## **PROGRAMME OF STUDIES**

Number of semesters: 3	Number ECTS points necessary to obtain qualifications: 90
Prerequisites:	Upon completion of studies graduate obtains
• completed undergraduate degree in Electrical Engineering at universities in Poland or	professional degree of: master of science, engineer
abroad,	2nd level qualifications
• completed undergraduate degree in related field of study, verified by the	
Qualification Comission.	
Possibility of continuing studies: 3rd level studies (PhD)	Graduate profile, employability:
	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).
Indicate connection with University's mission and its development strategy:	
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.	

#### 1. Description

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

sicence 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. List of education modules:

# 4.1. List of obligatory modules

## 4.1.1. List of general education modules

## 4.1.1.1. Liberal-managerial subjects module

			We	ekly r	numbe	er of ho	ours	male for the strength of the	Numb	er of hours	Number	of ECTS points				Cours	se	
No.	Course code	Name of course	lec	cl	lab	pr	sem	symbol	ZZU	CNPS	total	BK classes	course	crediting	universit y-wide	practical	kind	type

## 4.1.1.2. Foreign languages module

			Weekly	' numb	er of h	ours	malle for the location of the	Numb	er of hours	Number	of ECTS points				Cours	se	
No.	Course code	Name of course	lec cl	lab	pr	sem	symbol	ZZU	CNPS	total	BK classes	course	crediting	universit y-wide	practical	kind	type

## 4.1.1.3. Sporting classes module

			We	ekly n	umbe	r of ho	urs		Numb	er of hours	Number o	of ECTS points				Cours	e	
No.	Course code	Name of course	lec	cl	lab	pr	sem	Field-of-study educational effect symbol	ZZU	CNPS	total	BK classes	course	Way of crediting	universit y-wide	practical	kind	type

## 4.1.1.4. Information technologies module

			We	ekly r	numbe	er of ho	ours	Field of study advectional offers	Numb	er of hours	Number o	of ECTS points				Cours	se	
No.	Course code	Name of course	lec	cl	lab	pr	sem	symbol	ZZU	CNPS	total	BK classes	course	crediting	universit y-wide	practical	kind	type

#### Altogether for general education modules

	Total nu	ımber	of hour	s	Total number	Total number	Total number	Numb er of
lec	cl	lab	pr	sem	hours	hours	points	points
0	0	0	0	0	0	0	0	0

#### 4.1.2. List of basic sciences modules

#### 4.1.2.1. Mathematics module

			We	eekly r	numbe	er of ho	ours		Numb	er of hours	Number o	of ECTS points				Cour	se	
No.	Course code	Name of course	lec	cl	lab	pr	sem	Field-of-study educational effect symbol	ZZU	CNPS	total	BK classes	course	way of crediting	universit y-wide	practical	kind	type
1	ELR041311W ELR042111W ELR042511W	Numerical methods in engineering	1					K2ETK_W02 K2ETK_K02	15	30	1	0,7	т	Z			PD	ОВ
2	ELR041311P ELR042111P ELR042511P	Numerical methods in engineering				1		K2ETK_UO2 K2ETK_K02	15	30	1	0,7	Т	Z		Ρ	PD	ОВ
		Total	1	0	0	1	0		30	60	2	1,4		-				

## 4.1.2.2. Physics module

			We	eekly n	numbe	er of ho	ours	male for the least set of the	Numbe	er of hours	Number o	f ECTS points				Cours	se	
No.	Course code	Name of course	lec	cl	lab	pr	sem	symbol	ZZU	CNPS	total	BK classes	course	way or crediting	universit y-wide	practical	kind	type
1	ELR043307W	Electrical Measurement Nonelectrical Values	1					K2ETK_W05 K2ETK_K02	15	60	2	1,4	Т	Z			PD	OB
2	ELR043307L	Electrical Measurement Nonelectrical Values			1			K2ETK_U04 K2ETK_K02	15	30	1	0,7	Т	Z		Р	PD	OB
		Total	1	0	1	0	0		30	90	3	2,1						

## 4.1.2.3. Chemistry module

			Wee	ekly n	umbe	er of ho	urs		Numbe	er of hours	Number o	of ECTS points				Cours	se	
No.	Course code	Name of course	lec	cl	lab	pr	sem	Field-of-study educational effect symbol	ZZU	CNPS	total	BK classes	course	crediting	universit y-wide	practical	kind	type

