x	
46	Internet Measurement Techniques	Realization of measurement servers. Measurement data transmission with Wi-Fi routers. Microprocessor-based measurement systems with Wi-Fi communication.	x		x			x
47	Diploma Seminar	Legal basis and principles of the diploma process. Research methodology. Presentation of thesis results. Principles of and preparation for the competence examination. Scope of the competence examination covering selected issues in the area of industrial automation and in diagnostics and operation of measurement and control systems.		x		x	x	x

ECTS - subjects

No.	Course name	ECTS	Subjects in the field of humanities and social sciences	Elective subjects	Profile items	Classes in a foreign language
1	Design of Electrical Systems	4		4	4	
2	Finite Element Method	3		3	3	
3	Safety of Electrical Devices in Industry	5		5	5	
4	Short Circuits and Overvoltages in Power Systems	6			6	
5	Field-circuit Methods	2			2	2
6	Optimization Methods	2			2	2
7	Legal Conditions in the Business Activity	5	5			
8	Modeling Physical Phenomena in Electrical Machines and Transformers	5		5	5	
9	Design of Electrical Apparatus	3		3	3	
10	Instrument Transformers in Electrical Power Engineering	5		5	5	
11	Prototyping of Electromechanical Systems	3		3	3	
12	Computer-Aided Systems of Experimental Data Analysis	5		5	5	
13	Foreign Language for Specialist Purposes	2		2		
14	Thermal Impact of Electromagnetic Field	4		4	4	
15	Temperature Control and Power Electronic Heating Devices	4		4	4	
16	3D Design in Electrical Engineering	4		4	4	
17	Design of Control Modules	4		4	4	
18	Devices for Prosumer Generation	4		4	4	
19	Automation of Power Plants and Distributed Generation	4		4	4	
20	Construction Process - Legal and Practical Issues	4		4	4	

No.	Course name	ECTS	Subjects in the field of humanities and social sciences	Elective subjects	Profile items	Classes in a foreign language
21	Workshop on Measurements, Design, and Nonlinear Circuit Analysis	6			6	
22	Fast Digital Photography and Digital Imaging	4		4	4	
23	Automatic Train Control	4		4	4	
24	Renewable Energy Installation Project	4		4	4	
25	Artificial Intelligence in Technical Data Analysis	4		4	4	
26	Integration of Prosumers Systems and Electromobility	4		4	4	
27	Diploma Seminar	2		2		
28	Internship	4				
29	Final Project	20			20	
30	Digital Technologies in Electrical Power Engineering	4		4	4	
31	High-voltage Engineering	3		3	3	
32	Electrical Power Systems	5		5	5	
33	Power Measurements and Diagnostics	5		5	5	
34	Optimization in Electrical Power Engineering	3		3	3	
35	Economics of Electrical Power Systems	4		4	4	
36	Advanced Power System Protection	4		4	4	
37	Modeling and Simulation of Power Systems	5		5	5	
38	Diploma Seminar	2		2		
39	Integrated Sensory Systems	4		4	4	
40	Discrete-Time Control Systems	3		3	3	
41	Automatics Laboratory	5		5	5	

No.	Course name	ECTS	Subjects in the field of humanities and social sciences	Elective subjects	Profile items	Classes in a foreign language
42	Industrial Robot Controling	5		5	5	
43	Programmable Controllers in Automation Systems	5		5	5	
44	Documentation of Industrial Automation Systems	5		5	5	
45	Transducers and Measurement Systems	3		3	3	
46	Internet Measurement Techniques	3		3	3	
47	Diploma Seminar	2		2		

ECTS indicators

Name	brak	brak	brak

Methods of verifying and assessing learning outcomes

Verification of achieved learning outcomes requires the use of diverse forms of student assessment, appropriate to the categories of knowledge, skills, and social competencies to which these outcomes relate. The selection of suitable tools also depends on the specifics of the subject and the form of classes, and is described in the syllabi of individual courses. The achievement of the required learning outcomes is verified through:

1. Written work (exams, tests, reports, essays, projects, posters, thesis, etc.);
2. Oral statements (oral knowledge checks, public presentations such as delivering a paper, presentation, etc.);
3. Practical and/or project tasks (both group and individual);
4. Observation and evaluation of student activity during classes;
5. Self-assessment and peer assessment (especially in the case of group projects);
6. Competency exam and diploma exam.

Verification may be formative (partial, repeated during classes) and/or summative (final assessment). The final verification result is given according to the currently applicable grading scale.

The course coordinator or instructor is obliged, during the first class, to discuss the course syllabus and to formulate and provide documented information to students regarding the methods of verification and the conditions for conducting assessments of learning outcomes.

