

**BIALYSTOK UNIVERSITY OF TECHNOLOGY
FACULTY OF ELECTRICAL
ENGINEERING**

**PLAN OF BACHELOR DEGREE
ENGINEERING STUDIES**

course of study
ELECTRICAL AND ELECTRONIC ENGINEERING

BIALYSTOK 2017

Table 1. Table of references of course outcomes to the field outcomes for bachelor degree in *Electrical and Electronic Engineering* to the second level characteristic of Polish NQF (Polskiej Ramy Kwalifikacji)

Explanation of the table symbols:

EEE1_Xxx – course outcomes of education for bachelor degree in *Electrical and Electronic Engineering*, X: W – knowledge category, U – skills category, K – social competences category, xx – number of the learning outcome; P6S – outcomes of education in the field of technical sciences for bachelor degree according to Polish NQF (Polska Rama Kwalifikacji) (qualifications achieved with higher education – LEVEL 6, the field of technical sciences education, general-academic profile, engineer competences).

Symbol of the learning outcome for EEE	Description of the course education outcomes – study programme <i>Electrical and Electronic Engineering</i> , Bachelor degree, general-academic profile, engineering studies. After finishing studies the graduate:	Reference to the second level characteristic of Polish NQF – level 6 for technical sciences (P6S)	Reference to the second level characteristic of Polish NQF – level 6 for engineer competences
Knowledge: knows and understands			
EEE_W01	at the advanced level selected issues of mathematics, including algebra, analysis, probabilistics, mathematical logic, geometry, discrete and applied mathematics.	P6S_WG	P6S_WG
EEE_W02	at the advanced level selected issues of classical physics, modern physics, solid state physics and the fundamentals of quantum mechanics.	P6S_WG	P6S_WG
EEE_W03	IT issues, especially information technology, methodology and programming techniques necessary for using dedicated software for simulation and design of elements, electrical and microprocessor structures and systems.	P6S_WG	P6S_WG
EEE_W04	topics covered by theoretical knowledge in the area of electrical circuit theory, field theory and electromagnetic waves.	P6S_WG	P6S_WG
EEE_W05	detailed rules for the operation of electronic analog and digital components and circuits, electronic systems and digital signal processing.	P6S_WG	P6S_WG
EEE_W06	construction and operation of telecommunication systems and networks, embedded systems, devices and their components, as well as the techniques of transmitting signals and data in these systems.	P6S_WG	P6S_WG
EEE_W07	at the advanced level issues in the field of control and automation, architecture of digital systems and microprocessor systems, their programming and selected applications.	P6S_WG	P6S_WG
EEE_W08	construction, operation and exploitation principles as well as the fundamentals of design and modeling of electrical equipment and systems, including renewable energy systems, working in static and dynamic conditions, taking into account their energy efficiency.	P6S_WG	P6S_WG
EEE_W09	principles of conducting and developing	P6S_WG	P6S_WG