#### Altogether for basic sciences modules

	Total nu	ımber	of hour	rs	Total number	Total number	Total number	Numb er of
lec	cl	lab	pr	sem	hours	hours	noints	noints
2	0	1	1	0	60	150	5	3,5

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

## 4.1.3.1. Obligatory main-field-of-study module

			We	eekly r	numbe	er of h	ours			Numbe	er of hours	Number o	of ECTS points				Cour	se	
No.	Course code	Name of course	lec	cl	lab	pr	sem	m	Field-of-study educational effect symbol	ZZU	CNPS	total	BK classes	course	way of crediting	universit y-wide	practical	kind	type
1	ELR041310W	Selected problems of circuit theory	2					к	K2ETK_W01	30	90	3	2,1	Т	E			К	OB
2	ELR041310C	Selected problems of circuit theory		1				к	K2ETK_U01 K2ETK_K01	15	30	1	0,7	Т	Z		Р	К	OB
3	ELR042211W	Short-circuits in power systems	2					к	K2ETK_W03 K2ETK_K03	30	60	2	1,4	Т	Z			к	OB
4	ELR043209W	Electromechanical drive systems	2					к	K2ETK_W04	30	90	3	2,1	Т	Е			К	OB
5	ELR043209L	Electromechanical drive systems			1			к	K2ETK_U03 K2ETK_K01	15	30	1	0,7	Т	Z		Р	К	OB
		Total	6	1	1	0	0	)		120	300	10	7						

Altogether for main-field-of-study modules

	Total nu	ımber	of hour	s	Total number	Total number	Total number	Numb er of
lec	cl	lab	pr	sem	hours	hours	noints	noints
6	1	1	0	0	120	300	10	7

# 4.1.4. List of specialization modules

# 4.1.4.1. Obligatory specialization subjects module

			We	eekly r	numbe	r of ho	ours		Numbe	er of hours	Number o	f ECTS points				Cours	se	
No.	Course code	Name of course	lec	cl	lab	pr	sem	Field-of-study educational effect symbol	ZZU	CNPS	total	BK classes	course	crediting	universit y-wide	practical	kind	type
1	ELR041107W	Lightning and overvoltage protection	1					S2EEN_W09 K2ETK_K03	15	60	2	1,4	Т	Z			S	OB
2	ELR041107L	Lightning and overvoltage protection			1			S2EEN_U10 K2ETK_K03	15	30	1	0,7	Т	Z		Р	S	OB
3	ELR042112W	Fundamentals of digital power system protection and control	1					S2EEN_W04	15	90	3	2,1	Т	E			S	OB
4	ELR042112L	Fundamentals of digital power system protection and control			1			S2EEN_U04 K2ETK_K02 K2ETK_K06	15	30	1	0,7	Т	Z		Р	S	OB
5	ELR042113W	Digital Modelling in Power Systems	1					K2ETK_W03 S2EEN_W05	15	30	1	0,7	Т	Z			S	OB
6	ELR042113L	Digital Modelling in Power Systems			1			K2ETK_U01 S2EEN_U05 K2ETK_K02	15	30	1	0,7	Т	Z		Р	S	OB
7	ELR042212W	Power System Protection	2					S2EEN_W02 K2ETK_K07	30	60	2	1,4	Т	Z			S	OB
8	ELR042212L	Power System Protection			2			S2EEN_U01 S2EEN_U02 K2ETK_K07	30	90	3	2,1	Т	Z		Р	S	OB
9	ELR042213L	MV Network security			2			S2EEN_U11 K2ETK_K02	30	60	2	1,4	Т	Z		Р	S	OB
10	ELR042215W	Fiber optics	1					S2EEN_W07 K2ETK_K06	15	30	1	0,7	Т	Z			S	OB
11	ELR042215L	Fiber optics			1			S2EEN_U08 K2ETK_K06	15	30	1	0,7	Т	Z		Р	S	OB