Professional internships

Length: 4 weeks

ECTS credits earned: 4

Internships completed in accordance with the study program, in a form adapted to the profile and specificity of the field of study, and in accordance with the rules set forth by the faculty and the University.

Specializations/degree paths offered within the study program

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Characteristics of the course

Graduate profile

Electrical Engineering graduates possess in-depth theoretical and practical knowledge of modern electrical, power, control, and measurement systems and devices. They are prepared to work in industry, in design and engineering offices, and in research and development teams in positions related to the design, production, and use of electrical equipment and systems. They possess the skills to analyze, design, optimize, and effectively operate electrical machinery, power, and measurement systems using specialized engineering and IT tools. They can apply their acquired knowledge and skills to tasks requiring independence and an unconventional approach. They understand the economic conditions necessary to assess the viability of resource utilization in their engineering work. They understand the legal aspects of business activity, intellectual property protection, and the commercialization of research results. They can communicate fluently during discussions on specialized topics, lead teamwork, and lead debates. They understand the need for self-education and are able to learn and improve their skills after graduation. They are prepared to take on engineering challenges of a research and design nature, as well as to continue his education in third-cycle studies.

The relationship between the field of study and the university's strategy

Electrical Engineering, as a field of study at Lodz University of Technology, fully incorporates the provisions of the Statute of Lodz University of Technology (Senate Resolution No. 24/2025 of February 26, 2025) and pursues the goals set out in the Development Strategy of Lodz University of Technology. In accordance with the Annex to Resolution No. 39/2024 of the Senate of Lodz University of Technology of June 26, 2024, on the adoption of the Strategy of Lodz University of Technology for 2025-2030 - "Development Strategy of Lodz University of Technology for 2025-2030," the university's mission is: "Building a sustainable research university with a strong academic community, ensuring freedom of research and discussion, and modern education, developing local and global cooperation and innovation for the good of society, the economy, and the world." Lodz University of Technology's vision is to become: "A distinguished research university that brings together and develops talents, competencies, and technologies, operating on a friendly, green campus, serving as a valued partner for the economy, and working for the benefit of society, ensuring its leading place on the academic map of the country and the world."

The 2025–2030 strategy identifies the key challenges facing the university and sets development goals organized around eleven strategic areas, forming the acronym COOPERATION. This framework encompasses, among others, leadership, internationalization, innovation, social responsibility, sustainable development, and student engagement. The new concept is a continuation of existing activities while addressing current social, environmental, and economic needs. Its goal is to further strengthen Lodz University of Technology's position as a modern, responsible, and globally recognized research university.

A key priority of Lodz University of Technology's development strategy is ensuring a high level of education. To this end, modern teaching methods, innovative study programs, and flexible learning paths will be implemented. Traditional teaching methods will be increasingly supported by methods based on the principles of creative learning and independent knowledge acquisition, as well as tutoring and mentoring. Continuous improvement and broader application of new teaching methods must be combined with regular monitoring of the needs of the socio-economic environment. The university supports the creation of interdisciplinary and inter-university programs. An important direction of development will be the improvement of foreign language curricula, as well as obtaining national and international accreditation of study programs for individual fields of study. The university's distinguishing feature will be the ability to individualize the learning process, allowing students to fully benefit from the university's broad educational offerings and individualizing graduates' competency profiles.

The Electrical Engineering program aims to educate technical and administrative personnel for key sectors of the economy (electric power engineering, electrical machinery, construction, transport), staff for research and development centers, and the education sector, conduct scientific research in these areas, and disseminate knowledge, scientific achievements, and practical skills. The education of students in the Electrical Engineering program is intended to support the country's sustainable development and technological transformation, as well as to foster increased efficiency and competitiveness of the national economy.

In accordance with the Development Strategy of Lodz University of Technology, the Electrical Engineering program utilizes modern teaching methods and offers a wide selection of specializations and electives, supporting flexible learning paths and individualizing the development of graduate competencies. The Electrical Engineering program will develop opportunities for study in foreign languages, internationalize the educational process, and facilitate student and staff mobility.

Educational objectives and employment and continuing education opportunities

The aim of the second-cycle program in Electrical Engineering is to deepen and expand the theoretical knowledge and practical skills in electrical engineering acquired during the first-cycle program. These programs prepare graduates to independently and creatively solve complex engineering problems and conduct research and development in the fields of Automation, Electronics, Electrical Engineering, and Space Technologies. They acquire advanced knowledge in the analysis, design, modeling, and operation of electrical systems, devices, and installations, taking into account modern technologies, economic, legal, ethical, and environmental aspects. A graduate of Electrical Engineering will be a highly qualified specialist, prepared to undertake independent and managerial professional tasks in the dynamically developing electrical industry and related areas:

- energy and electric power enterprises for all voltage levels, as well as companies involved in the design, construction, modernization, and operation of electromechanical systems, as well as power and measurement systems;
- design offices and contractors implementing projects for the power industry, industry, and electrical installations;
- consulting and advisory firms operating in the areas of power engineering, energy efficiency, and green transformation;
- industrial enterprises utilizing modern power systems, electric drives, control systems, automation, and monitoring of technological processes;
- the renewable energy sector, energy storage, intelligent installations, power grids, and systems; research, development, and scientific entities;
- public and local government administration in the areas of energy, technical infrastructure, and energy and climate policy.