	measurements of physical quantities and measurement uncertainties, in particular in metrology; methods of measuring basic quantities characterizing various types of electrical and electronic components and systems, including high frequency systems.		
EEE_W10	rules of intellectual property protection and patent law, as well as the foundations of creation and development of forms of individual entrepreneurship, management, including quality management and business.	P6S_WK	P6S_WK
EEE_W11	non-technical conditions of engineering activities, principles of occupational safety and health and theoretical principles of safe operation of electrical equipment and systems.	P6S_WG P6S_WK	P6S_WG P6S_WK
Skills: can			
EEE_U01	gather information from literature, including catalogs and application notes, databases and other sources in English, integrate them, interpret them, select components of the proposed structure or system, draw conclusions and formulate and justify the opinions.	P6S_UW P6S_UK	P6S_UW
EEE_U02	use English for technical sciences, in particular electricity, electronics and telecommunications, as required by Level B2 of the European System of Language Training.	P6S_UK	
EEE_U03	demonstrate proficiency in English grammar and vocabulary, allowing to participate in discussions on technical subjects related to electrical engineering and electronics, and understand and create complex texts related to these disciplines.	P6S_UK	
EEE_U04	prepare in English a documented work on the implementation of a simple engineering task, prepare a text including a discussion of the results of this task and brief presentation.	P6S_UK	
EEE_U05	plan and execute simulations and use properly selected methods and devices to measure basic quantities and characteristics of electrical and electronic components and systems; present the results in numerical and graphical form, interpret them and draw appropriate conclusions.	P6S_UW	P6S_UW
EEE_U06	evaluate the suitability and use known mathematical methods and models as well as computer simulations and experiments to analyze and evaluate the operation of elements, simple structures as well as the engineering tasks typical of the studied specialization.	P6S_UW	P6S_UW
EEE_U07	formulate the algorithm, use high and low programming languages and appropriate IT tools to program microcontrollers or microprocessors for control, simulation, design and verification of components, circuits and simple systems within the studied specialty.	P6S_UW	P6S_UW
EEE_U08	compare design solutions of elements and structures taking into account specific performance and economic criteria, design and critically analyze selected structures and installations taking into account specific performance and economic criteria, using appropriate methods, techniques and tools,	P6S_UW	P6S_UW

	including computer aided and see their systemic and non-technical aspects.		
EEE_U09	apply health and safety rules.	P6S_UO	
EEE_U10	configure hardware and software components of a control system, taking into account principles of their cooperation.	P6S_UW	P6S_UW
EEE_U11	build, initiate and test a typical designed system in the field of studied specialization.	P6S_UW	P6S_UW
EEE_U12	organize own work and for team of people; estimate time necessary for the completion of the task; develop and implement a timetable for meeting deadlines, taking into account specific priorities.	P6S_UO P6S_UU	
Social competences: is ready to			
EEE_K01	critical assessment of collected knowledge, identifying priorities for achieving goals set by himself and others, proper identification and resolving dilemmas related to the profession of an electrical or electronic engineer.	P6S_KK	
EEE_K02	professional behavior, respect professional ethics and ethical standards in personal life and the diversity of views and cultures, care of the achievements and traditions of the profession of electrical and electronic engineers.	P6S_KR	
EEE_K03	think and act in an entrepreneurial manner with the awareness of the social role of a technical university graduate.	P6S_KO	

Full-time study programme

Study programme: *Electrical and Electronic Engineering*

Bachelor degree, general-academic profile, engineering studies

Semester 1 (15 weeks)											
No	Module name	Module ID	Hours per week for each form of teaching						Hours per semester	ECTS	Comments
			L	C	LC	SW	P	S			
1	Mathematics 1	EEE1A1 001	2E	2	-	-	-	-	60	5	0
2	Physics	EEE1A1 002	2E	-	1	-	-	-	45	5	0
3	Introduction to IT	EEE1A1 003	1	-	-	2	-	-	45	5	0
4	Occupational health, safety and ergonomics	EEE1A1 004	2/3	-	-	-	-	-	10	1	1
5	Protection of intellectual property rights	EEE1A1 005	4/3	-	-	-	-	-	20	1	0
6	Electrical circuits 1	EEE1A1 006	2	2	-	-	-	-	60	5	1
7	Polish language and culture course	EEE1A1 301	-	4	-	-	-	-	60	4	0
8	English 1	EEE1A1 302	-	2	-	-	-	-	30	2	0
Total:			9	10	1	2	-	-	330	28	
Elective:											
9	HES 1 1. Economic integration and European projects 2. Economic integration and European funds	EEE1A1 401 A/B	2	-	-	-	-	-	30	2	0
Minimum elective:									30	2	