12	ELR042311W	Computer Aided Design (CAD) in Energetic	2					S2EEN_W08 K2ETK_K01	30	60	2	1,4	Т	Z		S	OB
13	ELR042311L	Computer Aided Design (CAD) in Energetic			1			S2EEN_U09 K2ETK_K01	15	60	2	1,4	Т	Z	Р	S	ОВ
14	ELR042512W	Power Systems Operation and Control 1	2					S2EEN_W01 K2ETK_K06	30	90	3	2,1	Т	Е		S	OB
15	ELR042514L	Power Systems Operation and Control 2			2			S2EEN_U06 K2ETK_K06	30	60	2	1,4	Т	Z	Р	S	OB
16	ELR042515W	Modern technologies in electric power transmission and distribution	2					S2EEN_W01 S2EEN_W06	30	90	3	2,1	т	E		S	ОВ
17	ELR042515S	Modern technologies in electric power transmission and distribution					1	S2EEN_U07 K2ETK_U07 K2ETK_K06	15	30	1	0,7	т	Z	Р	S	ОВ
18	ELR042516W	Load management	1					S2EEN_W01 S2EEN_W10 K2ETK_K03	15	30	1	0,7	Т	Z		S	OB
19	ELR042517W	Energy management in energy systems	2					S2EEN_W10 K2ETK_K06	30	60	2	1,4	Т	Z		S	OB
20	ELR042521P	Control and monitoring systems in the power industry				2		S2EEN_U06 S2EEN_U07 K2ETK_K06	30	60	2	1,4	Т	Z	Р	S	OB
21	ELR043107W	Electromechanical Systems in Renewable Energy	2					S2EEN_W03	30	60	2	1,4	Т	Z		S	OB
22	ELR043107L	Electromechanical Systems in Renewable Energy			1			S2EEN_U03 K2ETK_K07	15	30	1	0,7	Т	Z	Р	S	OB
		Total	17	0	12	2	1		480	1170	39	27,3					

Altogether for specialization modules

					Total	Total	Total	Numb
	Total nu	imber	of hour	ſS	number	number	number	er of
		-	1	1	of ZZU	of CNPS	of ECTS	ECTS
lec	cl	lab	pr	sem	hours	hours	points	points
17	0	12	2	1	480	1170	39	27,3

## 4.2. List of optional modules

# 4.2.1. List of general education modules

## 4.2.1.1. Liberal-managerial subjects module

			W	eekly r	numbe	er of h	ours		Numb	er of hours	Number o	of ECTS points		14/au af		Cour	se	
No.	Course code	Name of course	lec	cl	lab	pr	sem	symbol	ZZU	CNPS	total	BK classes	course	crediting	universit y-wide	practical	kind	type
1	FLH051621S	Ethics in bussiness					1	K2ETK_U07 K2ETK_K06	15	60	2	1,4	Т	Z	0	Р	КО	W
2	PKH050421S	Social communication					1	K2ETK_U07 K2ETK_K06	15	60	2	1,4	Т	Z	0	Р	КО	W
3	PKH050521S	The art of public speaking					1	K2ETK_U07 K2ETK_K06	15	60	2	1,4	Т	Z	0	Р	КО	W
4	PRR041216W	Standardization and engineering law	1					K2ETK_W07 K2ETK_K03 K2ETK_K05	15	30	1	0,7	Т	Z	0		КО	W
5	PRR041217W	Engineering law	1					K2ETK_W07 K2ETK_K03 K2ETK_K05	15	30	1	0,7	Т	Z	0		КО	W
6	PRR041218W	Technical Standardization	1					K2ETK_W07 K2ETK_K03 K2ETK_K05	15	30	1	0,7	Т	Z	0		КО	W
7	ZMR042513W	Management of a Company	1					K2ETK_W06 K2ETK_K03 K2ETK_K06	15	60	2	1,4	Т	Z	0		КО	W
8	ZMR042521W	Management in the power industry	1					K2ETK_W06 K2ETK_K03 K2ETK_K06	15	60	2	1,4	Т	Z	0		КО	W
		Total	2	0	0	0	1		45	150	5	3,5						

#### 4.2.1.2. Foreign languages module

			We	eekly n	numbe	r of ho	urs		Numbe	er of hours	Number o	of ECTS points				Cours	se	
No.	Course code	Name of course	lec	cl	lab	pr	sem	Field-of-study educational effect symbol	ZZU	CNPS	total	BK classes	course	crediting	universit y-wide	practical	kind	type
1	JZL100709BKC	Foreign language B2+ or C1+		1				K2ETK_U05 K2ETK_K01	15	30	1	0,7	Т	Z	0	Р	ко	w
2	JZL100710BKC	Foreign language A1 or A2		3				K2ETK_U06 K2ETK_K01	45	60	2	1,4	т	Z	0	Ρ	ко	w
		Total	0	4	0	0	0		60	90	3	2,1						

