

PROGRAMME OF STUDIES

1. Description

<i>Number of semesters: 4</i>	<i>Number ECTS points necessary to obtain qualifications: 120</i>
<i>Prerequisites:</i> <ul style="list-style-type: none"> • <i>completed undergraduate degree in Electrical Engineering at universities in Poland or abroad,</i> • <i>completed undergraduate degree in related field of study, verified by the Qualification Commission.</i> 	<i>Upon completion of studies graduate obtains professional degree of: master of science, engineer</i> <i>2nd level qualifications</i>
<i>Possibility of continuing studies: 3rd level studies (PhD)</i>	<i>Graduate profile, employability:</i> <i>A graduate of the second degree studies in the specialization Electrical Power Engineering has advanced and well-established knowledge of the power system operation, automation, protection and control techniques in power engineering. Has ability to use computer tools for designing and modeling. It is capable of creative work and to make decisions and lead work-team labor. He is prepared to continue their education in third level studies (Ph.D. studies).</i>
<i>Indicate connection with University's mission and its development strategy:</i> <i>The knowledge gained during their studies not only lead to success in their future careers of the graduate, but also shapes the human being with a sense of entrepreneurship, creativeness and openness to new challenges.</i>	

2. Fields of science and scientific disciplines to which educational effects apply:

science field: technical sciences, science discipline: Electrical Engineering

3. Concise analysis of consistency between assumed educational effects and labour market needs:

Learning effects refer not only to the broadly understood electrical engineering, i.e. the generation, transmission, distribution, transforming, and utilization of electrical energy, but due to the demands of modern techniques and technologies currently used in electrical power engineering and industry - include electronic and microprocessor technology, computer science, management, and marketing. Obtaining the intended learning effects will enable graduates to find attractive and interesting work in all industries, especially in the electrical power engineering sector. The graduate is also prepared to start business in electrical engineering field. Proceedings on the educational effects were refereed and discussed at meetings of the Faculty of Electrical Engineering Convent, including representatives of industrial enterprises in the Polish territory, with particular emphasis on the Lower Silesia and the neighboring provinces. During meetings the needs of labor market were explained and discussed.

4.1.2. List of basic sciences modules

4.1.2.1. Mathematics module

No.	Course code	Name of course	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form of course	Way of crediting	Course			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes			university-wide	practical	kind	type
1	ELR041372W ELR042172W ELR042572W	Numerical methods in engineering	1					K2ETK_W02 K2ETK_K02	11	54	2	1,4	T	Z			PD	OB
2	ELR041372P ELR042172P ELR042572P	Numerical methods in engineering				1		K2ETK_U02 K2ETK_K02	11	54	2	1,4	T	Z		P	PD	OB
Total			1	0	0	1	0		22	108	4	2,8						

4.1.2.2. Physics module

No.	Course code	Name of course	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form of course	Way of crediting	Course			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes			university-wide	practical	kind	type
1	ELR043366W	Electrical Measurement Nonelectrical Values	1					K2ETK_W05 K2ETK_K02	11	54	2	1,4	T	Z			PD	OB
2	ELR043366L	Electrical Measurement Nonelectrical Values			1			K2ETK_U04 K2ETK_K02	11	27	1	0,7	T	Z		P	PD	OB
Total			1	0	1	0	0		22	81	3	2,1						

4.1.2.3. Chemistry module

No.	Course code	Name of course	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form of course	Way of crediting	Course			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes			university-wide	practical	kind	type

Altogether for basic sciences modules

Total number of hours					Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	Number of ECTS points
lec	cl	lab	pr	sem				
2	0	1	1	0	44	189	7	4,9

4.1.3. List of main-field-of-study modules

4.1.3.1. Obligatory main-field-of-study module

No.	Course code	Name of course	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form of course	Way of crediting	Course			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes			university-wide	practical	kind	type
1	ELR041371W	Selected problems of circuit theory	2					K2ETK_W01	22	108	4	2,8	T	E			K	OB
2	ELR041371C	Selected problems of circuit theory		1				K2ETK_U01 K2ETK_K01	11	54	2	1,4	T	Z		P	K	OB
3	ELR042271W	Short-circuits in power systems	2					K2ETK_W03 K2ETK_K03	22	81	3	2,1	T	Z			K	OB
4	ELR043262W	Electromechanical drive systems	2					K2ETK_W04	22	108	4	2,8	T	E			K	OB
5	ELR043262L	Electromechanical drive systems			1			K2ETK_U03 K2ETK_K01	11	27	1	0,7	T	Z		P	K	OB
Total			6	1	1	0	0		88	378	14	9,8						