Semester 2 (15 weeks)											
No	Module name	Module ID	Hours per week for each form of teaching						Hours per semester	ECTS	Comments
			L	C	LC	SW	P	S			
1	Mathematics 2	EEE1A2 001	2E	2	-	-	-	-	60	6	0
2	Electrical circuits 2	EEE1A2 002	1E	2	1	-	-	-	60	6	1
3	Metrology	EEE1A2 003	1	-	2	-	-	-	45	5	1
4	Techniques of presentation	EEE1A2 004	-	-	-	-	-	1	15	3	1
5	High-level programming languages	EEE1A2 005	1	-	-	2	-	-	45	6	1
6	Gymnastics 1	EEE1A2 006	-	2	-	-	-	-	30	0	0
7	English 2	EEE1A2 303	-	2	-	-	-	-	30	2	0
8	HES 2 – Academic entrepreneurship	EEE1A2 401	4/3	2/3	-	-	-	-	30	2	0
Total:			6 1/3	8 2/3	3	2	0	1	315	30	

Semester 3 (15 weeks)											
No	Module name	Module ID	Hours per week for each form of teaching						Hours per semester	ECTS	Comments
			L	C	LC	SW	P	S			
1	Electronics 1	EEE1A3 001	1	-	2	-	-	-	45	5	1
2	Object-oriented programming	EEE1A3 002	-	-	-	2	-	-	30	4	1
3	Fundamentals of control engineering	EEE1A3 003	2E	-	2	-	-	-	60	6	1
4	Basics of electromagnetism	EEE1A3 004	1	-	-	1	-	-	30	3	1
5	Gymnastics 2	EEE1A3 005	-	2	-	-	-	-	30	0	0
6	English 3	EEE1A3 304	-	2	-	-	-	-	30	2	0
Total:			4	4	4	3	-	-	225	20	
Elective:											
7	Application of computer science in electrical engineering	EEE1A3 101	-	-	-	2	-	-	30	4	1
8	Electrical machines 1	EEE1A3 102	2E	-	-	2	-	-	60	6	1
9	Network technologies	EEE1A3 201	1	-	2	-	-	-	45	5	1
10	Basics of photonics	EEE1A3 202	1E	-	2	-	-	-	45	5	1
Minimum elective:									90	10	

Semester 4 (15 weeks)												
No	Module name	Module ID	Hours per week for each form of teaching						Hours per semester	ECTS	Comments	
			L	C	LC	SW	P	S				
1	Electronics 2	EEE1A4 001	1E	-	2	-	-	-	45	5	1	
2	Control engineering and systems	EEE1A4 002	2E	-	-	2	-	-	60	5	1	
3	Renewable energy sources	EEE1A4 003	1	-	2	-	-	-	45	4	1	
4	Fundamentals of telecommunications	EEE1A4 004	2	-	1	-	-	-	45	4	1	
Total:			6	-	5	2	-	-	205	18		
Elective:												
5	Electrical machines 2	EEE1A4 101	1	-	2	-	-	-	45	4	1	
6	Electrical equipment and installations	EEE1A4 102	1	1	2	-	-	-	60	5	1	
7	Power systems	EEE1A4 103	2E	-	-	-	-	-	30	3	1	
8	High frequency techniques	EEE1A4 201	2E	-	-	1	-	-	45	4	1	
9	Automotive electronics	EEE1A4 202	1	-	2	-	-	-	45	4	1	
10	Sources and detectors of optical radiation	EEE1A4 203	1	-	2	-	-	-	45	4	1	
Minimum elective:									135	12		