A graduate of electrical engineering is also prepared to run their own business and to continue their education in third-cycle or postgraduate studies, expanding their professional competences.

Description of the process and outcome of consultations on the proposed study program with the socio-economic environment

The Electrical Engineering program was consulted in 2025 with the following entities:

- Apator S.A.
- ZREW Transformatory S.A.,
- Elektromonter sp. z o.o.,
- ABB Sp. z o.o. - Aleksandrów Łódzki branch,
- Hitachi Energy Poland Sp. z o.o.,
- SESTO Sp. z o.o.,
- PGE Dystrybucja S.A. Łódź branch,
- Newag Inteco DS S.A.,
- PGE Energetyka Kolejowa Obsługa sp. z o.o.

It received positive opinions from all the entities mentioned.

Description of competencies expected from a candidate applying for admission to studies

In accordance with the recruitment resolution in force for a given academic year.

The unit organizing education

Faculty of Electrical, Electronic, Computer and Control Engineering

Education program

Semester 1

Course	Number of hours	ECTS points	Form of verification	Obligatory
Short Circuits and Overvoltages in Power Systems	Project work: 20 Lecture: 20	6	Exam	Obligatory
Field-circuit Methods	Project work: 10 Lecture: 10	2	Graded assignment	Obligatory
Sum	**60**	**8**		

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Course	Number of hours	ECTS points	Form of verification	Obligatory
Integrated Sensory Systems	Laboratory classes: 10 Project work: 10 Lecture: 10	4	Graded assignment	Obligatory specialization courses
Discrete-Time Control Systems	Laboratory classes: 10 Lecture: 10	3	Graded assignment	Obligatory specialization courses
Automatics Laboratory	Tutorials: 10 Project work: 10 Lecture: 10	5	Exam	Obligatory specialization courses
Industrial Robot Controling	Laboratory classes: 15 Lecture: 15	5	Exam	Obligatory specialization courses
Sum	**110**	**17**		

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Course	Number of hours	ECTS points	Form of verification	Obligatory
Digital Technologies in Electrical Power Engineering	Laboratory classes: 10 Project work: 10 Lecture: 15	4	Graded assignment	Obligatory specialization courses
High-voltage Engineering	Laboratory classes: 10 Lecture: 10	3	Graded assignment	Obligatory specialization courses
Electrical Power Systems	Project work: 10 Lecture: 15	5	Exam	Obligatory specialization courses
Power Measurements and Diagnostics	Laboratory classes: 15 Lecture: 15	5	Exam	Obligatory specialization courses
Sum	**110**	**17**		

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Course	Number of hours	ECTS points	Form of verification	Obligatory
Design of Electrical Systems	Project work: 15 Lecture: 10	4	Graded assignment	Obligatory specialization courses
Finite Element Method	Project work: 15 Lecture: 10	3	Graded assignment	Obligatory specialization courses
Safety of Electrical Devices in Industry	Laboratory classes: 10 Project work: 15 Lecture: 10	5	Exam	Obligatory specialization courses
Sum	**85**	**12**		

Semester 2

Course	Number of hours	ECTS points	Form of verification	Obligatory
Optimization Methods	Laboratory classes: 10 Lecture: 10	2	Graded assignment	Obligatory
Legal Conditions in the Business Activity	Laboratory classes: 10 Project work: 20	5	Graded assignment	Obligatory
Sum	**50**	**7**		

brak

Course	Number of hours	ECTS points	Form of verification	Obligatory
Programmable Controllers in Automation Systems	Laboratory classes: 10 Lecture: 10	5	Exam	Obligatory specialization courses
Documentation of Industrial Automation Systems	Laboratory classes: 10 Lecture: 10	5	Exam	Obligatory specialization courses
Transducers and Measurement Systems	Laboratory classes: 10 Project work: 10 Lecture: 10	3	Graded assignment	Obligatory specialization courses
Internet Measurement Techniques	Laboratory classes: 10 Project work: 10 Lecture: 10	3	Graded assignment	Obligatory specialization courses
Sum	**100**	**16**		

brak

Course	Number of hours	ECTS points	Form of verification	Obligatory
Optimization in Electrical Power Engineering	Project work: 10 Lecture: 10	3	Graded assignment	Obligatory specialization courses