Altogether for main-field-of-study modules

Total number of hours					Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	Number of ECTS points
lec	cl	lab	pr	sem				
6	1	1	0	0	88	378	14	9,8

4.1.4. List of specialization modules

4.1.4.1. Obligatory specialization subjects module

No.	Course code	Name of course	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form of course	Way of crediting	Course			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes			university-wide	practical	kind	type
1	ELR041167W	Lightning and overvoltage protection	1					S2EEN_W09 K2ETK_K03	11	81	3	2,1	T	Z			S	OB
2	ELR041167L	Lightning and overvoltage protection			1			S2EEN_U10 K2ETK_K03	11	54	2	1,4	T	Z		P	S	OB
3	ELR042171W	Fundamentals of digital power system protection and control	1					S2EEN_W04	11	108	4	2,8	T	E			S	OB
4	ELR042171L	Fundamentals of digital power system protection and control			1			S2EEN_U04 K2ETK_K02 K2ETK_K06	11	54	2	1,4	T	Z		P	S	OB
5	ELR042177W	Digital Modelling in Power Systems	1					K2ETK_W03 S2EEN_W05	11	54	2	1,4	T	Z			S	OB
6	ELR042177L	Digital Modelling in Power Systems			1			K2ETK_U01 S2EEN_U05 K2ETK_K02	11	27	1	0,7	T	Z		P	S	OB
7	ELR042272W	Power System Protection	2					S2EEN_W02 K2ETK_K07	22	81	3	2,1	T	Z			S	OB
8	ELR042272L	Power System Protection			2			S2EEN_U01 S2EEN_U02 K2ETK_K07	22	81	3	2,1	T	Z		P	S	OB
9	ELR042273L	MV Network security			2			S2EEN_U11 K2ETK_K02	22	81	3	2,1	T	Z		P	S	OB
10	ELR042274W	Fiber optics	1					S2EEN_W07 K2ETK_K06	11	54	2	1,4	T	Z			S	OB
11	ELR042274L	Fiber optics			1			S2EEN_U08 K2ETK_K06	11	54	2	1,4	T	Z		P	S	OB
12	ELR042371W	Computer Aided Design (CAD) in Energetic	2					S2EEN_W08 K2ETK_K01	22	81	3	2,1	T	Z			S	OB
13	ELR042371L	Computer Aided Design (CAD) in Energetic			1			S2EEN_U09 K2ETK_K01	11	54	2	1,4	T	Z		P	S	OB
14	ELR042573W	Power Systems Operation and Control 1	2					S2EEN_W01 K2ETK_K06	22	108	4	2,8	T	E			S	OB
15	ELR042574W	Load management	2					S2EEN_W01 S2EEN_W10 K2ETK_K03	22	81	3	2,1	T	Z			S	OB
16	ELR042575L	Power Systems Operation and Control 2			2			S2EEN_U06 K2ETK_K06	22	54	2	1,4	T	Z		P	S	OB
17	ELR042576W	Modern technologies in electric power transmission and distribution	2					S2EEN_W01 S2EEN_W06	22	108	4	2,8	T	E			S	OB
18	ELR042576S	Modern technologies in electric power transmission and distribution					1	S2EEN_U07 K2ETK_U07 K2ETK_K06	11	54	2	1,4	T	Z		P	S	OB
19	ELR042577W	Energy management in energy systems	2					S2EEN_W10 K2ETK_K06	22	81	3	2,1	T	Z			S	OB
20	ELR042580P	Control and monitoring systems in the power industry				2		S2EEN_U06 S2EEN_U07 K2ETK_K06	22	81	3	2,1	T	Z		P	S	OB
21	ELR043167W	Electromechanical Systems in Renewable Energy	2					S2EEN_W03	22	81	3	2,1	T	Z			S	OB
22	ELR043167L	Electromechanical Systems in Renewable Energy			1			S2EEN_U03 K2ETK_K07	11	81	3	2,1	T	Z		P	S	OB
Total			18	0	12	2	1		363	1593	59	41,3						

Altogether for specialization modules

Total number of hours					Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	Number of ECTS points
lec	cl	lab	pr	sem				
18	0	12	2	1	363	1593	59	41,3