Semester 5 (15 weeks)												
No	Module name	Module ID	Hours per week for each form of teaching						Hours per semester	ECTS	Comments	
			L	C	LC	SW	P	S				
1	Microprocessor technique and microcontrollers	EEE1A5 001	2E	-	2	-	-	-	60	5	1	
2	Protection against interferences	EEE1A5 002	2E	-	2	-	-	-	60	5	1	
3	Digital systems	EEE1A5 003	1	-	2	-	-	-	45	5	1	
4	Programmable logic controllers	EEE1A5 004	1	-	2	-	-	-	45	5	1	
Total:			6	-	8	-	-	-	210	20		
Elective:												
5	Control of electrical drives 1	EEE1A5 101	1	-	2	-	-	-	45	5	1	
6	Power electronics 1	EEE1A5 102	2E	-	2	-	-	-	60	5	1	
7	Radioelectronic devices	EEE1A5 201	1	-	2	-	-	-	45	5	1	
8	Optical fibers	EEE1A5 202	1	-	2	-	-	-	45	5	1	
Minimum elective:									90	10		

Semester 6 (15 weeks)											
No	Module name	Module ID	Hours per week for each form of teaching						Hours per semester	ECTS	Comments
			L	C	LC	SW	P	S			
1	Digital signal processing	EEE1A6 001	2	-	2	-	-	-	60	6	1
2	Energy efficiency	EEE1A6 002	1	1	-	-	-	-	30	4	1
3	Field programmable gate arrays	EEE1A6 003	-	-	2	-	-	-	30	3	1
4	Workshop on programmable logic devices	EEE1A6 004	-	-	-	2	-	-	30	3	1
5	Embedded systems	EEE1A6 005	1	-	-	1	-	-	30	3	1
Total:			4	1	4	3	-	-	180	19	
Elective:											
6	Control of electrical drives 2	EEE1A6 101	1	-	1	-	1	-	45	4	1
7	Basics of lighting technology	EEE1A6 102	2E	-	1	-	-	-	45	4	1
8	Power electronics 2	EEE1A6 103	1	-	1	-	-	-	30	3	1
9	Telecommunication devices	EEE1A6 201	2E	-	-	-	1	-	45	4	1
10	Security and reliability of network systems	EEE1A6 202	2E	-	1	-	-	-	45	4	1
11	Project in IT networks	EEE1A6 203	-	-	-	-	2	-	30	3	1
Minimum elective:									120	11	

Semester 7 (15 weeks)											
No	Module name	Module ID	Hours per week for each form of teaching						Hours per semester	ECTS	Comments
			L	C	LC	SW	P	S			
1	Undergraduate thesis	EEE1A7 001	-	-	-	-	-	-	0	15	1
2	Undergraduate thesis seminar	EEE1A7 002	-	-	-	-	-	2	30	3	1
Total:			-	-	-	-	-	2	30	18	
Elective:											
3	High voltage technique	EEE1A7 101	2	-	2	-	-	-	60	5	1
4	Project of electrical installation in industrial buildings	EEE1A7 102	-	-	-	-	2	-	30	4	1
5	Project in lighting technology	EEE1A7 103	-	-	-	-	2	-	30	3	1
6	Fiberoptic networks	EEE1A7 201	2	1	-	-	-	-	45	4	1
7	Modern wireless network technologies	EEE1A7 202	2	-	-	-	-	-	30	3	1
8	Radio and television devices	EEE1A7 203	2	-	2	-	-	-	60	5	1
Minimum elective:									120	12	

Explanations

Shortcuts:

L – lecture, C – classes, LC – laboratory, P – project, SW – specialization workshop, S – seminar;

E – lecture with an exam;

HES – group of humanistic-economic-managerial subjects

Others:

➤ In each semester of full-time studies classes last 15 weeks.

➤ Each module lasts only one semester.

➤ Form of credit:

- Exam at the end of the lecture and evaluation with marks on other forms of the subject or evaluation with marks on each form of the subject.
- Student obtains credits for the module (ECTS) after receiving positive marks on each form of the subject.
- Nominal number of credits is 30 ECTS per semester.

During studies on the bachelor level each student is studying foreign language on the B2 proficiency level according to the European System of Language Education Description of the Council of Europe.

➤ In the column „Comments”: 0 – module taught by a professor from other faculties, 1 – module taught by a professor from the Faculty of Electrical Engineering.