#### 4.2.1.3. Sporting classes module

			We	ekly r	numbe	er of ho	ours		Numb	er of hours	Number o	of ECTS points	-			Cours	e	
No.	Course code	Name of course	lec	cl	lab	pr	sem	Field-of-study educational effect symbol	ZZU	CNPS	total	BK classes	course	crediting	universit y-wide	practical	kind	type

#### 4.2.1.4. Information technologies module

			We	eekly r	numbe	r of ho	urs	male for the state of the state	Numb	er of hours	Number o	of ECTS points				Cours	se	
No.	Course code	Name of course	lec	cl	lab	pr	sem	Field-of-study educational effect symbol	ZZU	CNPS	total	BK classes	course	crediting	universit y-wide	practical	kind	type

#### Altogether for general education modules

	Total nu	ımber	of hour	rs	Total number	Total number	Total number	Numb er of
lec	cl	lab	pr	sem	of ZZU hours	of CNPS hours	of ECTS	ECTS noints
2	4	0	0	1	105	240	8	5,6

## 4.2.2. List of basic sciences modules

#### 4.2.2.1. Mathematics module

			We	ekly n	numbe	er of h	ours		Numb	er of hours	Number o	f ECTS points				Cours	se	
No.	Course code	Name of course	lec	cl	lab	pr	sem	symbol	ZZU	CNPS	total	BK classes	course	crediting	universit y-wide	practical	kind	type

#### 4.2.2.2. Physics module

			Wee	ekly n	numbe	r of ho	urs	million and some standards	Numb	er of hours	Number o	of ECTS points				Cours	se	
No.	Course code	Name of course	lec	cl	lab	pr	sem	Field-of-study educational effect symbol	ZZU	CNPS	total	BK classes	course	crediting	universit y-wide	practical	kind	type

# 4.2.2.3. Chemistry module

ſ				We	ekly r	numb	er of h	ours		Numb	per of hours	Number	of ECTS points				Course	e	
	No.	Course code	Name of course	lec	cl	lab	pr	sem	symbol	ZZU	CNPS	total	BK classes	course	crediting	universit y-wide	practical	kind	type

#### Altogether for basic sciences modules

	Total nu	ımber	of houi	rs	Total number	Total number	Total number	Numb er of
lec	cl	lab	pr	sem	hours	hours	noints	points
0	0	0	0	0	0	0	0	0

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

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

			We	ekly n	umbe	er of ho	ours		Numb	er of hours	Number o	of ECTS points		Maria		Cours	se	
No.	Course code	Name of course	lec	cl	lab	pr	sem	symbol	ZZU	CNPS	total	BK classes	course	crediting	universit y-wide	practical	kind	type

## 4.2.3.2. Training module

			Wee	ekly n	numbe	r of ho	urs		Numb	er of hours	Number o	of ECTS points				Cours	se	
No.	Course code	Name of course	lec	cl	lab	pr	sem	Field-of-study educational effect symbol	ZZU	CNPS	total	BK classes	course	crediting	universit y-wide	practical	kind	type

## 4.2.3.3. Diploma dissertation module

			We		Weekly number of hours		ours		Numbe	er of hours	Number	of ECTS points				Cour	se	
No.	Course code	Name of course	lec cl lab pr sem symbol	Field-of-study educational effect symbol	ZZU	CNPS	total	BK classes	course	way of crediting	universit y-wide	practical	kind	type				
1	ELR041159D ELR042159D ELR043159D	Master's thesis				12		S2EEN_U15 K2ETK_K04 K2ETK_K06	180	540	18	12,6	т	Z		Ρ	S	w
2	ELR042158S	Diploma seminar					2	S2EEN_U14 K2ETK_K06	30	90	3	2,1	Т	Z		Р	S	W
		Total	0	0	0	12	2		210	630	21	14,7						

Altogether for main-field-of-study modules

	Total nu	ımber	of hour	s	Total number	Total number	Total number	Numb er of
lec	cl	lab	pr	sem	hours	hours	noints	noints
0	0	0	12	2	210	630	21	14,7