4.2. List of optional modules

4.2.1. List of general education modules

4.2.1.1. Liberal-managerial subjects module

No.	Course code	Name of course	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form of course	Way of crediting	Course			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes			university-wide	practical	kind	type
1	FLH551622S	Ethics in bussiness					1	K2ETK_U07 K2ETK_K06	11	54	2	1,4	T	Z	O	P	KO	W
2	PKH550422S	Social communication					1	K2ETK_U07 K2ETK_K06	11	54	2	1,4	T	Z	O	P	KO	W
3	PKH555522S	The art of public speaking					1	K2ETK_U07 K2ETK_K06	11	54	2	1,4	T	Z	O	P	KO	W
4	PRR041271W	Standardization and engineering law	1					K2ETK_W07 K2ETK_K03 K2ETK_K05	11	27	1	0,7	T	Z	O		KO	W
5	PRR041272W	Engineering law	1					K2ETK_W07 K2ETK_K03 K2ETK_K05	11	27	1	0,7	T	Z	O		KO	W
6	PRR041273W	Technical standardization	1					K2ETK_W07 K2ETK_K03 K2ETK_K05	11	27	1	0,7	T	Z	O		KO	W
7	ZMR042571W	Management of a Company	1					K2ETK_W06 K2ETK_K03 K2ETK_K06	11	54	2	1,4	T	Z	O		KO	W
8	ZMR042579W	Management in the power industry	1					K2ETK_W06 K2ETK_K03 K2ETK_K06	11	54	2	1,4	T	Z	O		KO	W
Total			2	0	0	0	1		33	135	5	3,5						

4.2.1.2. Foreign languages module

No.	Course code	Name of course	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form of course	Way of crediting	Course			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes			university-wide	practical	kind	type
1	JZL030001BKC	Foreign language A1 or A2		3				K2ETK_U06 K2ETK_K01	33	54	2	1,4	T	Z	O	P	KO	W
2	JZL030002BKC	Foreign language B2+ or C1+		1				K2ETK_U05 K2ETK_K01	11	27	1	0,7	T	Z	O	P	KO	W
Total			0	4	0	0	0		44	81	3	2,1						

4.2.1.3. Sporting classes module

No.	Course code	Name of course	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form of course	Way of crediting	Course			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes			university-wide	practical	kind	type

4.2.1.4. Information technologies module

No.	Course code	Name of course	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form of course	Way of crediting	Course			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes			university-wide	practical	kind	type

Altogether for general education modules

Total number of hours					Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	Number of ECTS points
lec	cl	lab	pr	sem				
2	4	0	0	1	77	216	8	5,6

4.2.2.1. Mathematics module

No.	Course code	Name of course	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form of course	Way of crediting	Course			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes			university-wide	practical	kind	type

Course code	
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No.	Course code	Name of course	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form of course	Way of crediting	Course			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes			university-wide	practical	kind	type

Course code	
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No.	Course code	Name of course	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form of course	Way of crediting	Course			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes			university-wide	practical	kind	type

Altogether for basic sciences modules

[illegible]

4.2.3. List of main-field-of-study modules

4.2.3.1. Optional main-field-of-study subjects module

No.	Course code	Name of course	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form of course	Way of crediting	Course			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes			university-wide	practical	kind	type

4.2.3.2. Training module

No.	Course code	Name of course	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form of course	Way of crediting	Course			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes			university-wide	practical	kind	type

4.2.3.3. Diploma dissertation module

No.	Course code	Name of course	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form of course	Way of crediting	Course			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes			university-wide	practical	kind	type
1	ELR041199D ELR042199D ELR043199D	Master's thesis				12		S2EEN_U15 K2ETK_K04 K2ETK_K06	132	567	21	14,7	T	Z		P	S	W
2	ELR042198S	Diploma seminar					2	S2EEN_U14 K2ETK_K06	22	108	4	2,8	T	Z		P	S	W
Total			0	0	0	12	2		154	675	25	17,5						

Altogether for main-field-of-study modules

Total number of hours					Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	Number of ECTS points
lec	cl	lab	pr	sem				
0	0	0	12	2	154	675	25	17,5