Course	Number of hours	ECTS points	Form of verification	Obligatory
Economics of Electrical Power Systems	Project work: 20 Lecture: 10	4	Graded assignment	Obligatory specialization courses
Advanced Power System Protection	Laboratory classes: 10 Lecture: 10	4	Exam	Obligatory specialization courses
Modeling and Simulation of Power Systems	Laboratory classes: 20 Lecture: 10	5	Exam	Obligatory specialization courses
Sum	**100**	**16**		

brak

Course	Number of hours	ECTS points	Form of verification	Obligatory
Modeling Physical Phenomena in Electrical Machines and Transformers	Laboratory classes: 15 Lecture: 10	5	Exam	Obligatory specialization courses
Design of Electrical Apparatus	Project work: 15 Lecture: 10	3	Graded assignment	Obligatory specialization courses
Instrument Transformers in Electrical Power Engineering	Project work: 20 Lecture: 10	5	Exam	Obligatory specialization courses
Prototyping of Electromechanical Systems	Project work: 20	3	Graded assignment	Obligatory specialization courses
Computer-Aided Systems of Experimental Data Analysis	Laboratory classes: 15 Lecture: 10	5	Exam	Obligatory specialization courses
Sum	**125**	**21**		

Semester 3

Course	Number of hours	ECTS points	Form of verification	Obligatory
Foreign Language for Specialist Purposes	Tutorials: 30	2	Graded assignment	Obligatory subjects to choose from
Workshop on Measurements, Design, and Nonlinear Circuit Analysis	Laboratory classes: 20 Project work: 20 Lecture: 20	6	Exam	Obligatory
Elective Course 1		8	Graded assignment	Optional
Student wybiera 1 blok				
Blok obieralny Zagadnienia cieplne w elektrotechnice		8	Graded assignment	Obligatory group
Thermal Impact of Electromagnetic Field	Laboratory classes: 20 Lecture: 15	4	Graded assignment	Optional
Temperature Control and Power Electronic Heating Devices	Laboratory classes: 20 Lecture: 15	4	Graded assignment	Optional
Blok obieralny Cyfrowe obrazowanie zjawisk przemysłowych		8	Graded assignment	Obligatory group
Design of Control Modules	Project work: 20 Lecture: 10	4	Graded assignment	Optional
Fast Digital Photography and Digital Imaging	Laboratory classes: 10 Project work: 20 Lecture: 10	4	Graded assignment	Optional
Blok obieralny Modelowanie przestrzenne i przetwarzanie informacji		8	Graded assignment	Obligatory group
3D Design in Electrical Engineering	Project work: 20 Lecture: 15	4	Graded assignment	Optional
Artificial Intelligence in Technical Data Analysis	Project work: 20 Lecture: 15	4	Graded assignment	Optional
Blok obieralny Elektroenergetyka prosumencka		8	Graded assignment	Obligatory group

Course	Number of hours	ECTS points	Form of verification	Obligatory
Devices for Prosumer Generation	Laboratory classes: 20 Lecture: 15	4	Graded assignment	Optional
Integration of Prosumers Systems and Electromobility	Laboratory classes: 10 Project work: 10 Lecture: 15	4	Graded assignment	Optional
Blok obieralny Automatyka elektroenergetyczna		8	Graded assignment	Obligatory group
Automation of Power Plants and Distributed Generation	Laboratory classes: 10 Project work: 10 Lecture: 15	4	Graded assignment	Optional
Automatic Train Control	Laboratory classes: 20 Lecture: 15	4	Graded assignment	Optional
Blok obieralny Uprawnienia budowlane i elektryczne		4	Graded assignment	Obligatory group
Construction Process - Legal and Practical Issues	Project work: 20 Lecture: 15	4	Graded assignment	Optional
Renewable Energy Installation Project	Project work: 20 Lecture: 15	4	Graded assignment	Optional
Sum	**160**	**16**		

Semester 4

Course	Number of hours	ECTS points	Form of verification	Obligatory
Internship	Internship: 0	4	Pass	Obligatory
Final Project	Diploma Thesis: 0	20	Pass	Obligatory
Sum	**0**	**24**		

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Course	Number of hours	ECTS points	Form of verification	Obligatory
Diploma Seminar	Seminar: 30	2	Graded assignment + exam	Obligatory subjects to choose from
Sum	**30**	**2**		

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Course	Number of hours	ECTS points	Form of verification	Obligatory
Diploma Seminar	Seminar: 30	2	Graded assignment + exam	Obligatory subjects to choose from
Sum	**30**	**2**		

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Course	Number of hours	ECTS points	Form of verification	Obligatory
Diploma Seminar	Seminar: 30	2	Graded assignment + exam	Obligatory subjects to choose from
Sum	**30**	**2**		