## 4.2.4. List of specialization modules

## 4.2.4.1. Specialization subjects module

			We	eekly n	umbe	r of ho	ours		Number of hours Number of ECTS point		of ECTS points				Course			
No.	Course code	Name of course	lec	cl	lab	pr	sem	Field-of-study educational effect symbol	ZZU	CNPS	total	BK classes	course	crediting	universit y-wide	practical	kind	type
1	ELR041109W	High Voltage Measurement and diagnostics of insulation	2					S2EEN_W13 K2ETK_K03 K2ETK_K06	30	60	2	1,4	Т	Z			S	W
2	ELR042114W	Logic design	2					S2EEN_W11	30	60	2	1,4	Т	E			S	W
3	ELR042114L	Logic design			1			S2EEN_U12 K2ETK_K02 K2ETK_K06 K2ETK_K07	15	30	1	0,7	т	Z		Р	S	w
4	ELR042115W	Artificial intelligence methods in power system protection and control	2					S2EEN_W11	30	60	2	1,4	т	E			S	w
5	ELR042115L	Artificial intelligence methods in power system protection and control			1			S2EEN_U12 K2ETK_K02 K2ETK_K06	15	30	1	0,7	т	Z		Р	S	w
6	ELR042116W	Peripheral devices of Programmable Logic Controllers	1					S2EEN_W12	15	30	1	0,7	Т	Z			S	W
7	ELR042116L	Peripheral devices of Programmable Logic Controllers			1			S2EEN_U13 K2ETK_K02 K2ETK_K07	15	30	1	0,7	Т	Z		Р	S	W
8	ELR042214W	PLC and Wireless Communication for Monitoring and Metering	2					S2EEN_W11 K2ETK_K06	30	60	2	1,4	Т	Е			S	W
9	ELR042214S	PLC and Wireless Communication for Monitoring and Metering					1	S2EEN_U12 K2ETK_K06	15	30	1	0,7	Т	Z		Р	S	W
10	ELR042312W	Intelligent electrical installations – computer planning and applications	1					S2EEN_W12	15	30	1	0,7	т	Z			S	w
11	ELR042312P	Intelligent electrical installations – computer planning and applications				1		S2EEN_U13 K2ETK_K06	15	30	1	0,7	т	Z		Р	S	w
12	ELR042411W	Electric shock protection systems in high-voltage installations	2					S2EEN_W13 K2ETK_K01	30	60	2	1,4	Т	Z			S	W
13	ELR042412W	Modern electrical devices	2					S2EEN_W13 K2ETK_K06	30	60	2	1,4	Т	Z			S	W
14	ELR042413W	Environmental aspects of the development of the electric power system	2					S2EEN_W13 K2ETK_K03	30	60	2	1,4	т	Z			S	w
15	ELR042414W	Operation and maintenance of electrical equipment	2					S2EEN_W13 K2ETK_K06	30	60	2	1,4	Т	Z			S	W
16	ELR042518W	Automation of Electric Power Systems	2					S2EEN_W11	30	60	2	1,4	Т	E			S	W
17	ELR042518L	Automation of Electric Power Systems			1			S2EEN_U12 K2ETK_K06	15	30	1	0,7	Т	Z		Р	S	W
18	ELR043218W	Power electronics converters in energetics	2					S2EEN_W11	30	60	2	1,4	Т	E			S	W
19	ELR043218L	Power electronics converters in energetics			1			S2EEN_U12 K2ETK_K07	15	30	1	0,7	Т	Z		Р	S	W
		Total	5	0	2	0	0		105	210	7	4,9						

#### Altogether for specialization modules

	Total nu	ımber	of hour	rs	Total number	Total number	Total number	Numb er of
lec	cl	lab	pr	sem	hours	hours	noints	noints
5	0	2	0	0	105	210	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:	magis	ster							
Number of diploma dissertation semesters	Number of ECTS points	Code							
1	21	ELR042158S ELR041159D ELR042159D ELR043159D							
	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:

14,7

## 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)

63 ECTS

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

Number of ECTS points for obligatory subjects	5
Number of ECTS points for optional subjects	0
Total number of ECTS points	5

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

Number of ECTS points for obligatory subjects	21
Number of ECTS points for optional subjects	28
Total number of ECTS points	49

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)

36 ECTS

#### 11. Range of diploma dissertation

#### 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:

Date

.....

.....

Name and surname, signature of student representative

.....

.....

Date

Dean's signature