4.2.4. List of specialization modules

4.2.4.1. Specialization subjects module

No.	Course code	Name of course	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form of course	Way of crediting	Course			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes			university-wide	practical	kind	type
1	ELR041168W	High voltage measurement and diagnostics of insulation	2					S2EEN_W13 K2ETK_K03 K2ETK_K06	22	54	2	1,4	T	Z			S	W
2	ELR042174W	Peripheral devices of Programmable Logic Controllers	1					S2EEN_W12	11	27	1	0,7	T	Z			S	W
3	ELR042174L	Peripheral devices of Programmable Logic Controllers			1			S2EEN_U13 K2ETK_K02 K2ETK_K07	11	27	1	0,7	T	Z		P	S	W
4	ELR042175W	Logic design	2					S2EEN_W11	22	54	2	1,4	T	E			S	W
5	ELR042175L	Logic design			1			S2EEN_U12 K2ETK_K02 K2ETK_K06 K2ETK_K07	11	27	1	0,7	T	Z		P	S	W
6	ELR042176W	Artificial intelligence methods in power system protection and control	2					S2EEN_W11	22	54	2	1,4	T	E			S	W
7	ELR042176L	Artificial intelligence methods in power system protection and control			1			S2EEN_U12 K2ETK_K02 K2ETK_K06	11	27	1	0,7	T	Z		P	S	W
8	ELR042275W	PLC and Wireless Communication for Monitoring and Metering	2					S2EEN_W11 K2ETK_K06	22	54	2	1,4	T	E			S	W
9	ELR042275S	PLC and Wireless Communication for Monitoring and Metering					1	S2EEN_U12 K2ETK_K06	11	27	1	0,7	T	Z		P	S	W
10	ELR042374W	Intelligent electrical installations – computer planning and applications	1					S2EEN_W12	11	27	1	0,7	T	Z			S	W
11	ELR042374P	Intelligent electrical installations – computer planning and applications				1		S2EEN_U13 K2ETK_K06	11	27	1	0,7	T	Z		P	S	W
12	ELR042471W	Electric shock protection systems in high-voltage installations	2					S2EEN_W13 K2ETK_K01	22	54	2	1,4	T	Z			S	W
13	ELR042472W	Modern electrical devices	2					S2EEN_W13 K2ETK_K06	22	54	2	1,4	T	Z			S	W
14	ELR042473W	Environmental aspects of the development of the electric power system	2					S2EEN_W13 K2ETK_K03	22	54	2	1,4	T	Z			S	W
15	ELR042474W	Operation and maintenance of electrical equipments	2					S2EEN_W13 K2ETK_K06	22	54	2	1,4	T	Z			S	W
16	ELR042578W	Automation of electric power systems	2					S2EEN_W11	22	54	2	1,4	T	E			S	W
17	ELR042578L	Automation of electric power systems			1			S2EEN_U12 K2ETK_K06	11	27	1	0,7	T	Z		P	S	W
18	ELR043274W	Power electronics converters in energetics	2					S2EEN_W11	22	54	2	1,4	T	E			S	W
19	ELR043274L	Power electronics converters in energetics			1			S2EEN_U12 K2ETK_K07	11	27	1	0,7	T	Z		P	S	W
Total			5	0	2	0	0		77	189	7	4,9						

Altogether for specialization modules

Total number of hours					Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	Number of ECTS points
lec	cl	lab	pr	sem				
5	0	2	0	0	77	189	7	4,9

4.3 Training module (Faculty Council resolution on principles of crediting training – attachment ...)

Name of training:			
Number of ECTS points	Number of ECTS points for BK classes	Training crediting mode	Code
Training duration	Training objective		

4.4. Diploma dissertation module

Type of diploma dissertation:	magister	
Number of diploma dissertation semesters	Number of ECTS points	Code
1	25	ELR042198S ELR041199D ELR042199D ELR043199D
Character of diploma dissertation		
Master Thesis can be classified as computational, theoretical, or may contain a description and analysis of performed experimental studies. In each case contains a section in which the author alone interpret and draw conclusions from own research. Intellectual contributions of student should be clearly visible.		
Number of BK ECTS points:	17,5	

5. Ways of verifying assumed educational effects

Type of classes	Ways of verifying assumed educational effects
lecture	examination, progress/final test
class	progress/final test
laboratory	pretest, report from laboratory
project	project defence
seminar	participation in discussion, topic presentation, essay
diploma dissertation	prepared diploma dissertation

6. Total number of ECTS points, which student has to obtain from classes requiring direct academic teacher-student contact (enter total of ECTS points for courses/groups of courses denoted with code BK)

84 ECTS

7. Total number of ECTS points, which student has to obtain from basic sciences classes

Number of ECTS points for obligatory subjects	7
Number of ECTS points for optional subjects	0
Total number of ECTS points	7

8. Total number of ECTS points, which student has to obtain from practical classes, including laboratory classes

Number of ECTS points for obligatory subjects	31
Number of ECTS points for optional subjects	32
Total number of ECTS points	63

9. Minimum number of ECTS points, which student has to obtain doing education modules offered as part of university-wide classes or other main field of study

8 ECTS

10. Total number of ECTS points, which student may obtain doing optional modules (min. 30% of total number of ECTS points)

40 ECTS

11. Range of diploma dissertation

The diploma examination problems are available on the Faculty website.

12. Requirements concerning deadlines for crediting courses/groups of courses for all courses in particular modules

No.	Course code	Name of course	Crediting by deadline of... (number of semester)
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

13. Plan of studies (attachment no.1)

Approved by faculty student government legislative body:

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Date

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Name and surname, signature of student representative

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Date

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Dean's signature